DOE/EA-1809

DRAFT
ENVIRONMENTAL ASSESSMENT

FOR

WHITE EARTH NATION WIND ENERGY PROJECT II
MAHNOMEN COUNTY, MINNESOTA,
WHITE EARTH INDIAN RESERVATION, USA

U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
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ACRONYMS AND ABBREVIATIONS

APE	area of potential effect
AQI	Air Quality Index
BBS	breeding bird survey
BCI	Bat Conservation International
CFR	*Code of Federal Regulations*
CRP	Conservation Reserve Program
dBA	decibel on the A-weighted scale, used to approximate the human ear's response to sound
DOE	U.S. Department of Energy
EA	Environmental Assessment
EMF	electromagnetic field
FAA	Federal Aviation Administration
FPPA	*Farmland Protection Policy Act*
FR	Federal Register
MBTA	Migratory Bird Treaty Act
MPCA	Minnesota Pollution Control Agency
MNDNR	Minnesota Department of Natural Resources
MStP&SSM / Soo Line /CP Railway	Minneapolis, St. Paul & Sault Ste. Marie Railway / Soo Line Railroad / Canadian Pacific Railway
NEPA	*National Environmental Policy Act*
NHPA	*National Historic Preservation Act*
NRCS	Natural Resources Conservation Service
NRHP	*National Register of Historic Places*
NTIA	National Telecommunications and Information Administration
PM_{10}	particulates with an aerodynamic diameter less than or equal to a nominal 10 micrometers
SHPO	State Historic Preservation Office(r)
THPO	Tribal Historic Preservation Office(r)
USCB	U.S. Census Bureau
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WMA	wildlife management area
White Earth Nation	White Earth Band of Chippewa Indians
WPA	waterfowl production area

1. INTRODUCTION

1.1 National Environmental Policy Act

The *National Environmental Policy Act* [42 United States Code (U.S.C.) 4321 et seq.; NEPA], the Council on Environmental Quality's NEPA regulations [40 Code of Federal Regulations (CFR) Parts 1500 to 1508], and the U.S. Department of Energy's (DOE) NEPA implementing procedures (10 CFR Part 1021) require that DOE consider the potential environmental impacts of a Proposed Action before making a decision. This requirement applies to decisions about whether to provide different types of financial assistance to States, Tribes, and private entities.

In compliance with these regulations, this Environmental Assessment (EA):

- Examines the potential environmental impacts of the Proposed Action and the No-Action Alternatives;
- 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 environment. This EA provides DOE and other decision makers the information needed to make an informed decision about funding the installation, operation, and eventual decommissioning of the proposed White Earth Nation Wind Energy Project II. 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 the project would not proceed. Only the Proposed Action and the No-Action alternatives are considered in this EA.

1.2 Background

The White Earth Nation, or White Earth Band of Chippewa Indians, as represented by the White Earth Reservation Tribal Council, seeks to develop viable wind resources within its boundaries to power its tribal facilities and access commercial markets for income generation from electric power. In 2009, DOE provided funding for a single turbine wind energy project at White Earth Village, Minnesota (DOE/EA-1648); this project is currently under construction with an expected completion date of June – July 2012. White Earth Nation proposes a second wind energy project, which this EA describes and evaluates. Based on action by the United States (U.S.) Congress, DOE has funding available to support this proposed project. This congressionally directed funding would allow the White Earth Nation to build on the findings of a prior DOE First Steps grant in developing available wind resources. This second project is in addition to the ongoing DOE-funded wind turbine project at White Earth Village.

The White Earth Reservation encompasses the entire land area of Mahnomen County, the northernmost two tiers of townships in Becker County, and the western two tiers of townships in Clearwater County, all in Minnesota (Figure 1-1). The Reservation is approximately 990,000 acres, with approximately 10 percent of the land area under direct control of the Tribe. Considerable ecological diversity exists within

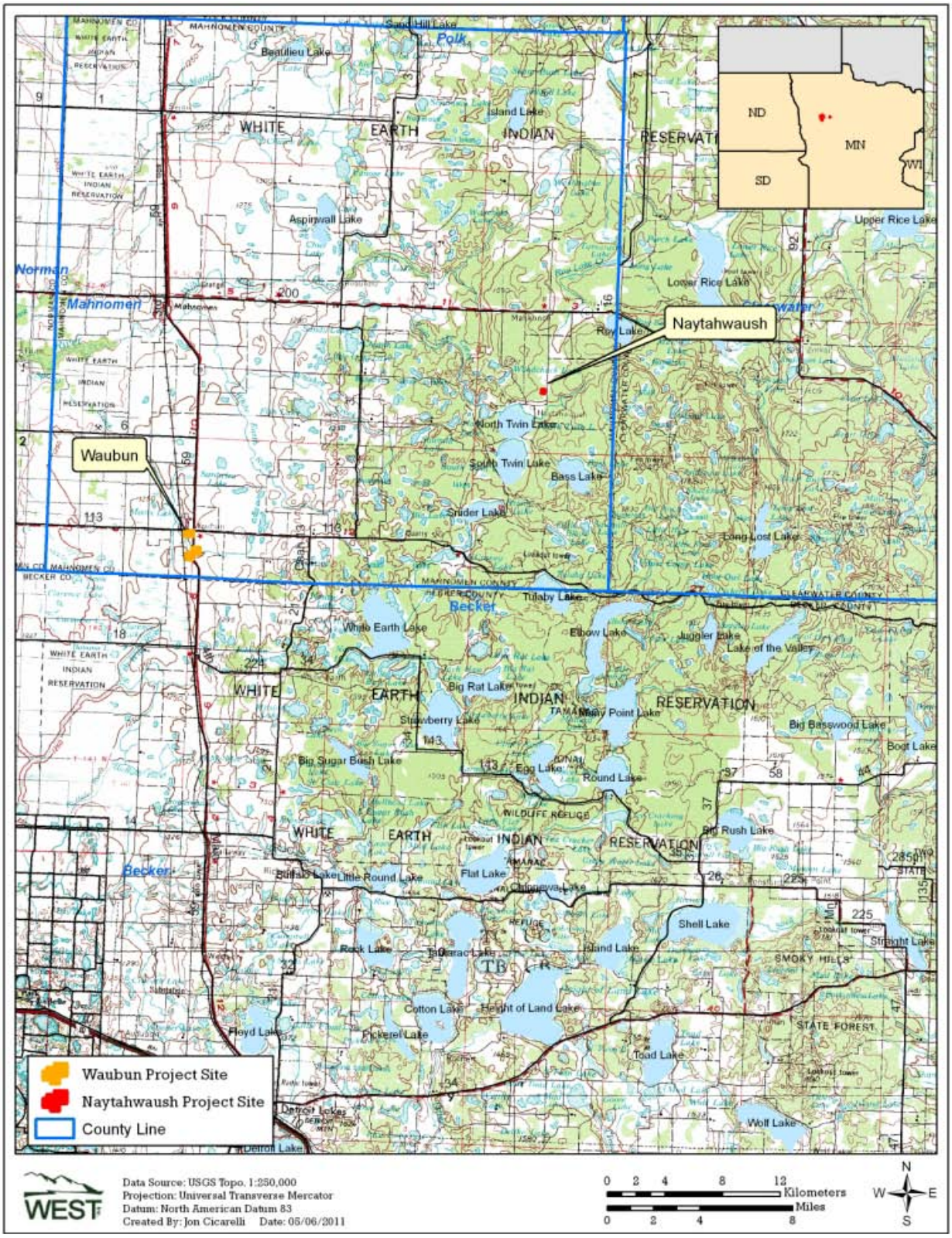

Figure 1-1. General Project Location

the Reservation: the western third is agricultural/prairie, the middle third is transitional from agricultural to deciduous and pine forest, and the eastern third is coniferous forest. About 10,000 of the approximately 20,000 enrolled tribal members live on or near the Reservation and constitute about 40 percent of the population within its boundaries.

1.3 Purpose and Need

1.3.1 DOE's Purpose and Need

DOE's purpose and need is to ensure that congressionally directed funds are used for activities that meet Congress' statutory aims to improve energy efficiency, reduce dependence on imported oil, decrease energy consumption, and promote renewable energy. However, it is not DOE's role to dictate to the White Earth Nation how to allocate its funds among these objectives or to prescribe the projects it should pursue.

1.3.2 White Earth Nation's Purpose and Need

White Earth Nation's purpose and need is to increase the utilization of renewable energy technology in meeting the energy needs of the White Earth Reservation Tribal Government and tribal community and to offset the Reservation's overall consumption of fossil fuels with renewable wind power. Recent national and regional forecasts project increasing consumption of electrical energy to continue into the foreseeable future, thus requiring development of new sources to meet the increasing energy demand.

The primary beneficiaries of this project would be the White Earth Tribal Government and residents of the Reservation. The Tribal Government would benefit from low-cost wind energy, potential revenue from the sale of the wind energy, greater utilization of renewable energy, and reduced reliance on fossil fuel. The residents of the Reservation would benefit from potentially better air quality, which is currently impacted by fossil fuel-driven electrical generation.

1.4 Public and Agency Involvement

1.4.1 DOE's Public Scoping Process

In accordance with the applicable regulations and policies, DOE's public scoping process for an EA involves providing notification and comment opportunities for host States and Tribes. DOE may also provide notification and comment opportunities for other interested people. DOE considers all comments received and makes revisions, if appropriate, before issuing the EA.

This section describes the public involvement opportunities for this project undertaken by both the White Earth Nation and DOE.

1.4.2 DOE's Public Involvement

In preparation of this EA, DOE sent scoping notices to stakeholders and interested parties including local, State, and Federal agencies, organizations, and adjacent landowners to solicit comment. Notice of public scoping, via postcards, were sent on December 3, 2010, directing stakeholders to DOE's Golden Field Office's Public Reading Room where DOE published the scoping letter for public review. The scoping letter described the proposed project and requested assistance in identifying potential issues for evaluation in the EA. The public comment period closed on January 4, 2011. Appendix A contains a copy of the notice of public scoping postcards, the scoping letter, and the stakeholder distribution list. In addition to

the scoping postcards that were sent out, DOE published a Notice of Public Scoping in the *Mahnomen Pioneer* newspaper on December 9 and 16, 2010, and the *Detroit Lakes Tribune* on December 15 and 22, 2010. Copies of these notices are also provided in Appendix A.

One scoping comment was received via email in response to the scoping notices. The comment questioned the use of Federal funds by the Tribe for an existing wind turbine in Callaway, Minnesota, that appears to be non-operational. The turbine referred to in the comment, however, is a private turbine not owned or operated by the White Earth Nation.

Pursuant to Section 7 of the *Endangered Species Act* and Section 106 of the *National Historic Preservation Act* (NHPA), DOE consulted with the U.S. Fish and Wildlife Service (USFWS), Minnesota State Historic Preservation Office (SHPO), and the White Earth Tribe Historic Preservation Officer (THPO) regarding the proposed project. Because a "no effect" determination was made for the grey wolf, the only federally listed threatened or endangered species with potential to occur in the project area, formal consultation with the USFWS was not necessary and not conducted (per 50 CFR §402.13). The SHPO concurred that "no effect" or "no adverse effect" would occur to historic properties eligible for listing in the National Register of Historic Places located within the area of potential effect. The THPO determined that no known cultural sites would be impacted by the proposed project. Copies of the consultation letters and response letters are included in Appendix B. A consultation letter was also sent to the Bureau of Indian Affairs requesting participation during the NEPA process (Appendix B). No response from this agency has been received to this date.

1.4.3 White Earth Nation's Public Involvement

The White Earth Nation published two notices in the local newspaper *Anishinaabeg Today* - one in the April 7, 2010, edition and one in the September 1, 2010, edition - to inform the local community about the proposed project. Copies of the notices are provided in Appendix A.

2. PROPOSED ACTION AND ALTERNATIVES

2.1 DOE's Proposed Action

DOE's Proposed Action is to allow White Earth Nation to use congressionally directed funds to assist in financing the White Earth Wind Energy Project II on the White Earth Reservation in western Minnesota.

2.2 White Earth Nation's Proposed Project

The White Earth Nation's Wind Energy Project II (proposed project) involves up to four wind turbines at two sites that would be partially funded by DOE. The two sites are near the towns of Waubun and Naytahwaush on the White Earth Reservation in Mahnomen County in western Minnesota (Figure 1-1).

White Earth Nation is considering various wind turbines; the sections below describe the potential configurations for the turbines at the two sites. The Tribe is considering three sizes of wind turbines for the project: 10-kilowatt, 40-kilowatt, and 300-kilowatt wind turbines. Specific wind turbine equipment has not been selected; however, the Tribe is considering wind turbines of European origin, remanufactured and improved by companies with wind industry electrical/installation experience.

White Earth Nation would install the wind turbines on self-supporting monopole or lattice towers (i.e., no guy wires would be used). The hub heights would range from 80 to 160 feet above ground level, and the total height would range from 105 to 187 feet, depending on the turbine used. The height of the10-kilowatt wind turbine would measure 130 feet to the hub and 141 feet to the blade tip at its highest position. The height of the 40-kilowatt wind turbine would range from 80 to 160 feet to the hub and 105 to 187 feet to a blade tip at its highest position, depending on the model used. The height of the 300-kilowatt wind turbine would measure 102 feet to the hub and 148 feet to a blade tip at its highest position.

The following subsections describe the two proposed project locations, referred to as the Waubun and Naytahwaush sites, and the project facilities proposed for the sites.

2.2.1 Project Sites

2.2.1.1 Waubun

The Waubun site consists of three subsites (A, B, and C) located south of Waubun along Highway 59 (Figure 2-1). Subsite A is owned by the City of Waubun and comprises approximately 35 acres of land directly south of the community on the west side of Highway 59. The land is currently leased for row crop farming and serves as a buffer between a residential area and the town's waste treatment lagoon. Subsite B is 46 acres and approximately 0.38 mile south of subsite A on the east side of Highway 59. Subsite B, located on tribal trust land, currently contains an abandoned sawmill; the Ojibwa Building Supply and the Waubun Solid Waste Transfer Station, both tribal enterprises. The eastern and southern portions of the site consist of Tribe-owned and leased agricultural land. Private agricultural land is located to the north of subsite B and the Waubun Waterfowl Production Area (WPA) is adjacent to the site to the east (Figure 2-1). Subsite C is approximately 38 acres and is located 0.43 mile south of subsite A on the west side of Highway 59. Subsite C consists of maintained open space on tribal trust land; an access road and the White Earth Housing Authority headquarters complex also occur within the site, west of the proposed turbine location. Waubun State Wildlife Management Area (WMA) is adjacent to subsite C to the west (Figure 2-1).

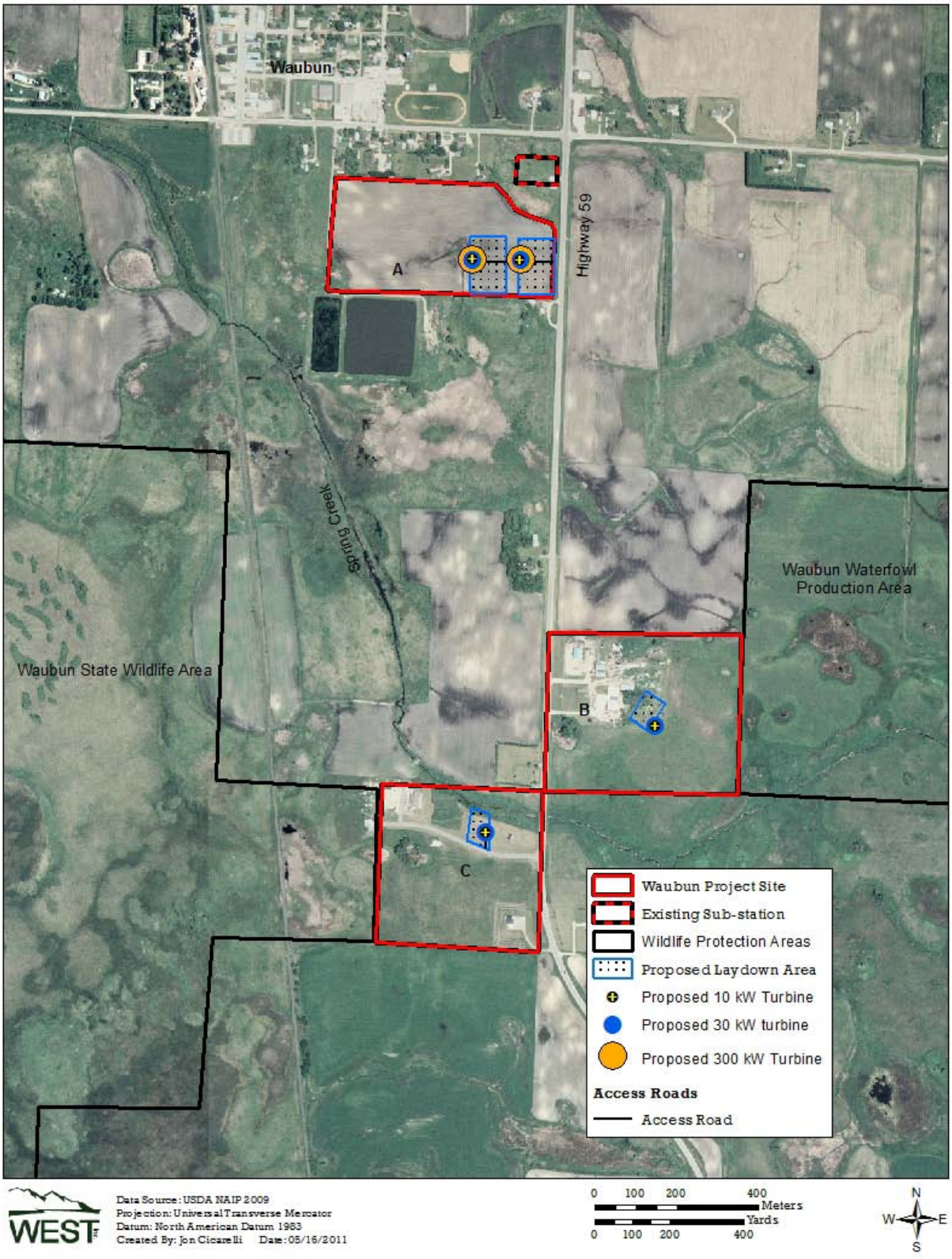

Figure 2-1. Waubun Site

At the Waubun site, White Earth Nation is proposing to install up to four wind turbines; one or two 10-kilowatt or 40-kilowatt wind turbines would be located at subsite A; one 10-kilowatt or 40-kilowatt wind turbine would be located at subsite B; and one 10-kilowatt or 40-kilowatt wind turbine would be located at subsite C. If the Tribe selected a 300-kilowatt wind turbine, only Waubun subsite A would be considered and only one such turbine would be installed.

Subsite A

At subsite A, White Earth Nation would install one or two wind turbines. If one wind turbine is installed, it could be a 10-, 40-, or 300-kilowatt unit. If two wind turbines are installed; 10-kilowatt or 40-kilowatt units would be used. If one wind turbine is installed, it would be located approximately 300 feet west of Highway 59 and 300 feet north of the southern boundary of the subsite. If two wind turbines are installed, the second turbine would be located between 325 and 430 feet west of the first wind turbine, as described. The Tribe would construct a new, unpaved access road, approximately 10 feet wide and ranging in length from 300 to 730 feet, depending on the number of turbines constructed. Construction lay-down areas would be approximately 1 acre per turbine for the 10-kilowatt and 40-kilowatt units; a 3-acre lay-down area would be needed if a 300-kilowatt unit is selected. Electric power would be transported underground from the subsite north to the existing Otter Tail Power Company electrical substation south of Waubun (Figure 2-1), a distance of approximately 1,275 feet.

Subsite B

At subsite B, White Earth Nation would install one wind turbine, either a 10-kilowatt or 40-kilowatt unit. The wind turbine would be installed approximately 850 feet east of Highway 59 and 350 feet southeast of the nearest building (Figure 2-1). This location would require construction of a new, unpaved, 10-foot-wide access road, approximately 350 feet long. A 1-acre laydown area would be required.

Electric power from the wind turbine would be transported underground from 300 to 350 feet to the existing overhead electrical line feed to the existing buildings on the site. The electric power would be used by the onsite facilities or sold to the Wild Rice Electric Cooperative at the site.

Subsite C

At subsite C, White Earth Nation would install one wind turbine, either a 10-kilowatt or 40-kilowatt unit. The wind turbine selected would be installed approximately 400 feet east of the administrative offices of the White Earth Housing Authority, 430 feet west of Highway 59, and 150 feet north of the existing paved access road (Figure 2-1). The Tribe would construct a new, unpaved access road, approximately 10 feet wide and 150 feet long, to connect the turbine site to the existing access road. A 1-acre lay down area would be required. Electric power from the wind turbine would be routed underground approximately 350 feet to the White Earth Housing Authority administrative building and any excess would be sold back to the Wild Rice Electric Cooperative through the existing building electrical connection to the utility.

2.2.1.2 Naytahwaush Site

The Naytahwaush site is on approximately 6 acres of maintained open space on tribal trust land adjacent to a softball field between the Naytahwaush Sports Complex and County Road 4 (Figure 2-2). Several scattered residences are located northeast, east, and southwest of the project area; the nearest is approximately 525 feet from the proposed wind turbine location.

Figure 2-2. Naytahwaush Site

White Earth Nation would install one 10-kilowatt or 40-kilowatt wind turbine at the site only if all four wind turbines were not installed at the Waubun site. The wind turbine would be installed approximately 135 feet west of County Road 4. The electric power would be transported underground to the Naytahwaush Sports Complex, tie into the electrical feed, and be used by the facility or sold to the Wild Rice Electric Cooperative. No special access road would be needed. A lay down area of approximately 1 acre adjacent to the wind turbine site would be required.

2.2.2 Construction and Installation

White Earth Nation would start construction after all necessary Federal and State permits and approvals were obtained (see Section 2.5). Construction activities would be based at the lay down areas. Construction would involve the following tasks: (1) surveying and constructing access roads and turbine pads, (2) constructing a foundation for the towers, (3) trenching for underground utilities, (4) placing underground electrical and communications cables in trenches, (5) connecting to the transformer, (6) transporting tower sections to the site and assembling the towers with a crane, (7) installing nacelle, rotor, and other turbine equipment, (8) final testing, and (9) final road grading, erosion control, and site cleanup. Further details on the construction phases are found below.

2.2.2.1 Access Roads

New access roads would be constructed at the three Waubun subsites; none would be necessary at the Naytauwaush site. The finished width of the access roads would be approximately 10 feet, but would be wider (up to 20 feet) during construction to allow access of heavy equipment. The access roads would be surfaced with gravel or crushed stone, depending upon what is locally available, for all-season access. Topsoil would be salvaged from road areas and replaced on roadside slopes and other temporarily disturbed areas following construction to provide a reclaimed growth medium. Table 2-1 shows temporary and permanent disturbance estimates for access roads at the Waubun subsite.

Table 2-1. Temporary and Permanent Disturbance at the Waubun Site – Access Roads

Waubun Subsite	Temporary Disturbance (acres)	Permanent Disturbance (acres)
A	Up to 0.34	Up to 0.17
B	0.16	0.08
C	0.07	0.03

2.2.2.2 Turbine Pads

The circular turbine base would be constructed of concrete poured into a metal form. The foundation would depend on whether a lattice or monopole tower is used. For the lattice tower, three piers 4-foot in diameter to which the tower is bolted are spaced in a tripod formation within a 24 foot diameter pad of approximately one-half foot depth. Each pier extends 10 foot deep into the ground and sits on a 2 foot high and 12 foot diameter concrete base. Alternately, for the monopole tower a 13 foot square by 13 foot deep poured concrete foundation has a 5 foot diameter bolt ring centered in the middle and 40 13-foot long bolts anchored deep in the foundation. The area for the turbine base would be excavated with a large backhoe or similar heavy equipment and the soil would be removed from the site or used for road construction in accordance with all applicable regulations and permit conditions. The total disturbed area (permanent disturbance) for the turbine pad and associated structures is expected to be less than 0.25 acre

per turbine for the life of the project. Table 2-2 shows permanent disturbance estimates for the turbine pad by site.

Table 2-2 Permanent Disturbance – Turbine Pads

Site	Permanent Disturbance (acres)
Waubun	
Subsite A	Up to 0.5
Subsite B	0.25
Subsite C	0.25
Naytahwaush	0.25

2.2.2.3 Turbine Installation

The metal turbine towers would arrive via truck in two or three pieces and be assembled onsite. The turbine nacelle and three blades would arrive separately via truck. 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 the anchor bolts; guy wires or other external support systems would not be used.

Temporary disturbance for wind turbine installation would be the laydown areas shown in Figures 2-1 and 2-2. Laydown area size would be 1 acre for the 10-kilowatt and 40-kilowatt wind turbines and 3 acres for the 300-kilowatt wind turbine. No permanent disturbance would be associated with turbine installation. Table 2-3 shows temporary disturbance estimates for turbine installation by site.

Table 2-3. Temporary Disturbance – Turbine Installation

Site	Temporary Disturbance (acres)
Waubun	
Subsite A	Up to 4
Subsite B	1
Subsite C	1
Naytahwaush	1

2.2.2.4 Transmission

Project transmission lines would be buried using conventional installation/trenching techniques to a depth of 48 inches, well below the 24 inches required by the National Electrical Code (NEC 300.5; as directed by the Minnesota Electrical Act). Disturbance associated with the transmission lines would be temporary, and the disturbance would be restored to the same condition that existed before the excavation, per Minnesota Administrative Rules 7819.1100, and reseeded with native species. Table 2-4 shows disturbance estimates for the transmission lines by site, assuming a 10-foot wide temporary construction corridor.

Table 2-4. Temporary Disturbance - Transmission Lines

Site	Temporary Disturbance (acres)
Waubun	
Subsite A	0.3
Subsite B	0.08
Subsite C	0.03
Naytahwaush	0.10

2.2.2.5 Construction Personnel, Schedule, and Facilities

Project construction would require five to six construction workers; construction is anticipated to last two months. During construction, the contractor would provide necessary facilities consistent with similarly sized construction projects, including 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 onsite to power vehicles and other equipment. Turbine oil, used as a lubricant, would also be onsite. No anticipated hazardous or flammable materials are expected to be stored onsite.

2.2.3 Operation

During initial operations, there would be an onsite, full-time technician; however, after the initial testing, more periodic (weekly) maintenance would be conducted to maximize performance and detect problems. The wind turbines would also be monitored from a remote location, as recommended by the turbine supplier, through a computerized control system. 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 uptower (that is, without using a crane to remove the turbine from the tower). 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.

2.2.4 Decommissioning

Pursuant to any final negotiated financial assistance agreement between White Earth Nation and DOE, White Earth Nation would retain title to the wind turbines and associated infrastructure and would be responsible for any decommissioning. The wind turbines and other infrastructure are expected to have a useful life of at least 20 years. The trend in the wind energy industry has been to “repower” older wind energy projects by upgrading equipment with more efficient turbines. It is possible that the project could be upgraded with more efficient equipment and would have a useful life longer than 20 years. However, if the project were terminated, the turbine and other infrastructure would be decommissioned and all facilities would be removed to a depth of approximately 3 feet below grade; unsalvageable material would be disposed of at authorized 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 all disturbed areas with native species. Decommissioned roads would be reclaimed or left in place, at the discretion of the White Earth Nation.

2.2.5 White Earth Nation's Committed Resource Protection Measures

As part of the proposed project, White Earth Nation commits to the following resource protection measures and procedures to minimize or avoid environmental impacts.

2.2.5.1 Cultural Resources

- White Earth Nation will have its staff archaeologist onsite during all excavation activities. This is standard practice for the White Earth Nation during excavations on federally funded projects.

- If cultural resources are discovered during construction, the construction supervisor will halt construction activities and immediately notify the SHPO and appropriate officials with the White Earth Nation, who would then notify DOE within 24 hours of discovery. Ground-disturbing activities will immediately cease, and the SHPO and THPO will be contacted for resolution and further instruction regarding additional studies and/or potential mitigation measures required in accordance with the NHPA.

- If a site could not be avoided, a detailed cultural resources recovery and mitigation plan will be developed and implemented after approval from the DOE, SHPO, and tribal authorities.

2.2.5.2 Visual Quality

- If shadow flicker problems are reported, the White Earth Nation will notify DOE and use commercially reasonable efforts to remedy the problem on a case-by-case basis, such as tree plantings or awning installation.

2.2.5.3 Noise

To minimize the impacts of noise on nearby residences and adjoining properties, White Earth Nation will:

- Properly maintain vehicles and install mufflers.

- Limit construction activities to 7:00 a.m. to 8:00 p.m.

- Use a modern turbine with low noise levels (all units under consideration for the proposed project meet this criteria).

2.2.5.4 Soils and Vegetation

During construction, White Earth Nation will follow these guidelines to minimize impacts to soils and vegetation:

- Limit construction activities to the permanent and temporary disturbance areas described above.

- Require the construction contractor to provide erosion and sediment control measures in accordance with Federal, State, and local laws and regulations.

- Prohibit off-road travel and other access outside of the cleared workspace.

- Obtain and adhere to appropriate storm water permit.

- Co-locate transmission lines, power cables, communication cables, and roads where possible.

During reclamation, operation, and decommissioning, the White Earth Nation will implement the following actions to minimize impacts to soils and vegetation:

- Restore all areas not needed for permanent operation of the proposed project to the original or near-original topographic features and reseed with a native seed stock.

- Monitor and control invasion of noxious weeds.

2.2.5.5 Land Use

At each of the sites, construction will occur within areas previously disturbed for agricultural purposes or in maintained and unmaintained fields. To minimize impacts to existing surrounding land uses, the White Earth Nation will limit construction activities to the permanent and temporary disturbance areas described above.

2.2.5.6 Air Quality

The White Earth Nation will ensure that:

- Dust abatement techniques will be employed during construction and operation to minimize fugitive dust from leaving the site. Such techniques may include, but not be limited to, watering exposed soils and placing gravel on roads.

- All equipment is properly maintained to minimize exhaust emissions.

2.2.5.7 Water Resources

To minimize loss or degradation to water resources, White Earth Nation will adhere to the following measures:

- Avoid wetlands when determining final turbine location, road construction, and placement of underground lines (the proposed turbine sites meet this criterion).

- Require the construction contractor to provide erosion and sediment control measures in accordance with Federal, State, and local laws and regulations.

- Obtain a storm water permit prior to construction.

- Dewatering may be necessary during excavation to maintain the groundwater level at a depth of between 1 to 2 feet below the bottom of the foundation, depending on soil type. Dewatering would be performed by pumping from sumps at the bottom of the excavation. Dewatering would be a temporary activity (less than 30 days) and has been determined would not affect nearby fens.

2.2.5.8 Wildlife

The White Earth Nation is committed to minimizing impacts to wildlife and will implement the following:

- Conduct training for all construction workers, instructing them to avoid harming or disturbing any wildlife, regardless of species, and to brief them on applicable laws and regulations.

- Limit construction activities to the permanent and temporary disturbance areas described above.

- Install all transmission and other cables underground to the greatest extent possible.

- Develop and implement a post-construction bird and bat fatality monitoring plan under the guidance of the USFWS and approval of DOE. At this stage, White Earth Nation is committed to developing and implementing the plan. Details, such as how long the monitoring would take place will be provided in the plan.

- If a lattice tower is used, the portion of the tower within the rotor-swept area would be wrapped in a fine wire mesh to eliminate perching opportunities.

2.2.5.9 Health and Safety

To minimize the impacts to public health and safety, the White Earth Nation will:

- Ensure that the contractor provide clean, safe drinking water, waste disposal services, portable toilets, and other items to meet basic human needs during construction of the project. All waste will be collected and properly disposed of offsite.

- Ensure that the contractor fuels and lubricates equipment and motor vehicles in a manner that protects against spills and evaporation. The White Earth Nation will require the contractor to dispose of unused lubricants and oils in an approved manner and location. White Earth Nation will also require the contractor to immediately clean up any spills of fuel, oil, grease, or other potentially toxic substances and discard the contaminated soils in an approved manner and location.

- Fence and flag any open pits or holes left unattended.

- Place signage to keep the public out of the work area.

- Ensure the construction contractor has a prepared and implements a Health and Safety Plan per Occupational Safety and Health Administration (OSHA) requirements before commencing work.

2.3 DOE's No-Action Alternative

Under the No-Action Alternative, DOE would not authorize White Earth Nation to use Federal funds for the proposed wind energy project. DOE assumes for purposes of this EA that the project would not proceed without this funding. This assumption allows a comparison between the potential impacts of the project as proposed and the impacts of not proceeding with the project.

2.4 Sites Considered but Not Carried Forward

The White Earth Nation examined several sites for wind turbine placement in addition to the Waubun and Naytahwaush sites. A site near the City of Mahnomen was initially considered for wind turbine placement; this site was eliminated from further consideration due to proximity to an airport. A site near the community of Pine Point in Becker County was considered; this site was eliminated due to indirect visual historic property concerns. The proposed wind turbine at Pine Point would introduce a new out-of-scale element into the landscape and result in a potential visual effect to the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall. The integrity of the setting may be negatively altered by this action; therefore, this site was dropped by White Earth Nation from further consideration.

2.5 Required Permits, Approvals, and Notifications

Prior to construction, all required Federal, State, and local permits and approvals will be obtained and notifications made, as required. The required permits and approvals are listed in Table 2-5.

Table 2-5. Federal, State, and Local Permits, Approvals, and Notifications

Agency	Permit/Approval/Notification
Federal Aviation Administration (FAA)	Notification is required if any turbine models selected for the project are more than 200 feet above ground level. None of the wind turbines considered for this project is more than 200 feet, total height.
USFWS	*Endangered Species Act*, *Migratory Bird Treaty Act* (MBTA), and *Bald and Golden Eagle Protection Act* consultation.
Minnesota SHPO	Section 106 NHPA consultation.
Minnesota Pollution Control Agency (MPCA)	Construction Storm Water Permit
Minnesota Department of Transportation	Oversize/Overweight Permit for operation of vehicles greater than 13 feet 6 inches in height, 8 feet 6 inches in width, and various lengths generally greater than 45 feet (depending on type of vehicle) on Minnesota's highways
Mahnomen County	No permit/approval/notification required because the project is within area zoned by City of Waubun
City of Waubun	Land Use Permit

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

This chapter examines the potential environmental impacts of the proposed project and the No-Action Alternative on affected environmental resources.

3.1 No-Action Alternative

Under the No-Action Alternative, DOE would not authorize the use of Federal funds for the design, construction, and/or operation of the proposed wind energy project and thus assumes, for purposes of this EA, that the project would not go forward without such funding. Therefore, there would not be any impacts to the resource areas analyzed in Section 3.3 of this EA.

3.2 Considerations Not Carried Forward for Further Analysis

Consistent with NEPA implementing regulations and guidance, DOE focuses the analysis in an EA on topics with the potential for significant environmental impact. For the reasons discussed below, the proposed project is not expected to have any measurable effects on certain resource areas; therefore, these resource areas are not carried forward for further analysis.

3.2.1 Waste Management

Solid wastes that are anticipated to be generated during construction include equipment packaging materials and construction-related material debris. Solid wastes generated during turbine operation would be minimal. Solid wastes that are anticipated to be generated during decommissioning include dismantled equipment and construction-related debris. Hazardous and universal wastes are not anticipated to be generated during installation, operation, or decommissioning. All wastes generated over the life of the project would be handled, collected, transferred, and disposed of in accordance with all applicable Federal, State, and local regulations. Used oil (e.g., spent gearbox oil, hydraulic fluid, and gear grease) is not considered a waste because it can be reused and/or recycled. Used oil would be generated during operations of the project. All used oil from the wind turbines would be handled, collected, transferred, and reused/recycled in accordance with applicable Federal and State regulations.

3.2.2 Geology

According to the Geology Map of Minnesota (Morey and Meints 2000), neither project site is underlain by a fault. In addition, Mahnomen County is not in a region of active or potential metallic mining operations (taconite and iron ore) or industrial mineral mining operations (e.g., silica sand, limestone, and peat; MNDNR 1998). Since no faults or known mineral deposits occur at either of the project sites, no geologic impacts are anticipated, either to the proposed wind turbines (e.g., potential damage to the wind turbines from an earthquake) or as a result of the wind turbines (e.g., access to a mineral deposit at a wind turbine location).

3.2.3 Water Resources

No surface water resources occur at Waubun subsites A and B; however, the sewage lagoons for the town of Waubun are located south of and adjacent to subsite A. The project features (wind turbines, access road, and underground transmission line) would be approximately 500 feet from the sewage lagoons, and no direct or indirect impacts are anticipated. Spring Creek flows through the northeast corner of subsite C; however, construction, operation, nor decommissioning of the turbine pad, wind turbine, 150-foot

access road, and underground transmission line would impact this resource. All these project features would be located more than 150 feet south of Spring Creek. No surface water resources occur at or adjacent to the Naytahwaush site; therefore, no impacts would occur. Since construction of the project would disturb more than 1 acre of land, White Earth Nation would obtain a Construction Storm Water permit from the MPCA prior to start of construction.

3.2.4 Floodplains

The project sites are within an area that has not been mapped on an official Federal Emergency Management Agency floodplain map that delineates special flood hazard areas. The lack of a map indicates this is not an area of concern for flooding. Since the only body of water in or near a project site is Spring Creek, which flows through the northwest corner of Waubun subsite C, the only floodplain of concern is associated with this body of water. Since no project facilities would occur in or near the Spring Creek floodplain, the project would not impact floodplains.

3.2.5 National Wild and Scenic Rivers

Based on a review of a map of Minnesota's Wild and Scenic Rivers (MNDNR 2011a), there are no national or State-designated Wild and Scenic Rivers within the project area. The nearest designated Wild and Scenic River is a portion of the Mississippi River, between St. Cloud and Anoka and more than 100 miles from the project sites and, therefore, would not be affected by the project.

3.2.6 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 White Earth Nation wind energy project would not involve the transportation, storage, or use of radioactive, explosive, or toxic materials. Consequently, it is highly unlikely that construction or operation of this project would be viewed as a potential target by saboteurs or terrorists. The project location is not near any national defense infrastructure or in the immediate vicinity of a major inland port, container terminal, or nuclear power plant. The proposed project would not offer any targets of opportunity for terrorists or saboteurs to inflict adverse impacts to human life, heath, or safety.

3.3 Considerations Carried Forward for Further Analysis

This section of the EA examines in detail the potential environmental impacts of the proposed project by the following affected resource areas:

- Land Use
- Visual Quality
- Noise
- Cultural Resources
- Soils
- Wetlands
- Biological Resources
- Human Health and Safety

- Transportation
- Socioeconomics and Environmental Justice
- Air Quality and Climate Change
- Utilities and Energy

3.3.1 Land Use

Both project sites are located within the White Earth Reservation boundary and all subsites are on tribal trust land except Waubun subsite A, which is owned by the City of Waubun. Land use on tribal trust land is under tribal control. Existing land uses on the tribal trust sites are as follows (Table 3-1):

Table 3-1. Existing Land Uses on the Tribal Trust Sites

Site	Existing Land Use
Waubun	
Subsite B	This site currently consists of an open field with scattered debris, primarily the remains of an abandoned sawmill; the Ojibwa Building Supply and Waubun Solid Waste Transfer Station, both tribal enterprises, also occur on the site. The south and east portions of the site are tribe-owned and leased agricultural land.
Subsite C	This site currently consists primarily of maintained open space. The White Earth Housing Authority headquarters complex is also located at the western end of this site. The Waubun State WMA is located directly west of and adjacent to the site. The Waubun cemetery is located adjacent to this site on the north side.
Naytahwaush	This site currently consists of maintained open space adjacent to a softball field that is part of the Naytahwaush Sports Complex. The Naytahwaush Sports Complex buildings are adjacent to the site to the west. Several scattered residences are located northeast, east, and southwest of the project area, the nearest is approximately 525 feet from the proposed wind turbine location.

Waubun subsite A, owned by the City of Waubun, is currently used as a field for agricultural production. The City of Waubun has zoning regulation for areas within the city limits and a 2-mile radius around the city limit, including the Waubun subsites. White Earth Nation would be required to complete a Land Use Permit application with the City of Waubun. After receipt of the application, the City would determine if a conditional use permit was necessary.

The FAA maintains standards for obstructions to air navigation or navigational aids or facilities. Such obstructions can include wind turbines. The closest airport to the sites is the Mahnomen County airport south of the city of Mahnomen. The closest project site to this airport is the Waubun site, which is more than 5 miles away. FAA notification is required for structures that extend more than 200 feet above the ground level (14 CFR Part 77). None of the wind turbines under consideration for this project is more than 200 feet in height (the tallest under consideration is 187 feet to the tip of a blade at its highest reach). Since the project sites are more than 20,000 feet from an airport and the wind turbine models under consideration are less than 200 feet above ground level, FAA notification is not required.

3.3.1.1 Direct and Indirect Impacts

At Waubun subsite A, the proposed project would result in the permanent conversion of up to 0.67 acre of farmland into the two wind turbine pads and an access road. Up to 4.7 additional acres could be temporarily disturbed for the laydown areas, access road, and transmission line construction. Except for the area of permanent disturbance, the proposed project would have little impact on existing land use

because farming activity could continue on the remainder of the site. Adjacent land uses, including the Waubun sewage lagoons, the City of Waubun, and low-laying emergent wetlands, would not be affected. The City of Waubun would enter into a joint venture or land rental contract with the White Earth Nation for use of the land and would benefit from an additional source of income.

At Waubun subsite B, the proposed project would result in the permanent conversion of approximately 0.33 acre of open field into a wind turbine pad and an access road. In addition, up to 1.24 acres would be temporarily disturbed for the laydown area, access road, and transmission line construction. This land use would be compatible with the adjacent land uses (Ojibwa Building Supply, Waubun Solid Waste Transfer Station, and farmland) and in accordance with tribal plans for use of the land.

At Waubun subsite C, the proposed project would result in the permanent conversion of 0.28 acre of a maintained open field into a wind turbine pad and an access road. In addition, up to 1.1 acres would be temporarily disturbed for the laydown area, access road, and transmission line construction. This land use would be compatible with the adjacent land uses (White Earth Housing Authority headquarters complex) and in accordance with tribal plans for use of the land.

At the Naytahwaush site, the proposed project would result in the permanent conversion of 0.25 acre of open space into a wind turbine pad. In addition, up to 1.1 acres would be temporarily disturbed for the laydown area and transmission line construction. This land use would be compatible with the adjacent land uses (softball field, Naytahwaush Sports Complex) and in accordance with tribal plans for use of the land.

Because the amount of land that would be converted to a new use is small, the new use would be compatible with existing and adjacent land uses at both sites and in accordance with White Earth Nation tribal plans and the City of Wauban plans. Furthermore, the project would not affect airspace regulated by the FAA since none of the wind turbine models under consideration extends more than 200 feet above ground level.

Although impacts would be minor, the White Earth Nation has committed to limiting construction activities to the permanent and temporary disturbance areas described in this EA to minimize land use impacts.

3.3.2 Visual Quality

Existing views of the project area vary somewhat by site. Waubun subsite A is currently an open field leased for row crop farming. It is mostly flat and visible from the city of Waubun and Highway 59 (Photo 1). Various elements around the edges of the field provide a vertical component to the landscape in the middle- and background views, such as scattered trees, scattered rural residences, the existing substation and transmission lines along Highway 59, and houses and buildings in Waubun. Other features, particularly the waste treatment lagoons, do not have a strong vertical component and are not immediately visible from various viewpoints. Subsite B is similar, consisting of an open, fairly flat field visible from Highway 59 (Photo 2). When viewed from Highway 59, scattered trees and rural residences provide a vertical component to the landscape in the background, and the onsite buildings (Ojibwa Building Supply and Waubun Solid Waste Transfer Station) occupy the foreground. Subsite C also consists of an open field with scattered trees and rural residences in the background when viewed from Highway 59, and the White Earth Housing Authority buildings and groupings of trees occupy the middle- and foregrounds (Photo 3). The Naytahwaush site is located in a maintained open field adjacent to a softball field and the Naytahwaush Sports Complex (Photo 4). It is visible from the Naytahwaush Sports Complex and County

Road 4. The open field is surrounded by a tree line in the background and the sporting facility in the foreground when viewed from County Road 4.

Visual receptors at the Waubun site include the residents of Waubun, travelers on Highway 59, and occupants of scattered rural residences, the White Earth Housing Authority buildings, and the Ojibwa Building Supply and Waubun Solid Waste Transfer Station. Visual receptors at the Naytahwaush site include users of the Naytahwaush Sports Complex, scattered residents east and south of the site, and travelers on County Road 4.

Photo 1. Existing view of Waubun subsite A - looking west towards the site from Highway 59.

Photo 2. Existing view of Waubun subsite B – looking southeast towards the site from the Waubun Solid Waste Transfer Station.

Photo 3. Existing view of Waubun subsite C – looking west from the site towards the White Earth Housing Authority building.

Photo 4. Existing view of Naytahwaush site - looking southwest towards the site from County Road 4.

3.3.2.1 Direct and Indirect Impacts

At Waubun subsite A, White Earth Nation would install one or two wind turbines. If one wind turbine is installed, it could be a 10-kilowatt, 40-kilowatt, or 300-kilowatt unit; if two wind turbines are installed; two 10-kilowatt or two 40-kilowatt units would be used. The maximum tower height among all three turbines is 160 feet to the hub, and 187 feet to the tip of a blade at its highest reach (the 40-kilowatt unit). A simulated view of what the project might look like is shown in Photo 5 below.

At Waubun subsites B and C, White Earth Nation would install a 10-kilowatt or 40-kilowatt wind turbine. The maximum tower height of the two turbines under consideration would be 160 feet to the hub, and 187 feet to the tip of a blade at its highest reach (a 40-kilowatt unit). Simulated views of these subsites are shown in Photos 6 (subsite B) and 7 (subsite C) below.

The nearest sensitive visual receptors to the Waubun subsites are residents in the city of Waubun and along Highway 59, the nearest of which is approximately 350 feet from subsite A. Residents, travelers along Highway 59, and workers at the Waubun Solid Waste Transfer Station, Ojibwe Building Supply, and White Earth Housing Authority headquarters complex would experience a visual impact of the wind turbines similar to the views shown in Photos 5 through 7. Because of the open nature of the Waubun subsites and the heights of the wind turbines, the turbines are expected to be seen from all directions from as far away as five miles.

Photo 5. Simulated view of proposed project at Waubun subsite A - looking west from Highway 59.

Photo 6. Simulated view of proposed project at Waubun subsite B – looking southeast towards the site from the Waubun Solid Waste Transfer Station.

Photo 7. Simulated view of proposed project at Waubun subsite C – looking west from near the site towards the White Earth Housing Authority building.

At the Naytahwaush site, White Earth Nation would install a 10-kilowatt or 40-kilowatt wind turbine. The maximum tower height of the two turbines under consideration would be 160 feet to the hub, and 187 feet to the tip of a blade at its highest reach (a 40-kilowatt unit). A simulated view of this site is shown in Photo 8 below.

The nearest sensitive visual receptors to Naytahwaush are the residents along County Road 4 and users of the Naytahwaush Sports Complex. The view of the wind turbine may be partially obscured for most nearby residents because the area is forested and trees surround nearby residences. The users of the Naytahwaush Sports Complex, however, would have a full view of the wind turbine. Travelers on County Road 4 would experience visual impact of the wind turbine similar to the view shown in Photo 8.

Relative to other types of utility projects and facilities, some people would view the wind turbines as clean, graceful lines that would not overpower the landscape or obstruct views as would large buildings. The wind turbines, however, would introduce a strong vertical element into the landscape. This would be a greater impact at the Waubun site than at the Naytahwaush site because the surrounding forest dominates the skyline at Naytahwaush. The perceived dominance of the wind turbines on the landscape would vary during time of day, time of year, and with weather conditions. When the angle of the sun is lower, sunlight striking the wind turbines would make them more visible. Reactions to the wind turbines would likely vary. Some people would prefer the setting as it now exists without the wind turbines. Others, however, may find them an interesting or even aesthetic point of visual interest on the landscape.

Photo 8. Simulated view of the proposed project at the Naytahwaush site - looking southwest towards the site from County Rd. 4.

Shadow flicker is a phenomenon such that when sunlight passes through rotating blades it creates a flickering shadow on stationary objects. Shadow flicker occurs on sunny days in the mornings and evenings when the turbine blades are between the sun and a receptor (occupied home or building); shadow flicker primarily affects receptors east and west of a wind turbine. On average, there are approximately 208 sunny days per year in Waubun and a similar number of sunny days are assumed for Naytahwaush (Homefacts 2011). Most sunshine occurs in the summer months (that is, June, July, and August). However, shadow flicker is generally limited to spring and fall months, and lasts for less than 60 minutes (Allen 2011). Thirty hours per year (1,800 minutes/year cumulatively) is considered a "de facto" standard as to what constitutes an impact (Allen 2011).

At Waubun, shadow flicker is not expected to impact viewers at subsite A due to a lack of receptors near the site, particularly to the east and west. Potential receptors at Waubun subsites B and C include workers at the Waubun Solid Waste Transfer Station and Ojibwe Building Supply located west of subsite B, and at the workers at the White Earth Housing Authority headquarters complex located west of subsite C. Potential receptors at the Naytahwaush site include the users of the sports complex located north and west of the site. Impacts to potential receptors at these sites would occur in the evening hours near sunset because all potential receptors are located west of the turbine sites. Impacts are also most likely to occur in spring and fall months and last for less than 60 minutes. The spring months (March to May) have a 45 to 55 percent chance of sunshine in Waubun and the fall months (September to November) have a 38 to 60 percent chance of sunshine (Homefacts 2011). In the spring months, the earliest sunset is 6:08 p.m. (March 1) and gets progressively later. Assuming 60 minutes of shadow flicker prior to sunset, workers and users of the sports complex would be expected to be leaving about the time shadow flicker is most likely to occur in the spring. Two factors further reduce the likelihood of shadow flicker impacts in the

spring: the chance of sunshine in March is 45 percent, and wind would have to blowing and at such an angle as to align the rotor plane perpendicular to the receptors. In the fall months, sunset is at 5:03 p.m on November 4th (2012) when daylight savings time ends. This means that for 60 minutes prior to sunset, workers and users of the sports complex could experience shadow flicker for approximately one hour during most of November. However, the chance of sunshine in November is 38 percent; therefore, shadow flicker impact could occur for an estimated 10 days in November, assuming the wind is blowing, and at such an angle as to align the rotor plane perpendicular to the receptors. Shadow flicker as a result of the proposed project would be well below the level of impact (30 days).

The proposed project would affect the viewshed at each project site. The wind turbines would be a dominant vertical component in the landscape due to their height, particularly at the Waubun site with its open landscape, but would not obstruct views in the way that a large building might. Since other vertical elements occur in each landscape, such as electrical transmission line poles, buildings, and trees, the visual impact from the turbine(s) would be somewhat minimized. A negligible amount of shadow flicker could occur during evening work hours in the fall. If shadow flicker causes annoyance to receptors, the White Earth Nation would use commercially reasonable efforts to remedy the problem on a case-by-case basis. Such measures include tree plantings or awning installation.

3.3.3 Noise

Ambient noise levels vary by site, but in general are typical of a semi-rural setting. The project sites are considered semi-rural based on the generally rural nature of the area, yet each site is located near some development (e.g., school, Naytahwaush Sports Complex, and the Waubun Solid Waste Transfer Station). At the three Waubun subsites, sources of ambient noise include vehicular traffic (cars, trucks, and farm equipment) on Highway 59, traffic coming and going from the Waubun Solid Waste Transfer Station at subsite B, and traffic associated with the sewage lagoon and White Earth Housing Authority headquarters complex employees. Ambient noise sources at the Naytahwaush site include traffic noise along County Road 4 and noise associated with the Naytahwaush Sports Complex. Other sources common to all sites include occasional aircraft and natural sources (e.g., wildlife, wind).

Because each of the project sites is semi-rural, sources of loud noises are likely few and intermittent. Under calm wind conditions, ambient noise levels are likely between 50 and 60 A-weighted decibels (dBA), which is the noise level range of a typical quiet suburban residential area that is not located near a major noise source, such as a major highway (BFCWA 2001). Based on land use, this is a reasonable comparison to each of the project sites. There are no known studies of ambient noise levels at any of the project sites.

People that might be sensitive to noise from the proposed project would depend on the distance from the wind turbine, which varies by site. Noise receptors that might be particularly sensitive to wind turbine noise include residences, libraries, hospitals, and schools. Table 3-2 shows the closest residence or other building/use area to the project sites.

Table 3-2. Nearest Residence and Other Building/Use Area to Project Sites.

Project Site	Nearest Residence	Nearest Building or Other Use Area
Waubun		
Subsite A	350 feet	600 feet (City of Waubun)
Subsite B	> ¼ mile	350 feet (Ojibwe Building Supply)
Subsite C	750 feet	500 feet (White Earth Housing Authority headquarters complex)
Naytahwaush	525 feet	200 feet (softball field)

		600 feet (Naytahwaush Sports Complex)

No sensitive wildlife noise receptors are known or likely to occur at the project sites based on the surrounding land uses (i.e., the area is not pristine; buildings, roads, sewer lagoons, other development occur near each project site); however, no study on sensitive wildlife noise receptors has been conducted.

3.3.3.1 Direct and Indirect Impacts

Increased noise levels would occur at and near the project sites during construction. The noise would be associated with construction activities, including noise generated by increased traffic on area roadways. Construction activities associated with development of a wind farm have been reported to generate noise levels of 85 to 88 dBA at a distance of 50 feet (BLM 1995). This noise level is greater than the estimated ambient noise levels at the project sites and can be equated with the noise levels associated with a heavy truck at 55 miles per hour. The nearest residence at both sites is 350 feet (Waubun subsite A), more than seven times the distance reported in the Bureau of Land Management study. The greater the distance from a noise source, the less the noise is heard. There are, however, many other variables that affect noise propagation such as source characteristics, air absorption, ground effects, blocking of sound by obstructions and uneven terrain, and weather. Calculating noise impacts from construction using complex models that consider all these factors is beyond the scope of this EA; however, construction noise would likely be audible at the nearby residences and other facilities. The noise, however, is unlikely to be at levels that are disruptive and any noise would be temporary in nature. Additionally, the White Earth Nation has committed to several measures to reduce potential noise impacts, such as properly maintaining vehicles including installation of mufflers, prohibiting loud music at the project site, and limiting construction to daylight hours. Therefore, noise levels associated with project construction would be minor.

Noise from operation of the proposed wind turbines is most likely to be produced from the revolving rotor blades as they encounter turbulence in the passing air, known as aerodynamic noise. Such noise is usually described as “swishing” or “whooshing” sounds (BLM 2005). Actual noise levels are affected by the speed at which the blades are moving through the air.

None of the product specification sheets for the wind turbine models under consideration for this project include noise levels. Figure 3-1 shows an example of noise that might be produced by a single, large, modern wind turbine, assumed to be on a 164-foot tower. The source sound power level is assumed to be 102 dBA, and the sound pressure levels are estimated at ground level (Rogers 2004).

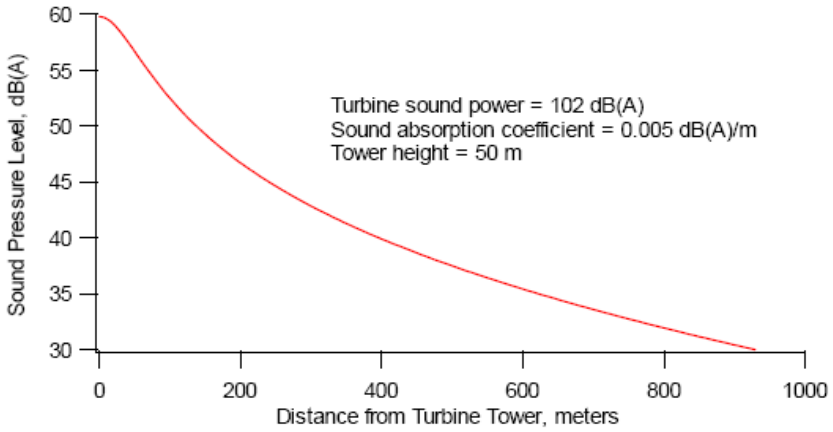

Figure 3-1. Graph showing wind turbine noise levels

Assuming the turbines chosen for the proposed project are similar to the one represented in the above graph, the nearest residence (approximately 350 feet at Waubun subsite A) would hear turbine-related noises at approximately 54 dBA. Noise impacts to other residences and developments at a greater distance would be even less. These noise levels are within the expected ambient noise levels (between 50 and 60 dBA) under calm wind conditions. The noise would only occur when the wind turbine is operating, and other existing background noises would mask the turbine noise levels to some degree. To put these noise levels in perspective, noise levels of 30 dBA are comparable to a soft whisper and 40 dBA are typical of noise in a library. At noise levels predicated for the proposed project, noise associated with operation of the wind turbine would be minor.

3.3.4 Cultural Resources

Cultural resources are physical remains of past human activity and are protected under the NHPA (16 U.S.C. 470 *et seq*.), the *Archaeological Resources Preservation Act of 1979*, as amended (16 U.S.C. 470aa *et seq*.), and other laws. Section 106 of NHPA requires DOE and other Federal agencies to assess and determine the potential effects of their proposed undertakings on prehistoric and historic resources and to develop measures to avoid or mitigate adverse impacts. Compliance with Section 106 requires consultation with the SHPO and/or the THPO, as applicable. The SHPO is responsible for effects to historic structures, while the White Earth THPO is responsible for archaeological resources (K. Gragg-Johnson 2011).

The THPO/archaeologist consulted the tribal cultural resources database to determine if there are any known archaeological resources within the project area. The THPO also visited each site. The THPO concluded that there are no known archaeological resources at the Waubun (including the three subsites) or Naytahwaush sites (Appendix C). Furthermore, the THPO confirmed to DOE that no sites of religious or traditional cultural importance occur within the project sites (Appendix B).

A Phase I and II Architectural History Survey and Assessment of Effects Study was conducted (Appendix C)[1] to identify all known architectural history resources within the area of potential effect (APE) and

1. The Phase I and II Architectural History Survey and Assessment of Effects Study was conducted when the project included a potential third wind turbine site at Pine Point in Becker County, and considered wind turbines more than

determine if any structures are potentially eligible for listing on the *National Register of Historic Places* (NRHP). An appropriate APE for historical and architectural resources accounts for any physical, auditory, or visual impacts to historical properties. For wind farm projects, the Minnesota SHPO suggested that the APE should vary depending on the height and location of the towers. White Earth Nation used the guidelines provided in the *Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission* (FCC 2004), which recommended that for towers 200 feet or less in overall height, an APE should be 0.5 mile. A larger APE may be required if a tower(s) is located in a prominent location, such as on top of a hill or bluff, where it is more visually prominent (Heidemann 2011). Neither project site is located in a prominent location; therefore, for this EA, the APE for architectural history is 0.5 mile around each of the Waubun and Naytahwaush project areas.

As a result of the Phase I survey and Phase II assessment study, two historic properties were recommended as eligible for listing in the NRHP. Both of these properties are within the Waubun APE; no historic properties recommended as eligible or listed on the NRHP were found within the Naytahwaush APE. The two recommended eligible properties are a newly identified segment of a previously determined eligible railroad corridor and the Golden Rule Store in Waubun (Figure 3-2).

200 feet in height. As a result of the Study, the Pine Point site and wind turbines over 200 feet in height were eliminated from further consideration, as documented in an addendum (106Group 2011b). This EA includes only information from the addendum relevant to the current project description

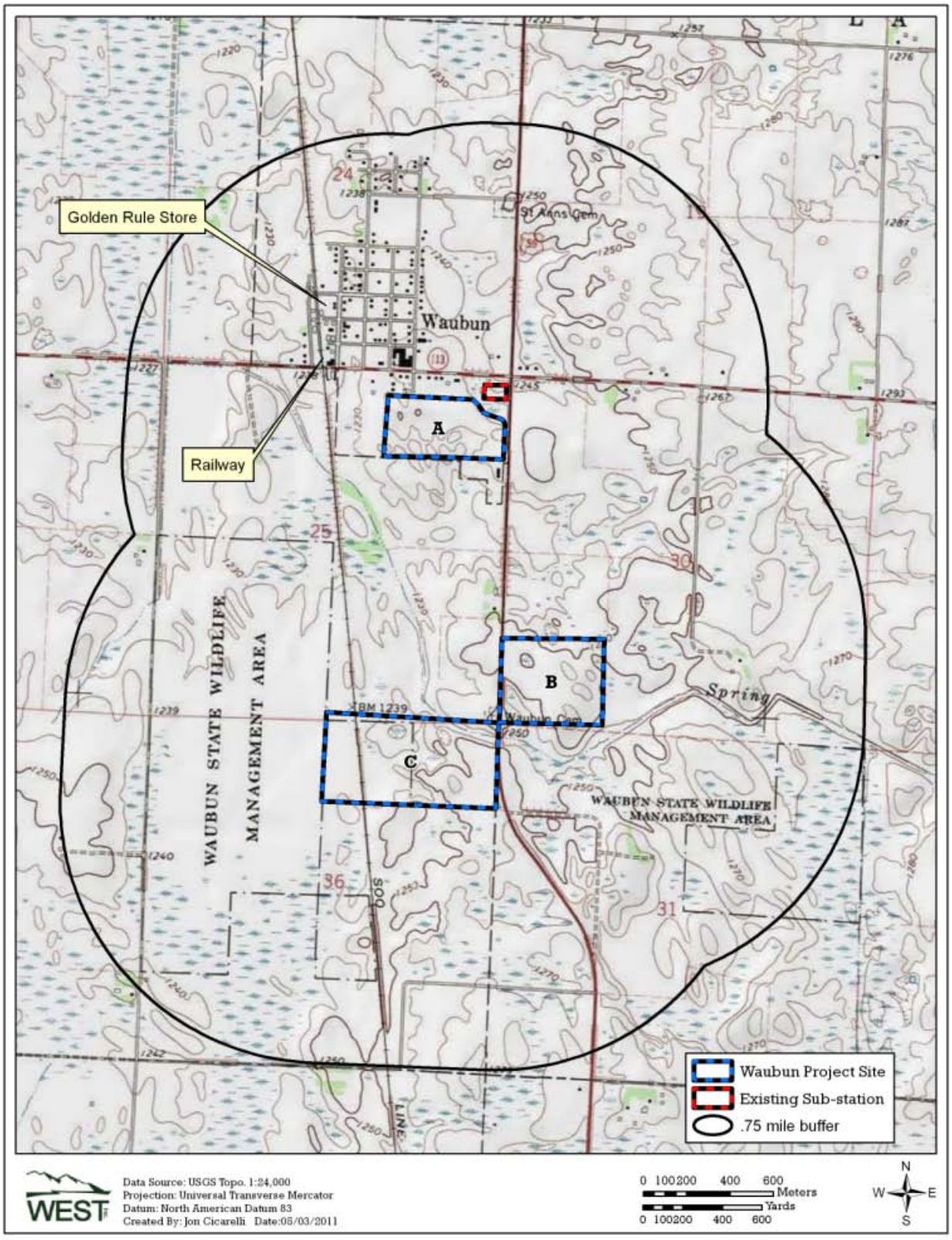

Figure 3-2. Eligible Architectural Properties near Waubun.

The Minneapolis, St. Paul & Sault Ste. Marie Railway/Soo Line Railroad/Canadian Pacific Railway (MStP&SSM /Soo Line/CP Railway) runs north-to-southwest of Waubun. This railroad segment is part of the MStP&SSM mainline that was constructed from Glenwood to Noyes, Minnesota in 1903-1904. Near Waubun, the railroad line generally runs in a north-to-south direction and is composed of a single set of active tracks on a raised bed of stone ballast. The tracks consist of steel rails laid on wood ties. This line was constructed as part of the railroad's expansion efforts throughout northern Minnesota. Known as the Winnipeg Line, the corridor connected Glenwood to Noyes and opened additional areas to service in the Red River Valley, as well as providing another connection to the Canadian Pacific Railway (Schmidt et al. 2007). In January of 1961, the MStP&SSM, Duluth South Shore & Atlantic Railway Company, and the Wisconsin Central Railway Company consolidated to form the Soo Line Railway Company (Prosser 1966). In 1990, the CP gained full control of the Soo Line.

The property is historically significant in the areas of transportation, commerce, and agriculture (Schmidt et al. 2007). As an operating rail line with intact tracks, this segment of the MStP&SSM /Soo Line/CP Railway continues to provide a sense of function and destination. The integrity of location, design, association, feeling, and setting is good.

The entire MStP&SSM /Soo Line/CP Railway corridor, running from Glenwood to Noyes, was previously determined eligible for listing in the NRHP under Criterion A, within the NRHP Multiple Property Listing, *Railroads in Minnesota 1862-1956* (Schmidt et al. 2007). The segment of this railroad corridor within the APE was not previously individually documented; however, it has sufficient integrity to convey its historical significance; therefore, is recommended as a contributing segment to the larger NRHP-eligible MStP&SSM /Soo Line/CP Railway corridor.

The Golden Rule Store is located at the southeast corner of First Street and Prairie Avenue, in the heart of the Waubun commercial district. It consists of a 1905 general store that was historically known as the Golden Rule Store. The one-story, rectangular shaped building rests on a poured concrete foundation and has a front gable roof that is covered with a mixture of ribbed metal sheets and corrugated metal. The north-facing façade is clad in wood siding and features a false front that is faced in clapboard siding and topped by a wood cornice. The centrally located recessed entry features Tuscan wood columns. Brick has been filled in around some of the replacement storefront windows. The secondary elevations are parged in smooth concrete.

A full-width, lean-to extension was constructed on the west elevation of the building in 1907. The extension rests on a poured concrete foundation, has a false front that is faced in vertical wood siding, and has a shed roof that is covered with corrugated metal. The extension is faced in fiber cement shingles and smooth, parged concrete on the west elevation and drop siding on the south elevation. The extension features an interior brick chimney and a skylight near the southern end. The west elevation of the lean-to extension has a two-light sliding wood window.

Waubun developed around the MStP&SSM line, which was constructed through Mahnomen County in 1904. The Golden Rule Store was constructed in 1905 at the southeast corner of First Street and Prairie Avenue. It was the second general store constructed in Waubun. The MStP&SSM depot was historically located at the end of Prairie Avenue, just a half of a block west of the Golden Rule Store. Many new arrivals to Waubun would have made their first stop in town at this store.

The Golden Rule Store has local significance for listing in the NRHP under Criterion A. The property is significant within the areas of commerce. The Golden Rule Store appears to be one of three existing commercial buildings in Waubun that date to the early 20th century. The other two buildings, the Luck

Land Company building on the north side of Central Avenue and the commercial building at 1001 Central Avenue, do not retain sufficient integrity to convey their historical significance.

The Golden Rule Store is the only known existing general store in Waubun that retains the best integrity of any surviving commercial building in Waubun that dates to the town's development period. The Golden Rule Store's period of significance ranges from 1905 when the building was constructed until 1922, when the building was no longer operated as a general/grocery store.

The Golden Rule Store's integrity of materials, design, and workmanship has been slightly compromised by the alterations to the storefront. Alterations include loss of some of the paneled wood siding, replacement display windows, and partial brick infill around the replacement windows. The lean-to addition was constructed in 1907, during the building's period of significance, and does not affect its integrity. However, the replacement window on the façade, cladding of the façade in vertical wood siding, and partial cladding of the west elevation in fiber cement shingles has slightly affected its integrity of materials, design, and workmanship.

3.3.4.1 Direct and Indirect Impacts

Since the THPO did not identify any archaeological resources or sites of religious or traditional cultural importance, the proposed project would not impact any known such resources within the APE.

An assessment of effects study was conducted as part of the Phase II architectural history evaluation for the previously determined eligible railroad corridor and the recommended eligible Golden Rule Store. The assessment was conducted in accordance with the Minnesota SHPO *Guidelines for History/Architecture Projects in Minnesota* (Minnesota SHPO 2010) and the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" [48 Federal Register (FR) 44716-44740] (NPS 1983).

MStP&SSM /Soo Line/CP Railway
Noise, Vibration, and Air Quality Effects: During construction of the proposed project there would be temporary increases in noise and vibration, and possible effects to the air quality. Any potential increase in noise during construction would be limited in duration and is not likely to affect an active railroad corridor. Any potential increase in dust during construction would be limited in duration and amounts generated would not be any greater than dust generated by wind storms. Any temporary direct effects from vibrations during construction, caused by tractor-trailers unloading materials or bulldozers moving earth, likely would not be greater than the vibration of freight traffic within the active railroad corridor. Therefore, the proposed construction activity is not anticipated to have any temporary, adverse direct or indirect effect on the MStP&SSM/Soo Line/CP Railway.

During operation of the proposed project, any noise generated by the wind turbines would be minimal and is not anticipated to significantly increase ambient noise levels in the area. Operation of the proposed project would not result in any permanent atmospheric effects that would impact the railroad corridor. In addition, any vibrations from the operation of the wind turbines would be minimal. Therefore, the operation of the proposed project is not anticipated to have any adverse permanent direct vibration or indirect noise or air quality effects on the MStP&SSM/Soo Line/CP Railway.

Visual Effects: The proposed construction of wind turbines east of the railroad corridor at the Waubun subsites would be visible from many areas of the corridor. However, the proposed wind turbines would

not compromise the ability of the railroad line to convey its sense of direction, which is a primary characteristic of a linear corridor to convey its significance. The turbines would introduce an out-of-scale feature into the general rural landscape along this stretch of the railroad line; however, this segment is only a small portion of a much longer historic resources and, given that the proposed wind turbines would only be visible from this short stretch, potential effects to this small portion of the line would be negligible to the larger whole.

Although the proposed construction of wind turbines would have permanent indirect visual effects on the MStP&SSM /Soo Line/CP Railway, the effects would not result in an adverse effect to the property or its ability to convey its historical significance.

Golden Rule Store

Noise, Vibration, and Air Quality Effects: During construction of the proposed project there would be temporary increases in noise and vibration, and possible effects to the air quality. Any potential increase in noise during construction would be limited in duration and is not likely to be greater than the noise generated by traffic on nearby County Road 113 or freight traffic on the nearby railroad. Any potential increase in dust during construction would be limited in duration and amounts generated would not be any greater than dust generated by wind storms. Any temporary direct effects from vibrations during construction, caused by tractor-trailers unloading materials or bulldozers moving earth, likely would be dissipated by the land area (approximately 1,445 feet) separating the nearest project site from the commercial building. Therefore, the proposed construction activity is not anticipated to have any temporary adverse direct or indirect effect on the Golden Rule Store.

During operation of the proposed project, any noise generated by the wind turbines would not be significant and, because the nearest wind turbine would be located approximately 2,685 feet away, is not anticipated to significantly increase ambient noise levels in the area. Operation of the proposed project would not result in any permanent atmospheric effects that would impact the commercial building. In addition, any vibrations from the operation of the wind turbines would be minimal and, given the distance of the nearest project site from the Golden Rule Store, the project is not anticipated to have any vibration effects on the property. Therefore, the operation of the proposed project is not anticipated to have any adverse permanent direct vibration or indirect noise or air quality effects on the Golden Rule Store.

Visual Effects: The proposed construction of wind turbines southeast of the Golden Rule Store would be visible from the historic property. The turbines would be visible due to the relatively flat topography and lack of significant mature trees between the nearest project site and the building. Given the overall larger height of the proposed wind turbines compared with the existing buildings and structures that surround the store, the proposed turbines would result in introducing a new out-of-scale element into the landscape, causing a visual effect to the Golden Rule Store. The proposed turbines would alter some of the views to and from the building, thereby slightly affecting the integrity of the small town setting and feeling of the store. The nearest proposed wind turbine would be approximately 2,685 feet away. The potential visual impact would be somewhat minimized since the perceived comparative height on the horizon would be reduced, given this distance. In addition, the turbines would occupy only a small portion of the views to and from the building. Also, the wind turbines would not impact any significant view to and from the property.

The proposed wind turbines would not affect the integrity of materials, design, workmanship, location, or association of the Golden Rule Store. Moreover, the significance of the building is due to its associations with commerce. Therefore, the proposed wind turbines would not compromise the ability of the Golden Rule Store to convey its historical significance as the only known existing general store in Waubun and as

a surviving commercial building with the best integrity of any buildings that date to the town's development period.

Although the proposed construction of wind turbines would have permanent indirect visual effects on the Golden Rule Store, the effects would not result in an adverse effect to the property or its ability to convey its historical significance.

Although no adverse cultural resources impacts are anticipated, White Earth Nation has committed to the measures listed in Section 2.2.5.1.

3.3.5 Soils

Soils in the project area have been mapped by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) and areas of prime farmland and statewide important farmland have been identified (NRCS 1997, 1998). Soil types within each of the site boundaries are shown on Figures 3-3 and 3-4 and are listed in Table 3-3.

The U.S. Department of Agriculture defines prime farmland as the land that is best suited for food, feed, forage, fiber, and oilseed crops. The soil qualities, growing season, and moisture supply are those needed for a well-managed soil to produce a sustained high yield of crops in an economic matter. It produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment. Other characteristics of prime farmland include acceptable levels of acidity or alkalinity, few or no rocks, is permeable to water and air, is not excessively erodible or saturated, and is not frequently flooded during the growing season (NRCS 1997, 1998). Farmland of statewide importance is land other than prime farmland and unique farmland (i.e., land used for the production of specific high-value food and fiber crops, such as cranberries) that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops (Dose 2011).

At Waubun subsite A (approximately 35 acres), all soils are either prime farmland (31.9 acres) or farmland of statewide importance (3.4 acres). At Waubun subsite B (approximately 46 acres), all soils are either prime farmland (28.6 acres) or farmland of statewide importance (17.2 acres). At Waubun subsite C (approximately 38 acres), most soils are either prime farmland (30 acres) or farmland of statewide importance (3.7 acres); the remainder has no classification. The Naytahwaush site (approximately 6 acres) has no prime farmland and 0.4 acre of farmland of statewide importance.

The *Farmland Protection Policy Act* (FPPA), administered by the NRCS, is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. The FPPA ensures that Federal programs are administered to be compatible with State and local government, as well as private programs and policies that protect farmland.

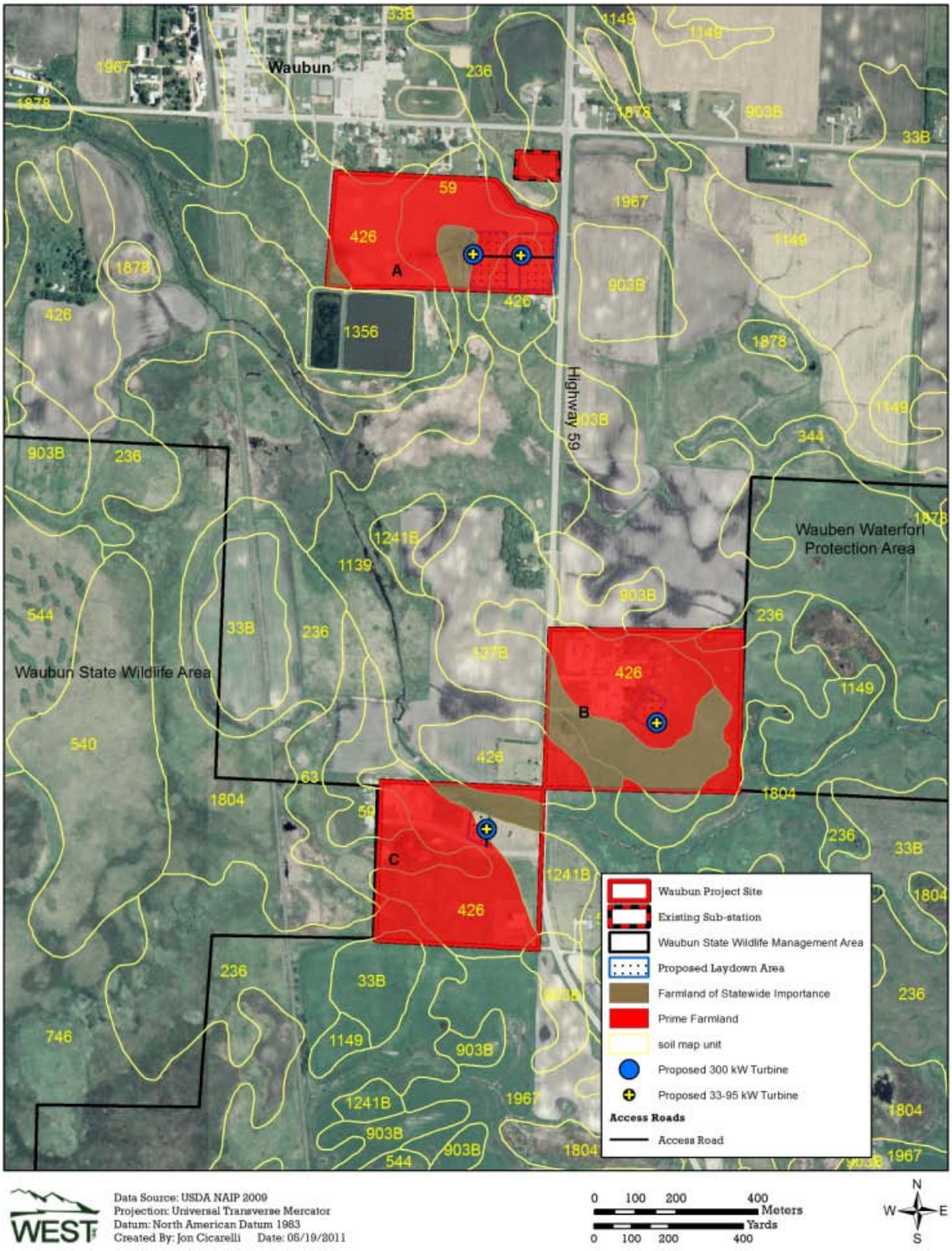

Figure 3-3. Waubun Site Soils

Figure 3-4. Naytahwaush Site Soils

Table 3-3. Soil Types in the Project Area.

Map Unit Symbol	Map Unit Name	Prime Farmland (yes/no)	Farmland of Statewide Importance (yes/no)
Waubun Subsite A			
1139	Marysland loam, occasionally flooded	No	Yes
426	Foldahl sandy loam	Yes	No
59	Grimstad sandy loam	Yes	No
1967	Hamerly-Vallers complex	Yes (where drained)	No
Waubun Subsite B			
1139	Marysland loam, occasionally flooded	No	Yes
426	Foldahl sandy loam	Yes	No
1967	Hamerly-Vallers complex	Yes (where drained)	No
1149	Hamerly clay loam	Yes	No
127B	Sverdrup sandy loam, 1 to 6 percent slopes	No	Yes
236	Vallers silty clay loam	Yes (where drained)	No
903B	Barnes-Langhei complex, 2 to 6 percent slopes	Yes	No
Waubun Subsite C			
59	Grimstad sandy loam	Yes	No
236	Vallers silty clay loam	Yes (where drained)	No
426	Foldahl sandy loam	Yes	No
1139	Marysland loam, occasionally flooded	No	Yes
1804	Hamre muck, ponded	No	No
63	Rockwell loam	Yes (where drained)	No
33B	Barnes loam, 2 to 6 percent slopes	Yes	No
1241B	Sandberg sandy loam, 1 to 6 percent slopes	No	No
Naytahwaush			
332B	Sugarbush sandy loam, 1 to 8 percent slopes	No	Yes
1030	Pits, gravel-Udipsamments complex	No	No

In compliance with FPPA, the NRCS and DOE jointly completed a Farmland Conversion Impact Rating form for the two sites (Appendix D). The form includes an assessment of the relative value of the farmland on a scale of 0 to 100 points as determined by the NRCS. The NRCS field office in Mahnomen made the land value determination. The form also includes a site assessment of the farmland based on 12 criteria with a total point value of 160 points. Data used for the assessment were obtained from geographical information system analysis, aerial photography, and the U.S. Census Bureau (USCB). The results of the land value and site assessments are shown below in Table 3-4. The FPPA states that sites receiving a combined score of less than 160 do not need protection under the FPPA. Based on this criterion, none of the project sites needs protection under the FPPA.

Table 3-4. Farmland Impact Rating Form Results

	Maximum Points	Waubun Subsite A	Waubun Subsite B	Waubun Subsite C	Naytahwaush
Relative Value of Farmland	100	76	64	78	45
Site Assessment	160	55	45	43	38
Total Points	260	131	109	121	83

3.3.5.1 Direct and Indirect Impacts

Table 3-5 shows the acreages of soils the proposed project would temporarily and permanently impact.

Table 3-5. Acreage of Disturbance by Project Site

Site	Temporary Disturbance (acres)			Permanent Disturbance (acres)	
	Access Road	Laydown Area	Transmission Line	Access Road	Turbine Pad
Waubun					
Subsite A	Up to 0.34	Up to 4	0.3	Up to 0.17	Up to 0.5
Subsite B	0.16	1	0.08	0.08	0.25
Subsite C	0.07	1	0.03	0.03	0.25
Naytahwaush	0	1	0.1	0	0.25

As shown in Table 3-5, temporary impacts include construction of access road and laydown areas, and installation of the underground transmission lines. Permanent impacts include areas that would be impacted by the turbine pad footprint and access roads.

Prime farmland would be permanently impacted at Waubun subsites A and B and farmland of statewide importance would be permanently impacted at Waubun subsite A. Neither prime farmland nor farmland of statewide importance would be impacted at Waubun subsite C or at the Naytahwaush site. Because none of the sites received a combined score of 160 or greater on the Farmland Conversion Impact Rating form, none of the project sites needs protection under the FPPA. Furthermore, the acreages permanently impacted would be small (see Table 3-5) and the remainder of the sites that contain agricultural land (Waubun subsites A and B) would remain farmable. Due to the small acreages of soil that would be permanently impacted and the FPPA scores, the proposed project would not result in adverse direct or indirect impacts to farmland soils.

3.3.6 Wetlands

Based on a review of National Wetland Inventory maps, wetlands occur within the three Waubun subsites, but none occur at the Naytahwaush site (Figures 3-5 and 3-6). The wetlands at Waubun include 0.11 acre of emergent (marsh) wetland at subsite A, 1.77 acres of emergent wetland and 0.45 acre of forested/shrub wetland at subsite B, and approximately 0.2 acre of emergent wetland and 0.51 acre of forested/shrub wetland at subsite C.

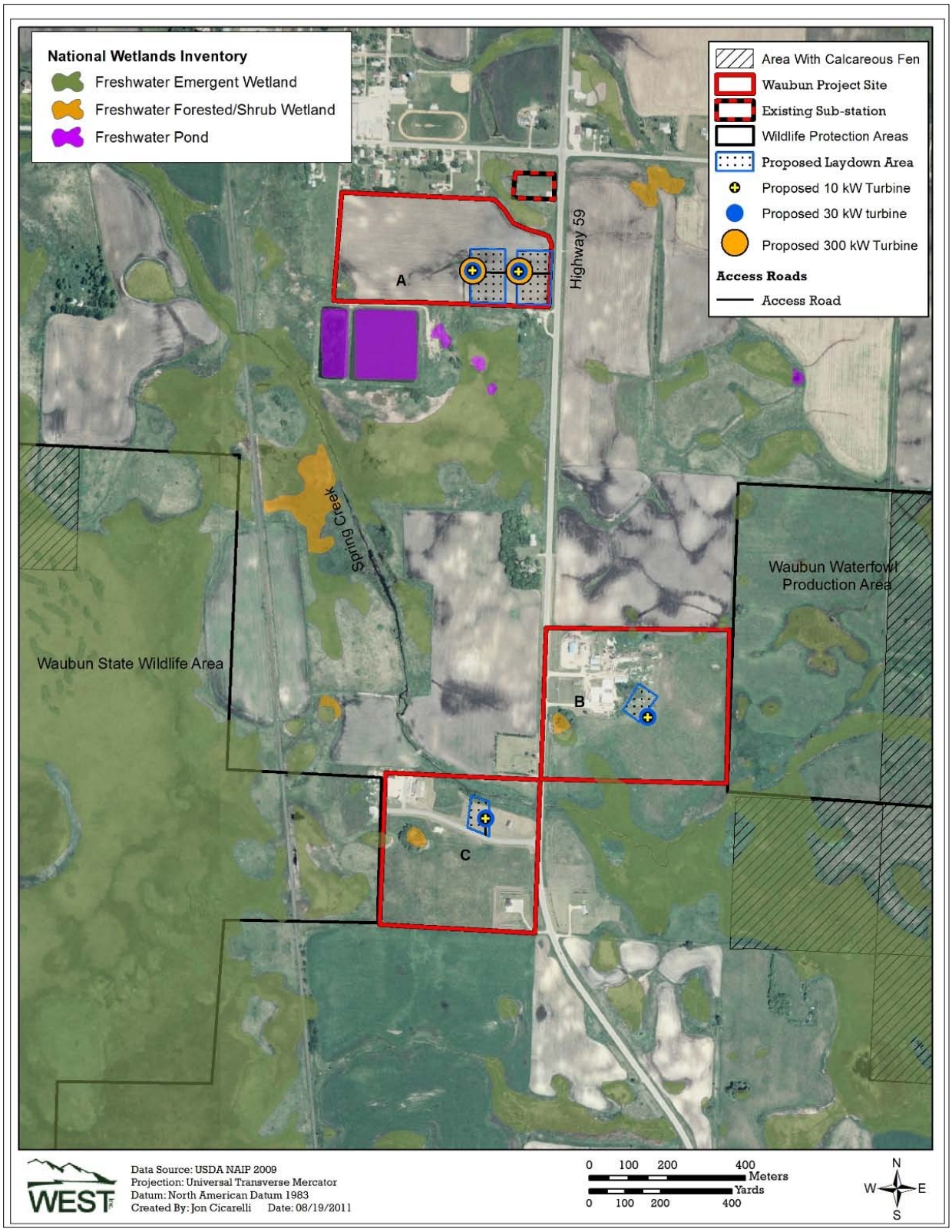

Figure 3-5. Waubun Site Wetlands

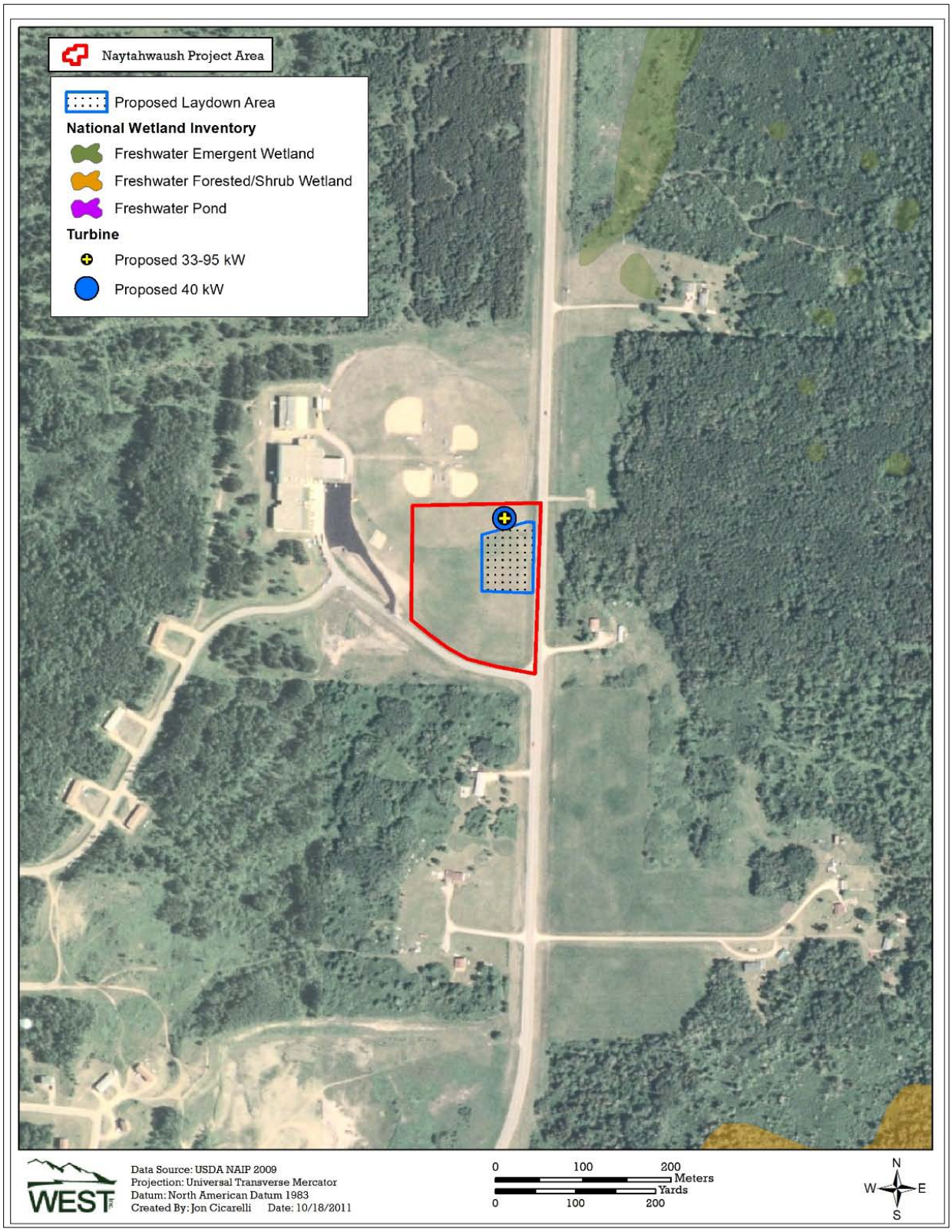

Figure 3-6. Naytahwaush Site Wetlands

Wetland habitats also occur adjacent to the Waubun project subsites, some of which are within the Waubun WPA and the Waubun State WMA. Some of these wetland habitats contain calcareous fens, as identified by the Department of Natural Resources Commissioner published in the State Register, and pursuant to the provisions of *Minnesota Statues*, section 103G.223 and *Minnesota Rules*, part 8420.0935. The list of fens is posted on the MNDNR website (MNDNR 2011b) and the general area that contains the calcareous fens near each Waubun subsite is shown in Figure 3-5 (note: the general area is shown in Figure 3-5 because the Commissioner does not identify the exact locations of the fens).

A calcareous fen is a rare and distinctive peat-accumulating wetland that is legally protected in Minnesota. Calcareous fens may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, except as provided for in a management plan approved by the commissioner of the Department of Natural Resources. Many of the unique characteristics of calcareous fens result from the upwelling of groundwater through calcareous substrates. Because of this dependence on groundwater hydrology, calcareous fens can be affected by nearby activities or even those several miles away.

3.3.6.1 Direct and Indirect Impacts

No direct wetlands impacts, such as filling or draining, would occur as a result of construction or operation of project features, including access roads, turbine pads, laydown areas, and underground transmission lines, because no project features occur in wetlands. The nearest wetlands at Waubun subsite A are outside the project boundary, approximately 300 feet to the north and 575feet to the south from the proposed wind turbines. One wetland is located within the project boundary, over 900 feet from the nearest proposed wind turbine. At Waubun subsite B, the nearest wetland is within the project boundary over 600 feet from the proposed wind turbine. At Waubun subsite C, the nearest wetland is within the project boundary approximately 550 feet from the proposed wind turbine. No wetlands occur at or near the Naytahwaush site.

Indirect impacts to wetlands at the Waubun subsites are not anticipated because the topography at each subsite is relatively flat (between 10 and 15 feet of elevational change at each subsite); therefore, dust or other contaminants from construction are unlikely to reach these wetlands via wind or surface transport.

Protected calcareous fens that occur approximately 0.7 mile from the nearest Waubun subite A turbine, 0.25 mile from the Waubun subsite B turbine, and 0.4 mile from the Waubun subsite C turbine would not be directly impacted by the project because all of the areas with fens occur outside the project boundaries; construction and operation of project features, including access roads, turbine pads, laydown areas, and underground transmission lines, would not result in filling, draining, or otherwise degrading the calcareous fens.

Indirect impacts due to changes in groundwater hydrology are of concern because the calcarous fens are dependent on groundwater hydrology. They typically occur on slight slopes where upwelling water eventually drains away and where surface water inputs are minimal. Groundwater in these areas is typically cold, oxygen-poor, and rich in calcium and magnesium bicarbonates (MNDRN 2008). A geotechnical evaluation of the proposed wind turbine sites encountered groundwater depths between 12 and 14 feet below the surface, therefore, dewatering may be necessary during construction. Dewatering would be performed during excavation to maintain the groundwater level at a depth of between 1 to 2 feet below the bottom of the foundation, depending on soil type. Dewatering would be performed by pumping from sumps at the bottom of the excavation. The MNDNR has reviewed information regarding potential dewatering during construction. Because the nearest wind turbine is located approximately 0.25 mile from a calcareous fen and is hydrologically downgradient, the MNDNR has determined that

temporary (less than 30 days) dewatering during construction would not have an adverse effect on the fens (Norris 2011).

3.3.7 Biological Resources

Biological resources include both wildlife and their habitat. Both are discussed in this section, along with a discussion of protected species. This assessment is based primarily on a site characterization study for the project (WEST 2010), a review of existing data from Minnesota Gap Analysis Project (MDNR 2009), Minnesota Department of Natural Resources (MNDNR), and a site visit. Several region-wide resources are also available that present information on life history and characteristics of listed species, habitat assessments, and recommended or required conservation strategies at the Federal and State levels.

3.3.7.1 Habitat

The Waubun site is located in the North Central Hardwoods ecoregion (EPA 2007), characterized as a transitional area between the predominantly forested Northern Lakes and Forests ecoregion to the north and the Agricultural ecoregion to the south. The Naytahwaush site is located in the Northern Lakes and Forests ecoregion (EPA 2007), characterized as a region of nutrient-poor glacial soils, coniferous and northern hardwood forests, undulating till plains, morainal hills, broad lacustrine basins, and extensive sandy outwash plains.

The MNDNR further classifies the sites according to its ecological classification system (MNDNR 2010). The Waubun site is on the eastern edge of the Red River Prairie subsection, a subunit of MNDNR's ecological classification system. The Red River Prairie subsection is characterized by a glacial lake plain with silty, sandy, and clayey lake deposits. It is generally level and uniform, broken by wetlands, meandering waterways, and old beach ridges. This subsection drains to the north into Canada via the Red River and its tributaries. Flooding is common in the spring due to the level topography. Tallgrass and wet prairie were the dominant vegetation prior to settlement. Native flora exists in patches, but much of the subsection has been ditched and drained for agriculture.

The Naytahwaush site is located on the border of two ecological subsections; Hardwood Hills and Pine Moraines/Outwash Plains. Hardwood Hills is characterized by steep slopes, high hills, and lakes formed in glacial end moraines and outwash plains. Wetlands and lakes in poorly drained potholes provide opportunities for recreation or wildlife habitat (MNDNR 2010). Pine Moraines/Outwash Plains is a mix of end moraines, outwash plains, till plains, and drumlin fields. White and red pine dominate the majority of forest communities on end moraines and till plains. Lakes are very common on the end moraines and some of the Outwash plains. Agriculture is common in the west, where center pivot irrigation of corn and potatoes is common (MNDNR 2010).

Currently, habitat at Waubun subsite A consists of an agricultural field, which was planted in soybeans in 2009. Waubun subsite B is partially developed and contains the Waubun Solid Waste Transfer Station and Ojibwe Building Supply. The site was previously used as a sawmill and now contains debris from that operation. The eastern part of the site had been enrolled in the Conservation Reserve Program (CRP). CRP is an NRCS program that encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. The site was tilled in the fall of 2009, indicating it is no longer in CRP. Waubun subsite C primarily consists of a maintained open field, but also includes the White Earth Housing Authority headquarters complex and a road that crosses through the western part of the site. The overall area is

generally flat with some areas of gently rolling hills. Habitat at the Naytahwaush site consists of maintained grass fields as part of the Naytahwaush Sports Complex.

According to a query of the Minnesota Natural History Information System, several native prairie remnants occur within the Waubun State WMA adjacent to Waubun subsite C. More than 99 percent of the prairie that was present in the state before settlement has been destroyed, and more than one-third of Minnesota's endangered, threatened, and species of special concern are now dependent on the remaining small fragments of Minnesota's prairie ecosystem.

Other unique habitats within 1 mile of the Waubun subsites, according to the Minnesota Natural Heritage Information System, include several calcareous fens that contain known occurrences of State-listed threatened plants. A calcareous fen is a rare and distinctive peat-accumulating wetland and is legally protected in Minnesota. Calcareous fens are designated as "outstanding resource value waters" in water quality regulations administered by the MPCA (*Minnesota Rules*, part 7050.0180) and are given special protection through *Minnesota Rules*, parts 8420.1010 to 8240.1060. The *Wetlands Conservation Act*, authorized by *Minnesota Statutes*, section 103G.223, states that: "calcareous fens may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, except as provided for in a management plan approved by the commissioner of the Department of Natural Resources." Many of the unique characteristics of calcareous fens result from the upwelling of groundwater through underlying calcareous formations. Because of this dependence on groundwater hydrology, calcareous fens can be affected by nearby activities or even those several miles away (see Section 3.3.6).

3.3.7.2 Wildlife

This section focuses on wildlife species that are most likely to be affected by the project, specifically birds and bats because of their potential to collide with the wind turbines. Species that are listed on either the Federal or State threatened or endangered species list Information for this section was gathered from a site visit in November 2009, U.S. Geological Survey (USGS) annual breeding bird survey (BBS) data, and range maps provided on the Cornell Lab of Ornithology Website (Cornell Lab of Ornithology 2011), as documented in the project site characterization study (WEST 2010).

A site visit was conducted in November 2009 after fall migration and, as expected, very few species and individuals were observed. No observations were made at the Waubun sites. One bald eagle (*Haliaeetus leucocephalus*) was observed approximately 1 mile from the Naytahwaush site; none were observed within the project site boundary. An American crow (*Corvus brachyrhynchos*), a blue jay (*Cyanocitta cristata*), a ruffed grouse (*Bonasa umbellus*), and a white-tailed deer (*Odocoileus virginianus*) also were observed in the general project area.

Although relatively few bird species were observed during the site visit in early winter, many birds could occur at or near the project sites during other seasons including passerines (songbirds), raptors (birds of prey), and waterfowl.

The USGS conducts annual BBSs along thousands of randomly established roadside routes in the United States. As can be seen in Figure 3-7, none of these routes crosses through either of the project sites. For purposes of this EA, the White Earth Nation selected two routes that occur nearby with similar habitat to determine what breeding birds are likely to occur in the project area. The Beltrami Route was selected as a representative for the Waubun site and the Tamarac National Wildlife Refuge Route was selected as a representative for Naytahwaush. Each BBS route is 24.5 miles long, and all birds seen or heard are tallied for a 3-minute period every half-mile along the route.

USGS recorded an average of 116 bird species from 1966 to 2007 during the summer BBS surveys along the Beltrami Route (Sauer et al. 2008). The most abundant birds were cliff swallow (*Petrochelidon pyrrhonota*) and red-winged blackbird (*Agelaius phoeniceus*), each with more than an average of 100 individual observations. Mourning dove (*Zenaida macrour*a), vesper sparrow (*Pooecetes gramineus*), western meadowlark (*Sturnella neglecta*), European starling (*Sturnus vulgaris*), bank swallow (*Riparia riparia*), common grackle (*Quiscalus quiscula*), bobolink (*Dolichonyx oryzivorus*), American robin (*Turdus migratorius*), and horned lark (*Eremophila alpestris*) were also common, all of which had an average of more than 20 observations on this route. Seven raptors were observed including northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), Swainson's hawk (*Buteo swainsonii*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), great horned owl (*Bubo virginianus*), and short-eared owl (*Asio flammeus*). As mentioned above, it is assumed that a similar species mix and abundance occurs in the Waubun area.

USGS recorded an average of 118 bird species from 1966 to 2007 during the summer BBS surveys along the Tamarac NWR Route (Sauer et al. 2008). The most abundant birds were ovenbird (*Seiurus aurocapillus*), chestnut-sided warbler (*Dendroica pensylvanica*), American crow (*Corvus brachyrhynchos*), veery (*Catharus fuscescens*), common yellowthroat (*Geothlypis trichas*), and yellow warbler (*Dendroica petechi*a), all of which averaged more than 20 individuals observed on this route. Raptor species recorded included osprey (*Pandion haliaetus*), bald eagle, sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk, red-shouldered hawk (*Buteo lineatus*), broad-winged hawk (*Buteo platypterus*), red-tailed hawk, American kestrel, great horned owl, and barred owl (*Strix varia*). As mentioned above, it is assumed that a similar species mix and abundance occurs at Naytahwaush.

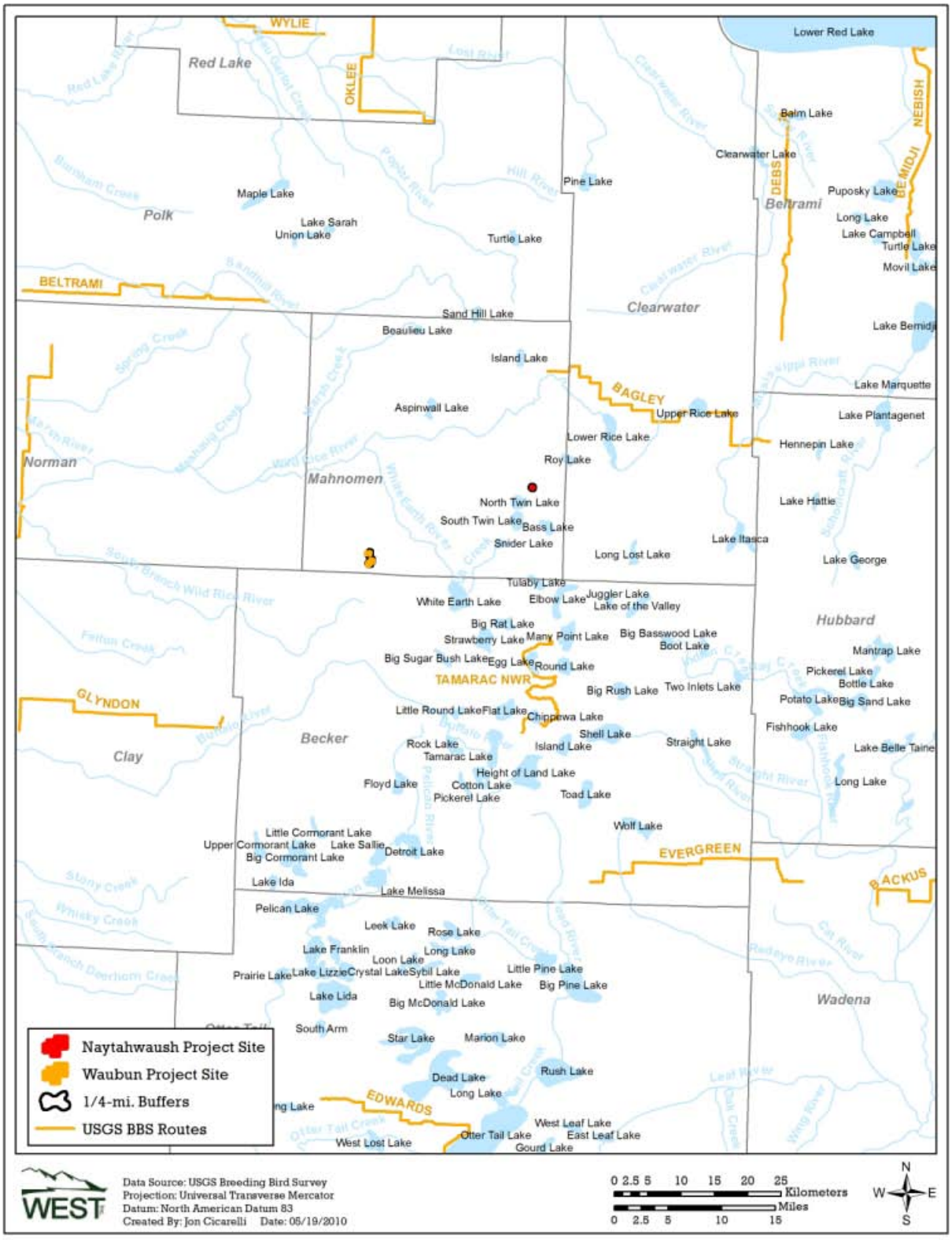

Figure 3-7. Breeding Bird Survey Routes

Raptor fatalities have been of particular concern at many wind energy facilities. Range maps provided on the Cornell Lab of Ornithology Website (Cornell Lab of Ornithology 2011) were used to determine raptor species that may occur in or near the project sites. Twenty-four raptors are likely to occur (Appendix E). Of these, species that could potentially breed in the area include American kestrel, bald eagle, broad-winged hawk, Cooper's hawk, northern harrier, red-tailed hawk, Swainson's hawk, red-shouldered hawk, osprey, sharp-shinned hawk, and turkey vulture. Owl species likely to breed in or near the sites include burrowing owl, eastern screech owl, great horned owl, long-eared owl, barred owl, northern saw-whet owl, and short-eared owl.

Raptor species that may also occur in the area outside of the breeding season (migration, winter, or post-breeding dispersal) include golden eagle (*Aquila chrysaetos*), gyrfalcon (*Falco rusticolus*), northern goshawk (*Accipiter gentilis*), merlin (*Falco columbarius*), rough-legged hawk (*Buteo lagopus*), and snowy owl (*Bubo scandiacus*). During the November 2009 site visit, bald eagle was the only raptor observed (seen near Twin Lakes southwest of the Naytahwaush site). During the 2011 raptor nest survey (see below), three northern harriers were observed flying within one-quarter mile of Waubun subsite C, and one immature bald eagle was observed flying approximately one-half mile north of the Naytahwaush site. Turkey vultures were observed within approximately 2 miles of both sites.

Potential nest structures for aboveground nesting raptor species are present in the form of living and dead trees within forested areas, shelterbelts, transmission lines, and infrastructure. Grassland areas could provide nesting habitats for ground-nesting raptors, such as the northern harrier and burrowing owl. Since potential raptor nest locations are present at or near each site, a raptor nest survey was conducted on April 7, 2011, by a qualified wildlife biologist (WEST 2011). The biologist used accessible roads and trails to conduct the survey in an attempt to observe all potential nest sites within a half-mile of all project sites prior to leaf-out. Visibility was limited in several areas around Naytahwaush due to thick stands of same-age coniferous forest. No raptor nests were observed.

No clear indicators of potential raptor prey species were noted during the field visit; however, suitable habitat is present for many prey species, and several species may occur within the general project area based on range maps. Prey species, including rabbits, rodents, waterfowl, fish, and passerines, are likely to exist within the different habitat types at the project sites. Waubun subsite A is located near sewage lagoons that could attract waterfowl, and Waubun subsite B has a waste transfer station that likely attracts small mammals. The Naytahwaush site has forest/grassland transition ecotones. All sites also have some level of disturbance (agriculture field, buildings, maintained grassland) relative to the surrounding natural areas, which could be a deterrent to some prey species. Although prey species are likely to be present, densities are not expected to be significantly different from areas surrounding the proposed sites, and may even be less due to existing land uses. With roost sites and food available, it is likely that raptors use the project area, but not to a greater degree than the surrounding areas and possibly less due to presence of undisturbed habitat in the surrounding area (e.g., wetlands, lakes, and forests).

Bird migration is of concern at wind turbine sites because of the possibility of migrating birds colliding with wind turbines. Since most species of birds are protected by the MBTA, loss of individual birds due to collisions with wind turbines would be a violation of the MBTA. Migrating songbirds and other species may be more at risk of turbine collision when ascending and descending from stopover habitats; they tend to migrate well-above the height of a wind turbine but fly at altitudes where they risk collision with a wind turbine or other structure while ascending or descending. It is likely that birds migrate through the general project area, including passerines, raptors, and waterfowl. The presence of large numbers of lakes, ponds, sewage lagoons, and wetlands intermingled among harvested grain crops in the general project vicinity attract migrating waterfowl. Both the Federal-managed Waubun WPA and the

State-managed Waubun State WMA are located in the vicinity of the proposed Waubun site (Figure 3-5). The Waubun WPA, located adjacent to Waubun subsite B, is one of 162 WPAs managed by the USFWS under the National Wildlife Refuge System in a five country region that includes Mahnomen County, and neighboring Polk, Becker, Norman, and Clay counties. WPAs consist of both upland grasslands and wetlands that are purchased by the Federal government to provide nesting habitat for waterfowl and hunting areas for waterfowl and upland game hunters (USFWS 2003). The Waubun WPA contains tallgrass prairie and wetland habitat. The primary waterfowl species that use the area include redhead (*Aythya Americana*), northern shoveler (*Anas clypeata*), blue-winged teal (*Anas discors*), mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), wood duck (*Aix sponsa*), canvasback (*Aythya valisineria*), and Canada goose (*Branta canadensis*). The Waubun State WMA, is managed by the Minnesota DNR. Habitat consists of tallgrass prairie, cattail/sedge marsh, and wet meadow. Bird species found in this WMA include northern harrier (*Circus cyaneus*), greater prairie chicken (*Tympanuchus cupido*), yellow rail (*Coturnicops noveboracensis*), sandhill crane (*Grus canadensis*), and various prairie sparrows. Several factors influence the migratory pathways of raptors and other birds, the most significant of which is geography. Two geographical features primarily used by raptors during migration are ridgelines and the shorelines of large bodies of water. There are no prominent hills, ridges, or other topographical features at either of the project sites that might cause updrafts where raptors might concentrate; however, an abrupt change in ecotone occurs in the general area, where the eastern hardwood forest changes to prairie. This change in ecotone includes a mild rise in elevation from west to east. This elevation change is not likely to create updrafts that would attract raptors; however, the change in habitat could attract both prey and raptors. No major waterbodies occur near any of the project sites with shoreline that might attract raptors; however, the Naytahwaush site is within an ecoregion that contains an extensive matrix of lakes. Moderate-sized lakes (at least 1 square mile) are present within 1 mile of the Naytahwaush site, and these lakes are likely to attract raptors such as bald eagles, osprey, and red-shouldered hawks.

According to Bat Conservation International (BCI 2009), seven species of bats could occur in Mahnomen County (Table 3-6). Two of these species, the northern long-eared myotis (*Myotis septentrionalis*) and eastern pipistrelle (*Pipistrellus subflavus*), are listed as a species of special concern in Minnesota; listed species are discussed further in the following section.

Table 3-6. Bat Species that Potentially Occur at the Project Sites

Species	Habitat	Timing of Occurrence
Eastern pipistrelle *Pipistrellus subflavus (subflavus)*	Roosts in tree foliage or high in tree crevices. Prefers edge habitats adjacent to agricultural settings in the vicinity of watercourses. Hibernates in caves or mines. In summer, roosts in foliage, cliff crevices, or manmade structures.	Likely summer resident and migrant
Eastern red bat *Lasiurus borealis*	Solitary tree-roosting bat. Roosts in the foliage of deciduous or evergreen trees and prefers trees bordered by open fields. Forages along forest edge, flood plain timber and fence rows. Uses woodland habitats.	Likely summer resident and migrant
Hoary bat *Lasiurus cinereus* (*cinereus*)	Solitary tree bat. Roosts in trees along forest borders and edges of forest clearings. Forages above water and forest openings such as grassy meadows.	Likely summer resident and migrant
Little brown myotis *Myotis lucifugus* (*lucifugus*)	Forms nursery colonies in buildings, attics, and other manmade structures. Uses a variety of habitats. Hibernates in caves or mines. Forages around trees and in open areas around water.	Likely summer resident and migrant
Northern long-eared myotis *Myotis septentrionalis*	Summer roosts are in variety of places from trees to manmade structures. Forages on forested hillsides and ridges. Hibernates in caves and mines.	Likely summer resident and migrant
Silver-haired bat *Lasionycteris noctivagans*	Solitary tree-roosting bat. Forms maternity colonies in tree cavities and small hollows. Roosts and hibernates beneath lose bark, in snags and in manmade structures.	Likely summer resident and migrant
Big brown bat *Eptesicus fuscus*	Forms maternity colonies beneath loose bark in forests and other trees, or in buildings, barns and bridges. Uses a variety of habitats including oak woodlands and dense tree canopy. May forage over cleared meadows and trees in pastures or along streams. May hibernate in caves.	Likely to occur year-round

Potential bat roosting habitat at or near each site includes trees and buildings. Caves are common roosting sites for many bat species; however, no caves were observed during the site visit and the topography of the area suggests caves are uncommon in this part of Minnesota. Bats generally forage over water and open spaces such as grasslands, streams, and wetlands/ponds, preying on insects that concentrate over water in wetlands and streams. These habitats are typically the most likely areas to attract foraging bats. Bat habitat (i.e., areas of water, wetlands, and other open space) exists near both of the project sites, but the extent of bat use within each specific site is not known.

In addition to the bird and bat species discussed above, mammal species likely to be found at or near the project sites are listed below (Table 3-7) based on MNDNR range maps and habitat requirements and availability (MNDNR 2011c).

Table 3-7. Mammals Potentially Occurring at or Near the Project Area.

Common Name	Scientific Name
Short-tailed weasel	*Mustela erminea*
Long-tailed weasel	*Mustela frenata*
Least weasel	*Mustela nivalis*
Mink	*Mustela vison*
Badger	*Taxidea taxus*
Raccoon	*Procyon lotor*
Virginia opossum	*Didelphis virginiana*
Porcupine	*Erethizon dorsatum*
Northern flying squirrel	*Glaucomys sabrinus*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Fox squirrel	*Sciurus niger*
Gray squirrel	*Sciurus carolinensis*
Red fox	*Vulpes vulpes*
Gray fox	*Urocyon cinereoargenteus*
Coyote	*Canis latrans*
Eastern cottontail	*Sylvilagus floridanus*
White-tailed jackrabbit	*Lepus townsendii*
Beaver	*Castor canadensis*
Muskrat	*Ondatra zibethicus*
Striped skunk	*Mephitis mephitis*
Eastern spotted skunk	*Spilogale putorius*
Bobcat	*Lynx rufus*

3.3.7.3 Federal- and State-Listed Species

This section addresses both Federal- and State-listed threatened or endangered species that have the potential to occur at the project sites. The gray wolf (*Canis lupus*) is the only federally listed species known or believed to occur in Mahnomen County (USFWS 2011). Three areas of critical habitat for gray wolves have been designated in north and northeast Minnesota, but not in Mahnomen County (43 FR 9607 9615, March 9, 1978).

According to the MNDNR online Rare Species Guide, the only State-listed species that are known or believed to occur in Mahnomen County are birds (Table 3-8; MNDNR 2011d). The Bat Conservation International (BCI) website indicates that two bat species that are considered species of concern could occur; therefore, these two species are also discussed in this section. The Minnesota Endangered Species statute prohibits the "take" of endangered or threatened species but does not protect species of special concern. Federal- and State-listed species and species of special concern that could occur at the project site are listed in Table 3-8.

Table 3-8. Federal- and State-Listed Species and State Species of Special Concern With Potential to Occur in the Project Area

Species	Habitat	Status	Known Occurrence in Mahnomen County?	Likelihood of Occurrence
Bald eagle *Haliaeetus leucocephalus*	Prefers coasts, lakes and rivers and is seen along mountain ridges in migration. Nests almost exclusively in live trees in wooded areas adjacent to marshes or bodies of water. Uses similar areas for roost sites in winter.	State species of special concern	Yes	Likely summer resident. Potential migrant.
Burrowing owl *Athene cunicularia*	Lives in dry, open areas with no trees and short grass. Found on golf courses, cemeteries, airports, vacant lots, university campuses, pastures, and prairie dog towns.	State-endangered	Yes	Potential summer resident.
Cerulean warbler *Dendroica cerulea*	During breeding season, inhabits mature deciduous forest. Prefers mesic to wet stands and bottomlands over uplands.	State species of special concern	Yes	Potential summer resident.
Greater prairie-chicken* *Tympanuchus cupido*	Lives in open prairie and oak savannah.	State species of special concern	Yes	Potential resident.
Horned grebe* *Podiceps auritus*	Breeds on small- to moderate-sized, shallow freshwater ponds and marshes. Winters along coasts and on large bodies of water.	State-threatened	Yes	Likely migrant.
Marbled godwit* *Limosa fedoa*	Breeds in marshes and flooded plains; during migration and in winter, breeds on mudflats and beaches.	State species of special concern	Yes	Likely summer resident.
Nelson's sharp-tailed sparrow* *Ammodramus nelsoni*	Lives in freshwater marshes and wet meadows in interior and brackish marshes along coast; in winter, lives in salt and brackish marshes.	State species of special concern	Yes	Likely summer resident. Potential migrant.
Red-shouldered hawk *Buteo lineatus*	Nests in large (> 300 acres), mature deciduous or mixed forests. Forages in wetlands including wet meadows, lowland forests, or upland areas.	State species of special concern	Yes	Likely summer resident.
Short-eared owl* *Buteo lineatus*	Requires large, open grassland or emergent wetland habitats such as prairie or marshes for breeding. Winters in old fields, marshes, and hayfields.	State species of special concern	Yes	Likely summer resident. Potential year-round resident.
Trumpeter swan *Cygnus buccinator*	Breeds in freshwater marshes and along ponds and lakes. Winters in lakes, streams, springs, rivers, and reservoirs.	State-threatened	Yes	Likely summer resident.

Species	Habitat	Status	Known Occurrence in Mahnomen County?	Likelihood of Occurrence
Wilson's phalarope *Phalaropus tricolor*	Breeds in shallow, prairie wetlands in the northern United States and southern Canada. During migration, inhabits shallow ponds, flooded fields, and sometimes mudflats.	State-threatened	Yes	Potential summer resident (Waubun). Potential migrant (Waubun).
Yellow rail* *Coturnicops noveboracensis*	Lives in shallow marshes and wet meadows; in winter, lives in drier freshwater and brackish marshes, as well as dense, deep grass, and rice fields.	State species of special concern	Yes	Likely summer resident.
Common tern *Sterna hirundo*	Nests on islands, marshes, and sometimes beaches of lakes and ocean.	State-threatened	No, but known occurrence in adjacent county.	Likely migrant.
Forster's tern *Sterna forsteri*	Breeds in marshes, generally with lots of open water and large stands of island-like vegetation.	State species of special concern	No, but known occurrence in adjacent county.	Likely summer resident. Potential migrant.
Eastern pipistrelle *Pipistrellus subflavus (subflavus)*	Roosts in tree foliage or high in tree crevices. Prefers edge habitats adjacent to agricultural settings in the vicinity of watercourses. Hibernates in caves or mines. In summer, roosts in foliage, cliff crevices, or manmade structures.	State species of special concern	No, but BCI indicates potential for occurrence.	Likely summer resident and migrant.
Northern long-eared myotis *Myotis septentrionalis*	Summer roosts are in a variety of places, from trees to manmade structures. Forages on forested hillsides and ridges. Hibernates in caves and mines.	State species of special concern	No, but BCI indicates potential for occurrence	Likely summer resident and migrant.
Gray wolf *Canis lupus*	Lives in temperate forests, mountains, tundra, taiga, and grasslands habitats. Territory may range in size from 50 to 1,000 square miles.	Federally threatened; State species of special concern	Yes	In Minnesota, the gray wolf is believed to occur through the northeast Great Lakes regions, as well as within specific WMA; potential to migrate through project area.

*Known occurrence within 1 mile of project sites, according to Minnesota Natural Heritage Information System.

The USFWS noted particular concern in its consultation letter about the greater prairie chicken, a State species of concern, but not a federally protected species (Appendix B). The Minnesota Natural Heritage Database indicates a record for this species approximately 0.3 mile southwest of Waubun subsite A. The USFWS noted a correlation between the species' habitat avoidance and turbine placement. Although this species is known to occur in the vicinity of the Waubun subsites, there is no habitat for this species in the agricultural field that makes up Waubun subsite A or the maintained open spaces that make up Waubun subsite C. Waubun subsite B is unlikely to provide habitat due to the disturbances adjacent to the proposed turbine site, including an agricultural field and the Waubun Solid Waste Transfer Station and Ojibwe Building Supply. None of the Waubun subsites provides important prairie chicken habitat for lekking, nesting, or brood-rearing, and any use of the sites would be incidental. The project area is at the eastern periphery of the range of greater prairie chicken in Minnesota; the core area for this species in the state is farther west (Larson 2009).

Five species listed as either threatened or endangered by the State of Minnesota occur in Mahnomen County (Table 3-8). Four of these species are birds that are closely associated with aquatic habitats (horned grebe, trumpeter swan, Wilson's phalarope, and common tern) and are not present on either of the project sites. A fifth species, the burrowing owl, prefers habitats with short grass or dry, open areas with burrowing mammals such as grazed pastures or mixed-grass prairies. The Waubun site is on the far eastern edge of the species range. Although burrowing owls have been observed in western Minnesota, they are rare. The first documented records of nesting burrowing owls in Minnesota since 1990 were recorded in Norman County in 2006 and Polk County in 2007 (MNDNR 2011d). Both counties are just west of Mahnomen County. The Naytahwaush site is outside the range of the burrowing owl.

Neither of the two bat species listed as species of special concern (Table 3-8) are known to occur in Mahnomen County.

3.3.7.4 Direct and Indirect Impacts

Habitat

Table 3-5 shows the acreage of temporary and permanent disturbance by project site. Direct, permanent habitat loss would be associated with construction of the new access roads and wind turbine pads and would affect up to 0.67 acre at Waubun subsite A, 0.33 acre at subsite B, and 0.28 acre at subsite C. At Naytahwaush, direct, permanent habitat loss would be 0.25 acre for the turbine pad; access road construction is not required at this site.

Areas temporarily impacted would be restored. Direct, temporary habitat loss would be associated with laydown areas, access roads, and underground transmission lines and would affect up to 4.7 acres at Waubun subsite A, 1.24 acres at subsite B, and 1.1 acres at subsite C. At Naytahwaush, direct, temporary habitat loss would be 1.1 acres. White Earth Nation has committed to restoring temporarily disturbed areas to the original or near-original topographic features and reseeding with a native seed or other seed stock.

Indirect impacts to habitat could include the introduction of noxious weed species. White Earth Nation has committed to monitoring and controlling noxious weeds to minimize the potential for indirect impacts.

While the disturbances from construction would directly affect small acreages of vegetation currently onsite, the project sites do not contain ecologically significant habitat and the onsite vegetation has been previously disturbed. Waubun subsite A is agricultural land, subsite B primarily consists of weedy forbs and grasses with scattered debris and an adjacent agricultural field, and subsite C is a maintained open grass field. The Naytahwaush site is a maintained grass field, part of the Naytahwaush Sports Complex.

Native prairie remnants that occur in the Waubun State WMA near Waubun subsite C are outside the project area and would be avoided. The wind turbines and other project features would be distant enough from the prairie remnants to allow for prairie management, such as prescribed burning; the White Earth Tribal Housing Authority headquarters complex is between the native prairie remnants and the project features. Because of the small acreage potentially affected (permanent disturbance would range from 0.25 acre at Naytahwaush to a maximum of 0.67 acre at Waubun subsite A), previous vegetation disturbance at both sites, and White Earth Nation's commitment to mitigation measures, habitat impacts would be minimal.

Wildlife

Wildlife impacts from wind energy projects primarily affect birds and bats; therefore, this section focuses on these species. The most probable direct impact to birds from the project would be mortality or injury due to collisions with wind turbine blades and/or towers. Based on studies at many wind farm sites, the ranges of avian mortality (presumably due to collision) is one to six bird kills per megawatt per year (AWEA 2009). Using this assumption, the proposed project could result in less than one to up to three bird kills per year because the total project energy output would be less than one-half megawatt (the maximum output would be 420 kilowatts, assuming one 300-kilowatt and three 40-kilowatt wind turbines are selected). If a lattice tower is used, this could provide a perching opportunity for birds, particularly raptors, since perching on high structures provides good views for hunting. If birds perched on a lattice tower, it is assumed this would increase the likelihood of collisions. Collisions may occur with resident birds foraging and flying within the project sites or with migrant birds moving through seasonally. Wooded areas, lakes, ponds, grasslands, agricultural fields, and wetlands found at or near the project sites provide stopover habitat for migrants. These types of habitats are found extensively throughout the region; therefore, their presence at and near each site are not likely to concentrate bird use in any one area as compared to adjacent areas.

The proximity of the Waubun WPA to proposed wind turbine at Waubun subsite B (0.17 mile) was noted by the USFWS in its consultation letter. The USFWS, therefore, recommended a 0.5-mile setback (Appendix B). White Earth Nation was unable to move the proposed site the recommended distance due to the limited size of the site and existing infrastructure on the site. The Tribe considered moving the turbine the maximum distance from the WPA within the site (approximately 0.25 mile), but existing infrastructure on the site precluded such a move. A review of existing literature on the effects of wind energy facility construction and operation on waterfowl indicates minimal waterfowl mortality at wind facilities in the United States and Europe. Similar to direct impacts, indirect impacts (i.e., avoidance) also appeared to be minimal. As described below, several reports about waterfowl displacement near wind turbines were reviewed, and measured displacement of waterfowl from wind turbines was found to range from zero to approximately 820 feet or less.

At the Top of Iowa wind energy facility in western Worth County, Iowa, approximately 1.2 million and 904,200 goose-use days (goose observed on a given survey) were recorded in the fall 2003 and 2004, respectively, in three WMAs in close proximity (actual distance not provided) to the wind resource area. For each year, fields with wind turbines were less likely to have Canada geese (*Branta canadensis*) foraging in them during fall, but the effects were considered negligible. There was no significant difference in Canada goose vigilance behavior in fields on the wind facility compared with fields without turbines. In summary, the Top of Iowa wind facility appeared to not adversely affect Canada goose use of the area and no mortalities were recorded (Jain 2005).

A study of wintering waterfowl [primarily Canada goose and mallard (*Anas platyrhynchos*)] use at a wind energy facility and adjacent undisturbed reference area in Illinois found the wind energy facility did not displace wintering waterfowl (Derby et al. 2009). A total of 2,728 waterfowl were recorded during winter, with Canada geese the most commonly observed species (81.4 percent of observations). Two

groups totaling 300 mallards and one group of 200 common goldeneyes (*Bucephala clangula*) were also recorded during winter surveys. Wintering waterfowl use in the wind energy facility (14.7 birds per plot per 20-minute survey) was not significantly different from use in the reference area (13.56 birds per plot per 20-minute survey). Comparisons were also made by species for mallards, Canada geese, and common goldeneyes; no significant differences in bird use by these species between the wind energy facility and the reference area were observed.

Waterfowl and waterbird surveys were conducted during pre-construction (spring 2008), construction (fall 2008), and in post-construction (spring 2009) periods at the Crystal Lake II Wind Energy Center in Winnebago County in northern Iowa. The study evaluated the impact of construction and operation of a wind facility on the movement and behavior of waterfowl and waterbirds between two wetland complexes. The presence of operating turbines, even within 0.2 mile of a wildlife/wetland area, did not appear to act as a barrier to waterfowl movement between wetland complexes. Waterfowl flew at lower altitudes, presumably to avoid turbines (Jones et al. 2010).

The USFWS initiated a four-year study in April 2008 to assess the impacts of wind energy development and operation on five species of breeding waterfowl and other birds in south-central North Dakota (41 turbines) and north-central South Dakota (120 turbines). One objective was to determine if the abundance of breeding waterfowl was similar for wetlands within wind facilities and those that were not in wind facilities. Results for both 2008 and 2009 found no evidence that the abundance of five species of breeding waterfowl was influenced by the presence or absence of wind energy facilities. Results are preliminary and data collection continued in 2010 (USFWS 2009).

Wintering pink-footed geese were studied in spring 1998 in Denmark to evaluate the effect of 61 wind turbines and other landscape elements, such as power lines, roads, and settlements, on field utilization by the geese. Nature reserves and shallow water lakes and marshes provided roosting areas, with the geese feeding in the croplands and pastures in the region. Field utilization by geese was estimated by measuring goose dropping density along transects that were placed perpendicular to the landscape element, including turbines. The effect of the landscape element, called avoidance distance, was defined as "the distance from a given landscape element to the point at which 50 percent of maximal dropping distance was reached." The avoidance distance from wind facilities with turbines in lines was about 328 feet and with turbines in cluster formation was about 656 feet. For the two transects located within the large cluster of turbines, no goose droppings were found. Results indicate that the loss of habitat due just to the presence of wind turbines was 4 percent of total field area and 13 percent of the available field area (Larsen et al. 2000).

Based on a before/after-control/impact study of bird displacement at the Buffalo Ridge wind energy facility in southwest Minnesota, use of the wind development areas following construction was lower than expected in some cases for waterfowl and, in one case, use was higher. The study, conducted in 1998 and 1999 concluded limited displacement of waterfowl occurred (Johnson et al. 2000).

The above studies suggest that the proximity of the Waubun WPA to the Waubun project site, particularly subsite B, is unlikely to adversely affect waterfowl that utilize the area. These studies were conducted at much larger wind energy sites (up to 120 turbines versus up to 4 turbines at Waubun), and in the case of the Crystal Lake II Wind Energy Center in Iowa, at a similar distance to a wildlife/wetland area as Waubun subsite B is to the Waubun WPA (within 0.2 mile and 0.17 mile, respectively). Of particular note is the Top of Iowa wind energy facility with no recorded mortalities of Canada geese despite up to 1.2 million goose-use days recorded at three WMAs in "close proximity" to the project (Jain 2005).

Although direct impact (mortality or injury) to birds is possible, the estimated impact to birds from the proposed project is considered minor because only a small number of individuals would be affected, not

populations. The impacts would be spread across multiple species and bird groups, as well as across seasons. Furthermore, most fatality estimates are based on projects where multiple wind turbines exist. With the exception of Waubun subsite A, where two wind turbines might be installed, one wind turbine would be installed at each site. It is reasonable to assume that a bird can more easily avoid a single wind turbine than multiple wind turbines in a wind farm. Furthermore, each of the sites is located within or near urban communities in previously altered land. This may lead to a greater propensity for migrating birds to avoid the sites and thus fewer potential impacts.

The most probable indirect impact to birds is displacement. Some grassland passerines that have been shown to be displaced at other wind energy facilities, such as the western meadowlark, bobolink, common yellowthroat, and red-winged blackbird, are likely to be present at the project sites based on the BBS, so some displacement could occur. Since no raptor nests were observed within or near any of the project sites during the raptor nest survey, displacement of nesting raptors is unlikely. Each of the sites has some level of existing disturbance (e.g., annual farming, Naytahwaush Sports Complex) that may currently cause displacement of bird species, so it is possible the addition of the wind turbine(s) would have little additional displacement effect. Indirect effects of the proposed project on birds is not considered significant because, if it does occur, the area surrounding each site has ample similar, undisturbed habitat that displaced birds could use, whether for foraging or nesting.

Bat casualties have been reported from most wind energy facilities where post-construction fatality data are publicly available. Reported estimates of bat mortality at wind energy facilities have ranged from 0.9 to 43.2 bats per megawatt annually in the United States, with an average of 4.6 fatalities per megawatt annually (NWCC 2004). Within the Midwest region, consisting of North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Michigan, Indiana, Ohio, and Kentucky, bat mortality from 26 wind energy projects with publicly available data ranges from 0.16 to 30.61 bats per megawatt annually, with an average of 6.1 bats per megawatt annually (Bay et al. 2010). Most of the bat casualties at wind energy facilities are migratory species that conduct long migrations between summer roosts and winter areas. The species most commonly found as fatalities at wind power facilities include hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), and eastern red bat (*Lasiurus borealis*). These are the most common species nationwide, as well as in the Midwest region. These three species could occur at the project sites as summer residents and migrants.

It is assumed that direct impacts to bats as a result of the proposed project would include mortality and injury. Mortality or injury could occur from collisions with the wind turbine or barotrauma, where a sudden drop in air pressure near the wind turbine blades causes fatal damage to the bats' lungs (Baerwald et al. 2008). An estimated 3 bat fatalities would occur, since the total energy output for the project would be under one-half megawatt (the maximum output would be 420 kilowatts, assuming White Earth Nation selects one 300-kilowatt and three 40-kilowatt wind turbines). This estimate is based on the Midwest region average of 6.1 bat fatalities per megawatt annually. It is assumed that most of the bat kills would consist of hoary bats, silver-haired bats, and/or eastern red bats since they have the potential to occur in the project area and are the most common species killed at other wind energy facilities in the region and nationally. Direct impacts are not considered significant because, while a small number of individuals are likely to be killed annually due to operation of the proposed project, bat populations would not be affected, particularly since the impact is likely spread across several species.

Indirect impacts to bats as a result of wind energy projects are not well known; most bat studies at wind energy facilities to date have focused on mortality. All seven bat species with the potential to occur in the project area could occur as summer residents or year-round resident in the case of the big brown bat (*Eptesicus fuscus*). Most of the bat species roost in trees, which makes them more likely to occur at the Naytahwaush site. Additionally, most of the bat species forage in habitats that could include the project sites. Any indirect impacts that might occur are most likely to occur at Naytahwaush and occur during

the summer months. Although indirect impacts are generally unknown and have not been well studied, it is assumed they would be minor.

Besides birds and bats, other species known to occur in the project area are small and large mammals, which are highly mobile and able to avoid disturbances (e.g., noise, dust) that are associated with construction of a project. Once construction was complete, impacts to mammals would expect to be minimal. The project area would not be fenced, so passage would not be restricted. Habitat loss would be minor compared with the large amount of similar habitat available in the area surrounding the project sites and generally low-quality habitat in which the project would occur. A minor increase in traffic and human activity is anticipated to be associated with regularly scheduled and unscheduled maintenance visits. The minimal increase in activity would not likely alter existing wildlife patterns. The sound produced by the wind turbines may cause some wildlife to avoid the area near the wind turbines; however, wildlife might become habituated once construction activity ceased. All proposed transmission lines would be placed underground, eliminating the risk to most wildlife species.

Federal- and State-Listed Species

One federally listed species, the threatened gray wolf, has potential, but is not known, to occur in the project area. Since the gray wolf is highly mobile, any individuals that happen to be in the area are expected to avoid the noise and activity associated with construction. Operation of the project would not affect the gray wolf.

Because the five State-listed species that are known to occur in Mahnomen County are all bird species, the direct and indirect impacts would be similar to those described above for non-listed bird species. Because the burrowing owl is rare in the region and is unlikely to occur at any of the project sites, no impacts should occur. The other four species (horned grebe, trumpeter swan, Wilson's phalarope, and common tern) associate closely with aquatic habitats; therefore, the greatest risk, albeit low, would occur during migration. While impacts including mortality could occur to listed birds, impacts are unlikely and not significant because populations would not be adversely affected and the status of a listed bird species would not change as a result of the proposed project.

Direct mortality of the greater prairie chicken, which is known to occur in the vicinity of the Waubun project sites, could occur due to collisions with project features. This species is considered a poor flyer, and may be more susceptible to collisions than other types of birds (Johnson and Holloran 2010). However, as a poor flyer, the greater prairie chicken would be unlikely to collide with turbine blades at a height of 60 feet or more or with single towers located in agricultural fields or maintained grass fields near existing buildings. If mortality did occur due to the project, the greater prairie chicken population in Minnesota would not be adversely affected since mortality would not be substantial enough to cause population declines, especially since the core of the population is found west of the site.

The project would not result in a loss of important greater prairie chicken habitat, such as lekking, nesting, or brood rearing for this species, since none occurs at either of the project sites. The USFWS has suggested that because prairie chicken evolved in habitats with little vertical structure, placement of tall manmade structures, such as wind turbines, in occupied habitat may result in a decrease in habitat suitability (USFWS 2004). Displacement from nearby occupied sites could occur, but is unlikely due to the distance from the wind turbines to known occupied habitat (0.3 mile); other suitable habitat is at a similar distance. Furthermore, data collected at a small wind energy facility in northwestern Minnesota indicate that impacts to greater prairie chickens are not likely. At a three-turbine wind energy facility in Minnesota, six active greater prairie chicken leks were located within 2 miles of turbines, with the nearest lek within 0.6 mile of the nearest turbine (USFWS 2004). Subsequent research at the three-turbine wind energy facility found that for 40 nest locations, nesting hens were not avoiding turbines. Based on extensive research of the prairie chicken population in the vicinity of that wind energy facility from 1997

to 2009, it was concluded that the distribution and location of leks, and especially nests, was determined by the presence of adequate habitat in the form of residual grass cover, not the presence of vertical structures such as trees, woodlots, power lines, and wind turbines (Toepfer and Vodehnal 2009). This study provides evidence that prairie chickens on leks as well as nesting hens did not appear to avoid turbines at a similarly sized small wind energy project.

Two bat species listed as species of concern, the eastern pipistrelle and northern long-eared myotis, are not known to occur in Mahnomen County. Potential direct and indirect impacts would be the same as described above for non-listed bat species. While impacts including mortality could occur, impacts are not significant because populations would not be affected and the status of a listed bat species is not expected to change as a result of the proposed project.

3.3.8 Human Health and Safety

Health and safety issues related to the proposed project are primarily related to construction. Worker health and safety during construction would be the responsibility of the contractor. Contractors typically have a health and safety plan that addresses issues such as confined space entry, hoisting and rigging operations, and proper handling and disposal of toxic and hazardous substances. White Earth Nation would ensure the contractor hired for construction had an appropriate health and safety plan. Additionally, the White Earth Nation has committed to the following practices related to health and safety during construction: providing clean safe drinking water, waste disposal, portable toilets, fencing of open pits, and limiting site access to contractors and other necessary personnel.

The term electromagnetic field (EMF) refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from the voltage or electrical charges and magnetic fields are caused by the flow of electricity or current traveling along transmission lines, collector lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors. While the general consensus is that electric fields pose no risk to humans, the question of whether exposure to magnetic fields potentially can cause biological responses or even health effects continues to be the subject of research and debate. Wind turbines are not considered a significant source of EMF exposure since emission levels around wind farms are low (CMOH 2010). Based on the most current research on EMF, and the distance between any turbine and occupied residences, the turbine would have no impact to public health and safety due to EMF.

Because no fuel is burned to power the wind turbines, 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. Some lubricants are used in wind turbines, including gearbox oil, hydraulic fluid, and gear grease. White Earth Nation would ensure that the maintenance worker hired was 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 wind turbine would be limited to the maintenance worker and White Earth Nation officials; therefore, no public health and safety issues are anticipated.

3.3.9 Transportation

The Waubun site is served by Highway 59 and the Naytahwaush site is served by County Road 4. Access to the Interstate transportation system (i.e., Interstate 94) is available via Highway 59 near Fergus Falls. Plans have not been made regarding transportation of project materials and equipment; however, it is likely all could use existing infrastructure. The three Waubun subsites would require construction of new

access roads ranging in length from 150 to 2,100 feet; no new access roads would be needed for the Naytahwaush site.

3.3.9.1 Direct and Indirect Impacts

Large pieces of equipment such as the turbine tower, rotor blade, and nacelle would be designated oversized loads and would temporarily slow traffic. These would be short-term impacts. A permit from the Minnesota Department of Transportation would be required for this transportation prior to movement of the parts of the wind turbine to the project sites.

During the construction phase of the project, a temporary increase in the number and frequency of vehicular traffic on the local roads identified above surrounding the project site is anticipated. No long-term or permanent impacts to the local transportation systems would occur as a result of this project.

3.3.10 Socioeconomics and Environmental Justice

The proposed project is located within the boundaries of the White Earth Reservation. According to the White Earth Economic Development Office , the population of the White Earth Reservation is 9,188 people and the number of enrolled Indians in or near the Reservation boundaries is 4,055 (WEEDO 2011). The official unemployment rate has been approximately 5 percent, but the true unemployment rate is estimated to be 30 to 40 percent due to the lack of job opportunities. The median family income for residents of the White Earth Reservation is estimated at $33,144, compared with $50,046 nationally. The White Earth Tribal Council is the largest employer, and the Tribe's principal economic activity is the Shooting Star Casino, Hotel and Event Center. Other businesses owned by the Tribe are the Manitoc Mall in Mahnomen, and Ojibwa Building Supplies and White Earth Sanitation, both in Waubun. These tribal businesses are major employers of the White Earth population.

Five to six workers would be employed during the construction period. Most construction workers would be employees of the various construction and equipment manufacturing companies under contract to the White Earth Nation. It is likely that construction workers would include a mix of locally hired workers for road and turbine foundation construction and specialized staff from outside the area for specialized construction (e.g., electrical collector system construction, turbine erection, and turbine testing). Construction of the project would require use of concrete, fuel, and other equipment and supplies, most of which would be purchased locally or regionally. After the project was constructed and tested, it is anticipated that a small staff of part-time employees would be required for operations and maintenance. Therefore, the proposed project would have a small direct, beneficial impact to the local economy, especially during the construction period.

Executive Order 12989 (February 11, 1994) directs Federal agencies to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." On the White Earth Reservation, approximately 44 percent of the population is American Indian, which is considered a minority population by the USCB, and an estimated 40 percent of the tribal population is low income. Since the proposed project would benefit the local economy, including local low-income and minority populations on the White Earth Reservation, the proposed project would not have disproportionate adverse effects on these groups of people.

3.3.11 Air Quality and Climate Change

Because of the rural nature of the two project sites, air quality is expected to be generally good. There are no large stationary sources (e.g., a power plant or refinery) of air pollutants near the sites and area sources

(e.g., residential wood combustion and gas stations) are few and scattered. Mobile sources (e.g. vehicles, trains, aircraft, and construction equipment) are also few and scattered.

To provide a simple, uniform way to report daily air quality conditions and assess ambient air quality, the U.S. Environmental Protection Agency developed the Air Quality Index (AQI). In Minnesota, four pollutants are used to calculate the AQI: ground-level ozone, sulfur dioxide, carbon monoxide, and fine particulate matter (PM_{10}; MPCA 2010). The two pollutants of most concern in Minnesota are ozone and PM_{10}. Ozone is only a problem in warm weather and, therefore, is only monitored from April through September; PM_{10} is monitored year-round. Nine ambient air quality monitoring stations are located throughout the state, but not all four pollutants are measured at each station. The closest AQI monitoring station to the project area is in Detroit Lakes, Becker County, approximately 25 miles south of Waubun. Two pollutants are measured at this station: ozone and PM_{10}. According to the most recent annual summary for this station (2009), the Detroit Lakes station had 311 "good" AQI days, with an average reading of 32 (MPCA 2010). "Good" air quality has an AQI between 0 and 50, while "moderate" air quality has an AQI between 50 and 100. An AQI of 100 suggests health effects might be expected in sensitive populations. The Detroit Lakes station recorded two days in March 2009 with an AQI of more than 100. Due to the proximity of the Detroit Lakes monitoring station to the project sites, it is assumed the air quality is similar.

Minnesota's *Next Generation Energy Act* establishes greenhouse gas reduction goals for the state as follows: 15 percent reduction from 2005 levels by 2015; 30 percent reduction by 2025; and 80 percent reduction by 2050. According to a greenhouse gas emissions estimate for Minnesota by economic sector, the two sectors that had the most growth in emissions from 1970 to 2006 were electric power and transportation. Emissions from these two sectors comprised roughly 42 percent of all Minnesota greenhouse gas emissions in 1970, and by 2006 they accounted for 64 percent, more than doubling in absolute terms (Ciborowski and Claflin 2009).

3.3.11.1 Direct and Indirect Impacts

Air Quality

Both negative and beneficial impacts to air quality are likely to be associated with development of the proposed project. Air quality would be minimally impacted in the immediate vicinity of the two project sites during construction due to dust and exhaust from construction equipment. Fugitive dust from ground disturbance would be generated during construction of the turbine pads, access roads, and buried transmission lines. The amount of fugitive dust would depend largely on weather conditions during construction, with windy and dry weather generating the most fugitive dust. Fugitive dust emissions would be temporary and intermittent during trenching and pad construction activities within the two-month construction window. After construction, air quality is expected to return to pre-construction levels. Construction related impacts to air quality would be minor because they would be localized and temporary.

No negative direct or indirect air quality impacts are anticipated for operation of the proposed project.

Climate Change

It is assumed that if the wind turbines were not built, the power needed by the White Earth Nation would continue to be supplied by other sources, primarily fossil fuels. As mentioned above, electric power generation is one of the top two sectors for greenhouse gas emissions in Minnesota. Use of wind power would offset greenhouse gases and other fossil fuel emissions currently used to generate electricity (Table 3-10).

In the United States, most of the greenhouse gas emissions are in the form of carbon dioxide emissions from burning fossil fuels. Reducing these emissions is increasingly becoming a goal of both industry and individuals because of their effect of trapping heat in the atmosphere and the associated effect that increased heat in the atmosphere has on climate. Table 3-10 shows the amount of carbon dioxide that would be offset for wind turbine models similar to those under consideration for the project.

Table 3-10. Carbon Dioxide Offsets for the Wind Turbine Models Under Consideration

Wind turbine model	Nameplate capacity (kW)	Gross capacity factor (kW)	Net capacity factor (kW)	Estimated annual output (kWh)	Estimated value - power sales	Tons CO_2 equivalent – (annual metric tons)
Jacobs	20	23.84	21.9	38,444	$1,538	27.6
Next Generation	33	30.2	27.8	80,405	$3,126	57.7
Vinco	65	16.6	15.27	87,134	$3,485	62.6
Vinco	95	17.3	15.9	135,924	$5,437	97.6
Heron	300	14.2	13.1	388,921	$15,557	279

kW = kilowatt; kWh = kilowatt-hour.

The proposed project could offset an estimated maximum of 452.1 annual metric tons of carbon dioxide. Assuming a 20-year project life, a maximum of 9,042 metric tons of carbon dioxide could be offset. Since the proposed project contributes toward offsetting atmospheric carbon dioxide, it is considered to have a beneficial impact toward the goal of reducing greenhouse gas emissions and their effect on climate**.**

3.3.12 Utilities and Energy

Currently, Otter Tail Power Company and Wild Rice Electric Cooperative supply power to the White Earth Reservation and surrounding area. The primary fuel source for these companies is coal.

If not properly sited, wind turbines can cause interference in radio, microwave, radar, and other frequencies, disrupting critical lines of communication. The National Telecommunications and Information Administration (NTIA) is responsible for managing the Federal spectrum and is involved in resolving technical telecommunications issues for the Federal government and private sector. The NTIA can aid in siting wind turbine projects is there is potential for a proposed project to interfere with Federal radio communication links.

3.3.12.1 Direct and Indirect Impacts

The project could generate up to 630,136 kilowatts per hour per year, or enough electricity to supply up to 35 homes each year (at an average of 18,000 kilowatt-hours per year). The project would produce substantial amounts of clean electricity for the 20-year design life of the project. The primary beneficiaries of this project are the White Earth Nation tribal government and residents of the Reservation and the upper Midwest. The tribal government would benefit from low-cost wind energy, potential revenue from the sale of the wind energy, greater utilization of renewable energy, and reduced reliance on fossil fuel. The residents of the Reservation and the upper Midwest would benefit from potentially better air quality, which is currently impacted by a fossil fuel-driven electrical generation. The existing transmission system is capable of accepting electricity generated by the project. No adverse energy impacts would result from the project.

Implementation of the proposed project would not increase demand for natural resources or energy supplies to levels exceeding availability. The project's net impact on energy supplies would be positive, as the wind energy produced would be a renewable resource. Therefore, adverse impacts are not expected.

The proposed project would not interfere with civilian or military radar because the wind turbines would be less than 200-feet high. Radar usually does not scan for object this close to the ground because common land features at this height, such as trees, would normally cause distorted, cluttered, or misleading radar images (AWEA 2008). Furthermore, the proposed project would not interfere with existing microwave systems and broadcast stations because the proposed wind turbines would not physically block the line-of-sight between two microwave transmitters or between a television station and reception points (Polisky 2005). The nearest microwave towers are located adjacent to each other 24 miles east of Waubun (City-Data 2011). One has frequencies assigned in the 900MHz band with an overall height of 190 feet; the second has frequencies assigned in the 6GHz band with an overall height of 200 feet. Based on height alone, the proposed wind turbines would not interfere with microwave transmission because the highest proposed wind turbine (187 feet total height) would be below the height of the microwave transmissions. No television broadcast towers occur within 40 miles of the proposed project and due to the small scale of the project, it would not interfere with television broadcast. Because this preliminary analysis does not indicate any potential for the proposed project to interfere with communication, a formal review was not conducted by the NTIA .

3.4 Irreversible and Irretrievable Commitment of Resources

A commitment of resources is irreversible when its primary or secondary impacts limit the future options for a resource or limit those factors that are renewable only over long periods of time. Examples of nonrenewable resources are minerals, including petroleum. An irretrievable commitment of resources refers to the use or consumption of a resource that is neither renewable nor recoverable for use by future generations. Examples of irretrievable resources are the loss of a recreational use of an area. While an action may result in the loss of a resource that is irretrievable, the action may be reversible. Irreversible and irretrievable commitments of resources are primarily related to construction activities.

For the proposed project, resources consumed during construction of the project, including labor, fossil fuels, and construction materials, would be committed for the life of the project. Nonrenewable fossil fuels would be irretrievably lost through the use of gasoline- and diesel-powered construction equipment during construction. A maximum of 1.53 acres of land would be irreversibly committed during the functional life of the project. The expenditure of congressionally directed funding from DOE would also be irreversible.

3.5 Unavoidable Adverse Impacts

Unavoidable adverse impacts associated with the proposed project include:

- Long-term loss of approximately 1.53 acres resulting from the construction of the turbine pads and access roads;
- A minimal increase in noise levels during construction and operation;
- Introduction of an additional vertical element into the existing viewshed;
- Minimal shadow flicker impacts; and

- A risk of tower collapse.

These impacts are both temporary, in the case of the construction noise, and long-term, in regard to the conversion of existing land uses to wind turbine pads and access roads, visual and shadow flicker impacts, and the risk of tower collapse. Overall, impacts of the proposed project on the environment and human health would be minimal.

3.6 The Relationships Between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

Short-term use of the environment, as the term is used in this document, is that used during the life of the project, whereas long-term productivity refers to the period of time after the project has been decommissioned, the equipment removed, and the land reclaimed and stabilized. The short-term use of the project area for the proposed project would not affect the long-term productivity of the area. If it is decided at some time in the future that the project has reached its useful life, the turbine, tower, and foundation could be decommissioned and the site reclaimed and revegetated to resemble the pre-disturbance conditions. The installation of wind turbine(s) at the sites would not preclude using the land for purposes that were suitable prior to this project.

4. CUMULATIVE IMPACTS

Cumulative impacts are those potential environmental impacts that result "from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

4.1 Reasonably Foreseeable Projects

Reasonably foreseeable projects were identified by reviewing the FAA's Wind Turbine Build Out Website, which provides an overview of determined and proposed wind turbine/meteorological projects within a 48-nautical-mile radius of a specified location, as well as other projects proposed by the White Earth Nation (FAA 2011). The Wind Turbine Build Out Website is a tool meant to identify areas where cumulative impacts may become a factor in the aeronautical study process. The review found that one other wind turbine project is located in Mahnomen County, three are located on the Mahnomen/Polk County line, one is located in Becker County, several wind projects are located in southeast Clay County, two are located in western Hubbard County, and three are located in eastern Cass County, North Dakota (Figure 4-1).

New physical projects on the Reservation that the White Earth Nation announced for fiscal year 2011 (October - September) include eight new elderly homes, a new Circle of Life School, various home rehabilitations, a women's shelter, Phase 1 Rediscovery Center, Tribal college campus, 30 new homes, a convenience store, and the initial White Earth Wind Project. All of these projects are located at or near the town of White Earth, approximately 6 miles southeast of Waubun and 12 miles southwest of Naytahwasuh. No new projects have been announced for fiscal year 2012.

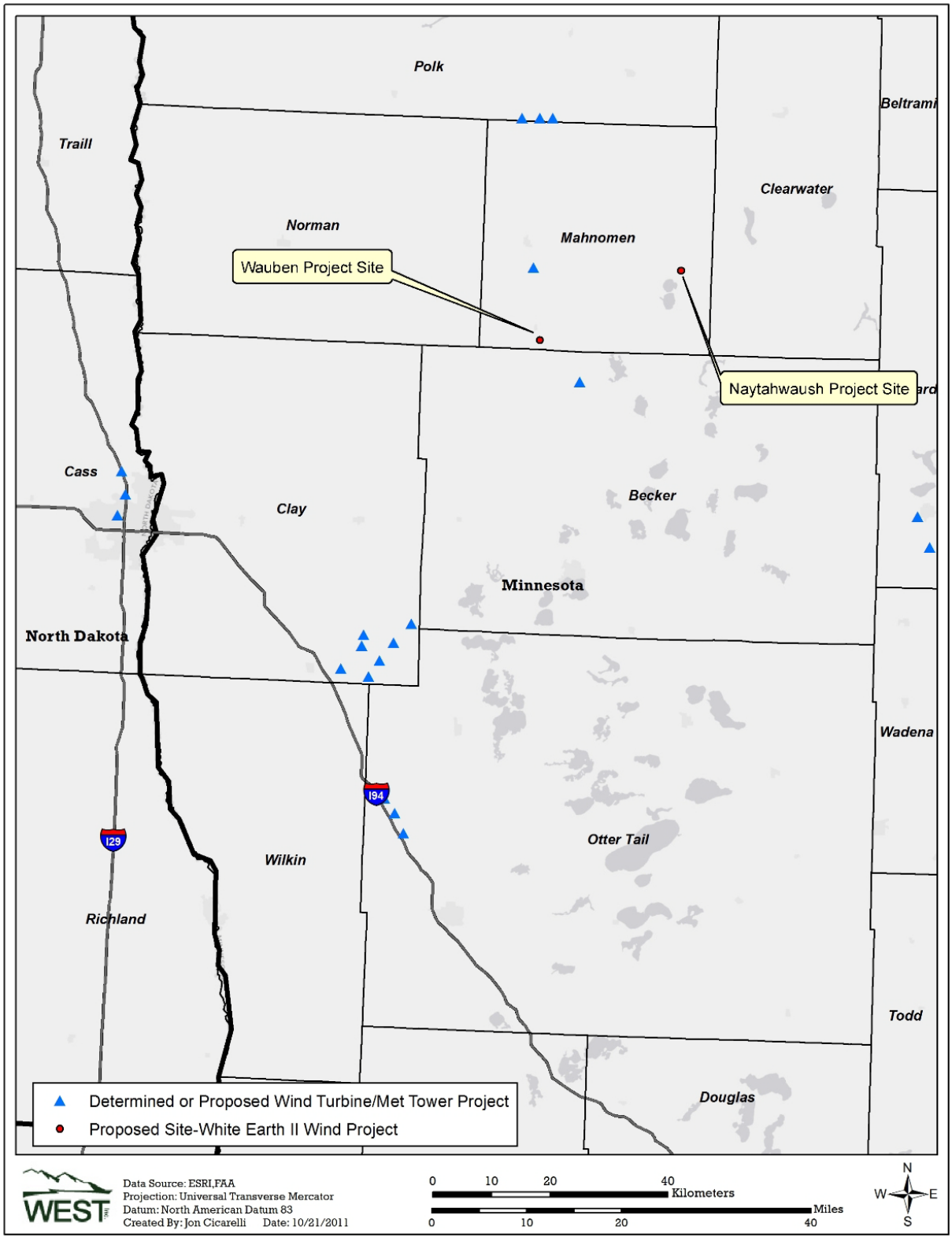

Figure 4-1. Determined and Proposed Wind Turbine/Meteorological Tower Projects within 48-nautical-miles of the Proposed Project

4.2 Summary of Cumulative Impacts

The White Earth Nation has evaluated the cumulative impacts of their proposed project when considered along with other past and present projects, as well as the reasonably foreseeable projects described in Section 4.1. The zone of influence for the cumulative impact evaluation was primarily the White Earth Nation boundary; however the wind turbine projects within 48 nautical miles identified by the FAA were also included in the evaluation.

4.2.1 Greenhouse Gas Impacts and Climate Change

As noted in Section 3.3.11, the proposed project could offset an estimated maximum of 452.1 annual metric tons of carbon dioxide or a maximum of 9,042 metric tons of carbon dioxide over an estimated 20-year life of the project. Offsetting atmospheric carbon dioxide is considered to have a beneficial impact toward the goal of reducing greenhouse gas emissions and their effect on climate. Nineteen other wind projects have been determined or are proposed within 48 nautical miles of the proposed project, including White Earth Nation's initial wind project located at White Earth. These other wind projects, combined with the proposed project, contribute toward reducing greenhouse gas emissions and their effect on climate. Quantitative data are not available, but the contribution of the nineteen other winds projects toward reducing greenhouse gas emissions is certainly greater than the proposed project alone.

4.2.2 Biological Resources

The proposed project would present a vertical element in the landscape that could result in bird and bat collisions. Other reasonably foreseeable wind turbines (Figure 4-1) and tall structures located on the White Earth Reservation (e.g., buildings, communication towers, power lines) also present collision risks to birds and bats; the proposed project would add cumulatively to this risk.

4.2.3 Socioeconomics

The proposed project, in combination with the White Earth Wind Project I near the village of White Earth and the other proposed or determined wind projects in the area (Figure 4-1) provide employment opportunities for local workers for both construction and operation/maintenance. In June 2011, eight White Earth Reservation students graduated from Minnesota West Community and Technical College as wind energy mechanics. The proposed and other wind projects would provide employment opportunities for this trained, local workforce.

5. REFERENCES

106Group. 2011a. Phase I and II Architectural History Survey and Assessment of Effects Study for the White Earth Nation Wind Project, Becker and Mahnomen Counties, Minnesota. Unpublished technical report submitted to Western EcoSystems Technology, Cheyenne, Wyoming.

106Group 2011. Phase I and II Architectural History Survey and Assessment of Effects Study for the White Earth Nation Wind Project, Becker and Mahnomen Counties, Minnesota – Addendum I. Unpublished technical report submitted to Western EcoSystems Technology, Cheyenne, Wyoming.

Allen, M.W. Understanding the Current Science, Regulation and Mitigation of Shadow Flicker. Community Concerns and Mitigation Methods. New England Wind Energy Education Project. February 10. Available online at: http://www.windpoweringamerica.gov/pdfs/workshops/2011/webinar_shadow_flicker_allen.pdf

American Wind Energy Association (AWEA). 2008. In the Public Interest – How and Why to Permit for Small Wind Systems. A Guide for State and Local Governments. Available online at: http://www.awea.org/_cs_upload/learnabout/smallwind/4426_1.pdf

American Wind Energy Association (AWEA). 2009. Wind Turbines and Health. Available online at: http://www.awea.org/pubs/factsheets/Wind_Turbines_and_Health.pdf

Baerwald, E.F., G.H. D'Amours, B.J. Klug, and R.M.R. Barclay. 2008. Barotrauma is a Significant Cause of Bat Fatalities at Wind Turbines. Current Biology 18(16): R695-R696.

Bat Conservation International (BCI). 2009. Bat Species: US Bats. BCI, Inc., Austin, Texas. Homepage: http://www.batcon.org; Species profiles available online at: http://www.batcon.org/SPprofiles/index.asp Accessed 2009.

Bay, K., W.P. Erickson, and M. Kesterke. 2010. Updated Summary of Bird and Bat Fatalities from Wind-Energy Facilities. Presented at the National Wind Coordinating Collaborative (NWCC) Wildlife and Wind Research Meeting VIII, October 19-21, 2010, Lakewood, Colorado.

Bureau of Land Management (BLM). 1995. Final KENETECH/PacifiCorp Windpower Project Environmental Impact Statement. FES-95-29. Prepared by U.S. Department of the Interior, Bureau of Land Management, Great Divide Resource Area, Rawlins, Wyoming and Mariah Associates, Inc., Laramie, Wyoming.

BLM (Bureau of Land Management) 2005. "Chapter 5. Potential Impacts of Wind Energy Development and Analysis of Mitigation Measures." Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States. FES -5-11. June 2005. U.S. Department of the Interior, Bureau of Land Management.

Burnt Fork Creek Watershed Alliance (BFCWA). 2001. Noise Primer and Commuter Rail Basics. Presented at a November 2001 meeting. Available online at: http://www.garail.com/Pages/burnt_fork_creek_presentation_november_2001.htm. Accessed December 2010.

Ciborowski P. and A. Claflin. 2009. Greenhouse Gas Emissions in Minnesota: 1970-2006. Minnesota Pollution Control Agency. St. Paul, Minnesota.

City-Data. 2011. City data for Waubun, Minnesota. Available online at: http://www.city-data.com/city/Waubun-Minnesota.html. Accessed Nov. 2011.

Cornell Lab of Ornithology. 2011. All About Birds website, available online at: www.allaboutbirds.org.

Derby, C., and K. Bay, and J. Ritzert. 2009. Bird Use Monitoring, Grand Ridge Wind Resource Area, La Salle County, Illinois. Year One Final Report: March 2008 – February 2009. Prepared for Grand Ridge Energy LLC by Western EcoSystems Technology, Inc., Cheyenne, Wyoming. July 29, 2009.

DOE (U.S. Department of Energy) 2007. Report # DOE/EIA-0573. Energy Information Administration EIA.

Dose, H. 2011. Natural Resources Conservation Service Area 1 Resource Soil Scientist, Thief River Falls, MN. Pers. comm. E. Lack Western EcoSystems Technology, January 21, 2011.

Federal Aviation Administration (FAA). 2011. Obstruction Evaluation/Airport Airspace Analysis. Available online at: https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

Federal Communications Commission (FCC). 2004. Nationwide Programmatic Agreement for the Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission. Electronic document, Federal Communications Commission website, http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-222A3.pdf, accessed January 25, 2010.

Gragg-Johnson, K. 2011. Minnesota State Historic Preservation Office Review and Compliance Associate, pers. comm. E. Lack WEST, January 18, 2011.

Mary Ann Heidemann, Mary Ann. 2011. Minnesota State Historic Preservation Office Review and Compliance, pers. comm. 106 Group, 2011.

Homefacts. 2011. Waubun Weather Information – Waubun Historical Weather Data by Month. Available online at: http://www.homefacts.com/weather/Minnesota/Mahnomen-County/Waubun.html. Accessed October 2011.

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller, eds. Cambridge University Press, Cambridge, United Kingdom and New York, New York, USA. 996 pp. Available online at: http://www.ipcc.ch/ipccreports/ar4-wg1.htm

Jain, A.A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. Thesis. Iowa State University, Ames, Iowa.

Johnson, G.D. and M.J. Holloran. 2010. Greater Sage-Grouse and Wind Energy Development: A Review of the Issues. Renewable Northwest Project, Portland, Oregon.

Johnson, G.D., W. P. Erickson, M. D. Strickland, M. F. Shepherd and D. A. Shepherd. 2000. Avian Monitoring Studies at the Buffalo Ridge, Minnesota Wind Resource Area: Results of a 4-Year Study. Prepared for Northern States Power Company by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 2000.

Jones, J., and K. Kosciuch, T. Gys, J. Lindsay, and G. Zenner. 2010. Do Operational Turbines Create a Barrier to Waterfowl Movement in the Prairie Pothole Region of North America? A poster presented at the Wind Wildlife Research Meeting VIII, October 19-21, 2010, Lakewood, Colorado.

Larsen, J. K., and J. Madsen. 2000. Effects of Wind Turbines and Other Physical Elements on Field Utilization by Pink-Footed Geese (Anser brachyrhynchus): A Landscape Perspective. Landscape Ecology, 15:755-764.

Larson, M.A. 2009. Prairie-Chicken Survey in Minnesota During 2008 and 2009. Minnesota Department of Natural Resources, Forest Wildlife Populations and Research Group. Grand Rapids. August 19, 2009.

Minnesota Department of Natural Resources (MNDNR). 1998. Mineral Industries of Minnesota Map. Available online at: http://images.dnr.state.mn.us/education_safety/education/geology/digging/minmap.gif

Minnesota Department of Natural Resources (MNDNR). 2008. Calcareous Fen Fact Sheet. Available from Minnesota Natural Heritage Program.

Minnesota Department of Natural Resources (MNDNR). 2010. Ecological Classification System. Available online at: http://www.dnr.state.mn.us/ecs/index.html

Minnesota Department of Natural Resources (MNDNR). 2011a. Minnesota's Wild, Scenic, and Recreational Rivers. Interactive map available online at: http://www.dnr.state.mn.us/waters/watermgmt_section/wild_scenic/wsrivers/rivers.html.

Minnesota Department of Natural Resources (MNDNR). 2011b. Identification of Known Calcareous Fens. Available online at: http://files.dnr.state.mn.us/publications/waters/calcareous_fen_list_nov_2009_rev1.pdf.

Minnesota Department of Natural Resources (MNDNR). 2011c. Mammals of Minnesota website. Available online at: http://www.dnr.state.mn.us/snapshots/mammals/index.html.

Minnesota Department of Natural Resources (MNDNR). 2011d. Rare Species Guide. Available online at: http://www.dnr.state.mn.us/rsg/index.html

Minnesota Gap Analysis. 2009. GAP Land Cover - Image. Gap analysis metadata, Michigan Department of Natural Resources (MDNR).

Minnesota Pollution Control Agency (MPCA). 2010. Minnesota Air Quality Index 2009 Summary.

Minnesota State Historic Preservation Office (SHPO). 2010. Guidelines for History/Architecture Projects in Minnesota.

Morey, G.B. and J. Meints, compilers. 2000. Geologic Map of Minnesota, Bedrock Geology. 3rd edition. Minnesota Geological Survey State Map Series S-20, scale 1:1,000,000.

National Parks Service (NPS). 1983. The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. 48 FR 44716-44740.

National Wind Coordinating Collaborative (NWCC). 2004. Wind Turbine Interactions with Birds and Bats: A Summary of Research Results and Remaining Questions. Fact Sheet: Second Edition. Available online at http://www.nationalwind.org/publications/wildlife/wildlife_factsheet.pdf. Accessed December 2010.

Norris, D. Wetlands Program Coordinator, Division of Ecological and Water Resources, Minnesota Department of Natural Resources. Pers. comm. E. Lack, Western EcoSystems Technology, November 2, 2011.

Ontario Chief Medical Officer of Health. 2010. Potential Health Impacts of Wind Turbines. Chief Medical Officer of Health Report. May.

Polisky, L.E. 2005. White Paper – Identifying and Avoiding Radio Frequency Interference for Wind Turbine Facilities. Comsearch, Ashburn, VA. Bulletin TP-100321-EN. Available online at www.avw.co.nz/catalogue/images/andrew/docs/TP-100321-EN.pdf.

Prosser, R. S. 1966. Rails to the North Star, One Hundred Years of Railroad Evolution in Minnesota. Dillon Press, Minneapolis, Minnesota.

Rogers, A.L. 2004. Wind Turbine Acoustic Noise. A white paper prepared by the Renewable Energy Research Laboratory (NREL), University of Massachusetts at Amherst. Available online at: http://www.ceere.org/rerl/publications/whitepapers/Wind_Turbine_Acoustic_Noise_Rev2006.pdf

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966–2007. Version 5.15.2008. U.S. Geological Survey, Patuxent Wildlife Research Center, Laurel, Maryland, USA. Available online at: www.mbr-pwrc.usgs.gov/bbs/bbs.html.

Schmidt, A. J., A. C. Vermeer, B. H. Bradley, and D. R. Pratt. 2007. Railroads in Minnesota, 1862-1956 National Register of Historic Places Multiple Property Documentation Form. Minnesota Historical Society, St. Paul. On file at the Minnesota State Historic Preservation Office, St. Paul.

Toepfer, J.E. and W.L. Vodehnal. 2009. Greater prairie chickens: Grasslands and vertical structures. Presentation at the 28th Meeting of the Prairie Grouse Technical Council, Portales, New Mexico, October 5-8, 2009.

U.S. Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP). 2009. NAIP Imagery and Status Maps. Last modified August 31, 2009. http://www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai

Natural Resource Conservation Service (NRCS) 1998. Soil Survey of Becker County, Minnesota. U.S. Department of Agriculture.

Natural Resource Conservation Service (NRCS) 1997. Soil Survey of Mahnomen County, Minnesota. U.S. Department of Agriculture.

U.S. Environmental Protection Agency (EPA). 2007. Ecoregions. USEPA, Corvallis, Oregon. Available online at: http://www.epa.gov/wed/pages/ecoregions.htm. Ecoregion data available at: http://www.epa.gov/wed/pages/ecoregions/level_ii.htm and http://www.epa.gov/wed/pages/ecoregions/level_iii.htm

U.S. Fish and Wildlife Service (USFWS). 2003. Detroit Lakes Wetland Management District, Comprehensive Conservation Plan and Environmental Assessment.

U.S. Fish and Wildlife Service (USFWS). 2004. Prairie Grouse Leks and Wind Turbines: U.S. Fish and Wildlife Service Justification for a 5-Mile Buffer from Leks; Additional Grassland Songbird Recommendations. An unpublished briefing paper.

U.S .Fish and Wildlife Service (USFWS) Region 6 Habitat and Population Evaluation Team. 2009. Assessing Potential Impacts of Wind Energy Development on Breeding Ducks and Waterbirds in the Prairie Pothole Region of North and South Dakota-2008 Progress Report and 2009 Progress Report Addendum. Bismarck, North Dakota. 35 pp.

U.S. Fish and Wildlife Service (USFWS). 2011. Endangered Species Program website. Available online at http://www.fws.gov/endangered - accessed January 28, 2011.

U.S. Geological Survey (USGS). 2009. USGS Topographic Maps. Homepage available at: http://topomaps.usgs.gov/

U.S. Geological Survey (USGS). 2001. North American Breeding Bird Survey Route Location Maps. USGS, Patuxent Wildlife Research Center. Laurel, Maryland. Available online at: http://www.pwrc.usgs.gov/BBS/results/routemaps/routeMapStatic.html

Western EcoSystems Technology (WEST). 2010. Site Characterization Study White Earth Energy Project II Mahnomen and Becker Counties, Minnesota. Unpublished technical report.

Western EcoSystems Technology (WEST). 2011. Raptor Nest Survey Results White Earth Energy Project II Mahnomen and Becker Counties, Minnesota. Unpublished technical memo.

White Earth Economic Development Office (WEEDO). 2011. White Earth Facts and Figures. Available onlines at: (http://www.whiteearth.com/programs/)

6. AGENCIES AND PERSONS CONSULTED

Name	Organization
Natural Resource Conservation Service	
Heather Dose	NRCS - Thief River Falls Office
Jeff Hellerich	NRCS – Fergus Falls Office
U.S. Fish and Wildlife Service	
Rich Davis	USFWS – Wildlife Biologist
Pete Fasbender	USFWS – Deputy Field Supervisor
White Earth Nation	
Doug McAurthur	Tribe Wildlife Biologist
Tom McCauley	Tribal Historic Preservation Officer
City of Waubun	
Germaine Reigert	City Clerk
Peter Revere	Zoning Officer
Mahnomen County	
Mark Diekman	
Minnesota State Historic Preservation Office	
Kelly Gragg-Johnson	Review and Compliance Associate
Mary Ann Heidemann	Manager of Government Programs and Compliance

1.1.1.1.1.1.1.1 APPENDIX A: PUBLIC SCOPING NOTICES

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

December 7, 2010

TO: **Distribution List**

SUBJECT: **Notice of Scoping – White Earth Nation Wind Energy Project II, Becker and Mahnomen Counties, Minnesota**

The U.S. Department of Energy (DOE) has awarded Federal funding to the White Earth Nation, as represented by the White Earth Reservation Tribal Council, and is proposing to authorize the expenditure of the funding by White Earth Nation for the construction and operation of up to nine wind turbines within its tribal boundaries in northwest Minnesota (Project). DOE has previously authorized the White Earth Nation to use a small percentage of their federal funding for pre-construction activities, which include preliminary design, permitting and environmental studies. DOE is preparing an Environmental Assessment (EA) related to the proposed funding of the White Earth Nation's proposed Project.

The Project is in addition to an ongoing DOE-funded wind turbine project at the White Earth village and is part of the tribe's plan to continue to develop viable wind resources within its boundaries that would power tribal facilities and/or for the sale of generated electrical energy to the local utility. The attached Project Description details the proposed Project and its location.

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

- Identify any adverse environmental impacts and potential associated mitigation measures should the proposed action be implemented;
- Evaluate viable alternatives to the proposed project, including a no action alternative;
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and
- Characterize any irreversible and irretrievable commitments of resources that would be involved should the 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 avoid, minimize, or mitigate those impacts. The EA will describe, at a minimum, the potentially affected environment and the impacts that may result to:

- Air Quality and Climate
- Geology and Soils
- Biological Resources
- Water Resources
- Cultural and Historical Resources
- Land Use
- Noise
- Infrastructure
- Occupational and Public Health and Safety
- Aesthetics and Visual Resources
- Socioeconomics and Environmental Justice
- Intentional Destructive Acts

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.

Development of a Reasonable Range of Alternatives

NEPA requires DOE 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. DOE will determine the need for project redesign or a project alternative during the course of environmental review.

The EA will address the No-Action Alternative, in which DOE would not authorize the expenditure of federal funding for the proposed Project. DOE has assumed for analysis that the White Earth Nation would not proceed with the proposed wind turbine project without the Department's assistance.

Public Participation

DOE invites the public and agencies to identify the issues that they feel the Department should consider in the EA. DOE will post the draft EA in the DOE Golden Field Office online reading room later this year at:

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

The DOE Golden Field Office welcomes your input throughout DOE's NEPA process, but to ensure that your comments are received in time for consideration in the EA, please provide them on or before **January 4, 2011**, to:

Ms. Laura Margason
NEPA Document Manager
U.S. Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401

Or via email

Laura.margason@go.doe.gov

Sincerely,

Laura Margason

Laura Margason

Attachment: Project Description

PROJECT DESCRIPTION

WHITE EARTH NATION WIND ENERGY PROJECT II

BECKER AND MAHNOMEN COUNTIES, MINNESOTA

The proposed White Earth Nation Wind Energy Project II involves up to nine wind turbines at three sites identified for wind turbine placement; up to six of the proposed wind turbines would be funded by DOE. The three sites are near the towns of Waubun, Naytahwaush, and Pine Point (Figure 1); the Waubun site consists of three "sub-sites". One of the Waubun sub-sites (A) is owned by the City of Waubun; the other sites are on tribal trust lands. Power from all sites would be transported underground to appropriate electrical interconnection stations. Access roads approximately 12 feet wide would be constructed as appropriate for each site and temporary lay-down areas (1 to 3 acres in size) would be required for each wind turbine.

At the Waubun site, up to two mid-size (300 kW) wind turbines and up to two small (33-95 kW) wind turbines are proposed and the White Earth Nation seeks federal funds through the DOE for these wind turbines (Figure 2). The two 300 kW wind turbines could both be located at sub-site A, or one each could be located at sub-sites A, B, or C. The two 33-95 kW wind turbines would be located at either or both sub-sites B or C, if these sub-sites are not occupied by a 300 kW wind turbine.

As an alternative to the above proposal for the Waubun site, the White Earth Nation is considering another wind generation option for this site for which they are not seeking federal funds from DOE. This alternative option would be in lieu of the proposed option described above and will be evaluated in the EA because the turbines would be sited on tribal trust land in the case of Waubun sub-sites B and C. Under this alternative, up to five mid-size (300 kW) wind turbines could be placed at sub-site A and a large (1.5 MW) wind turbine could be placed at either sub-site A or C (Figure 3).

At the Naytahwaush and Pine Point sites, a single small (33-95 kW) wind turbine is proposed for each site (Figures 4 and 5). The White Earth Nation seeks federal funds through the DOE for these wind turbines.

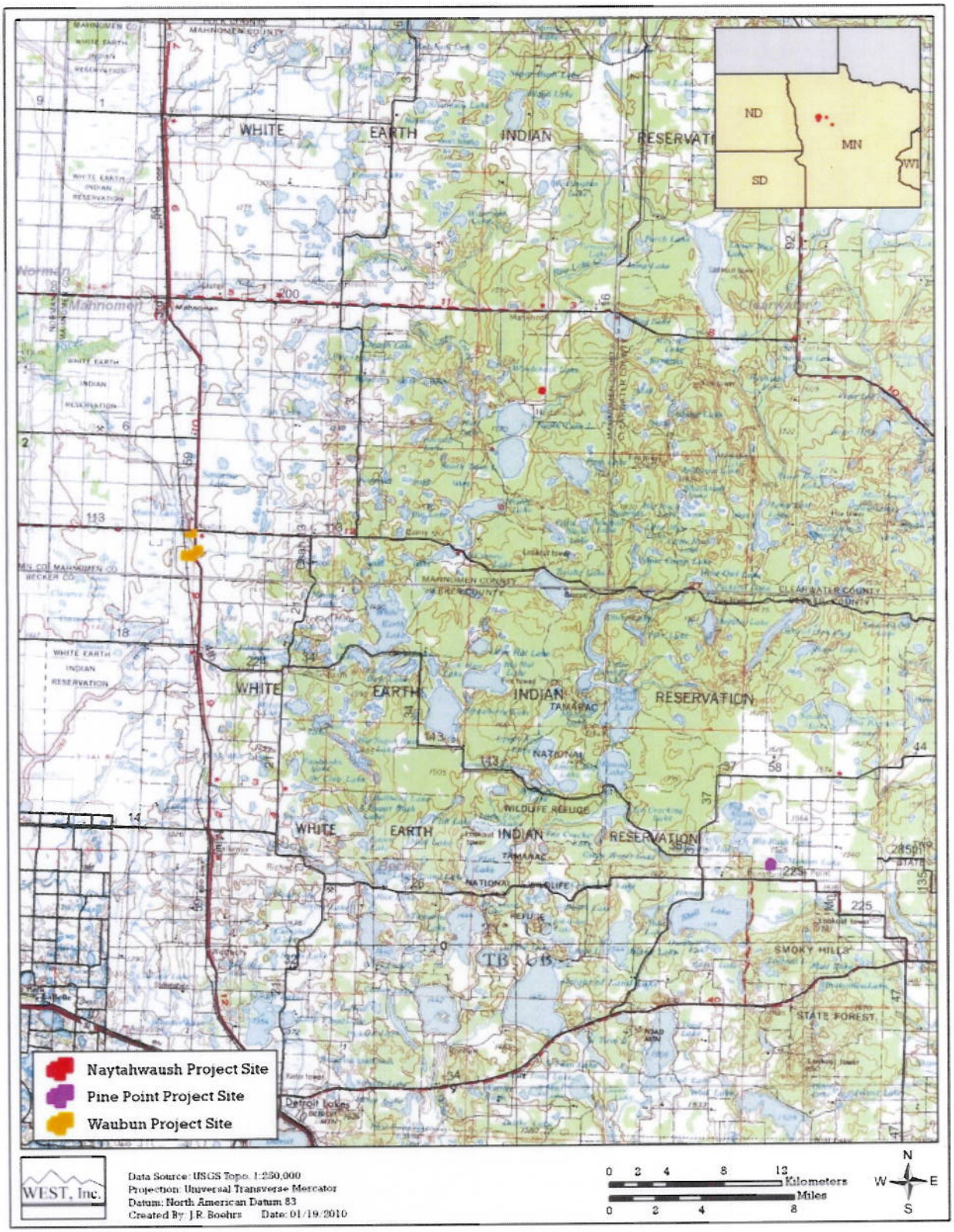

Figure 1. Proposed Wind Turbine Locations

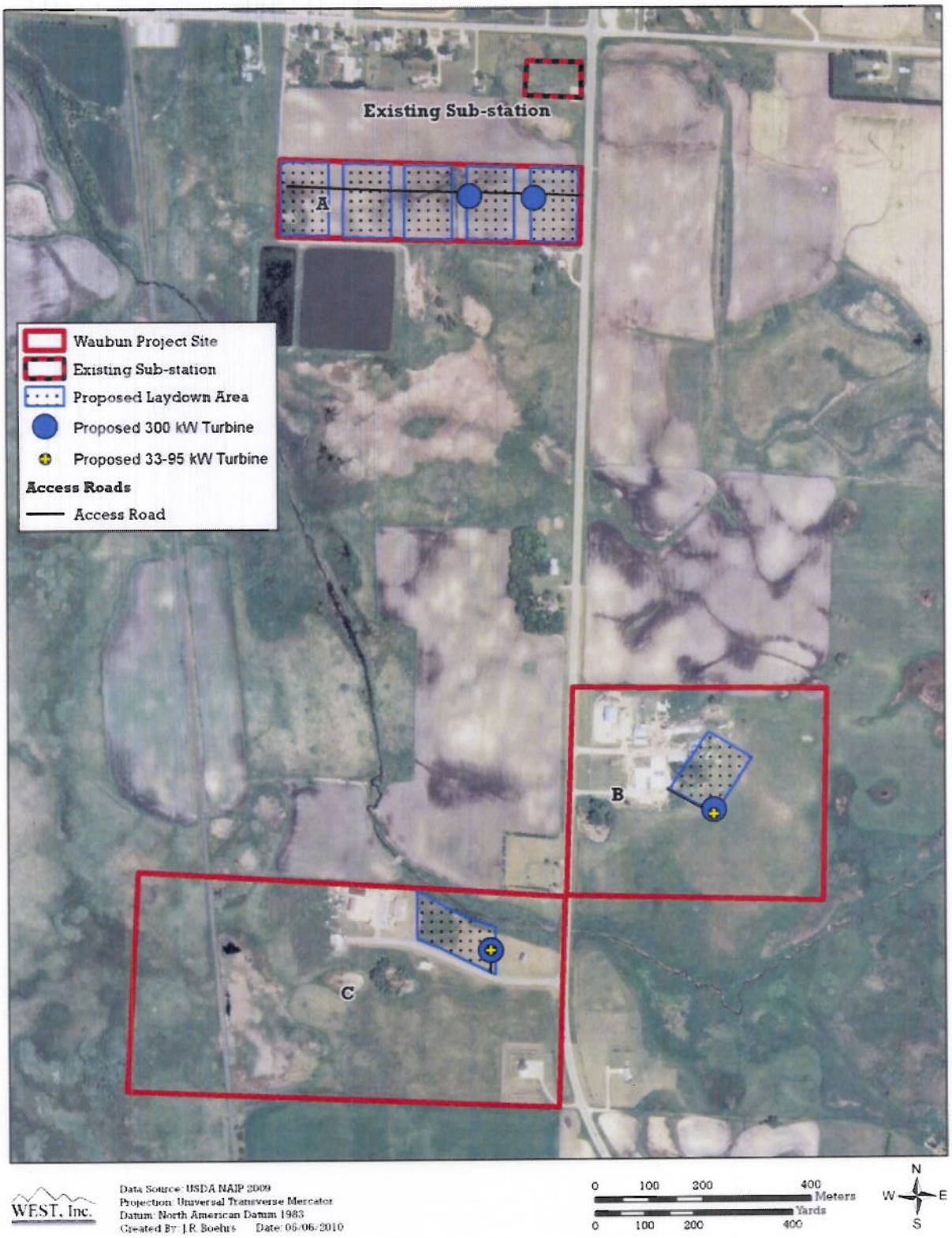

Figure 2. Proposed Waubun Site Wind Turbine Configuration

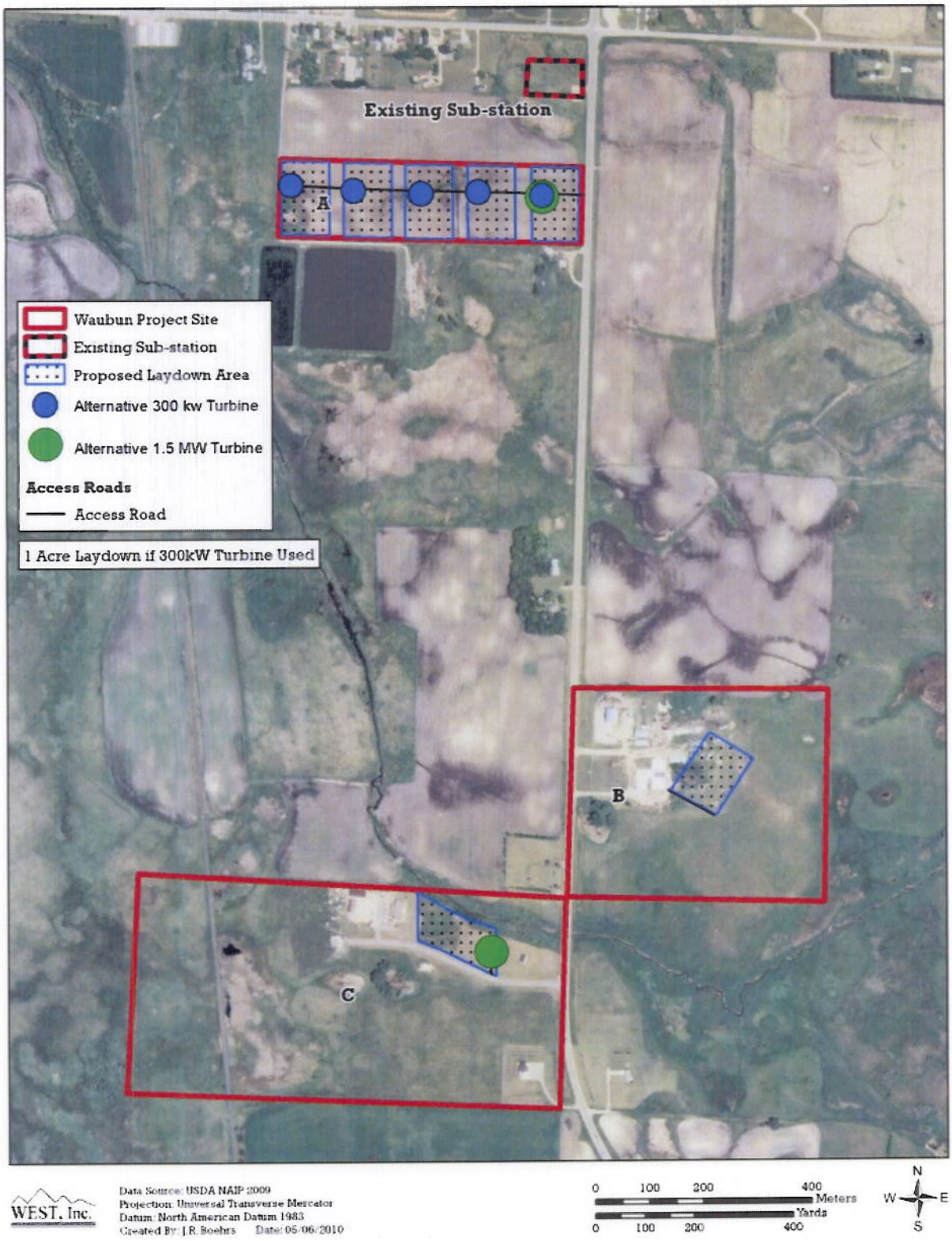

Figure 3. Alternative (non-federally funded) Waubun Site Wind Turbine Configuration

Figure 4. Proposed Naytahwaush Site Wind Turbine Configuration

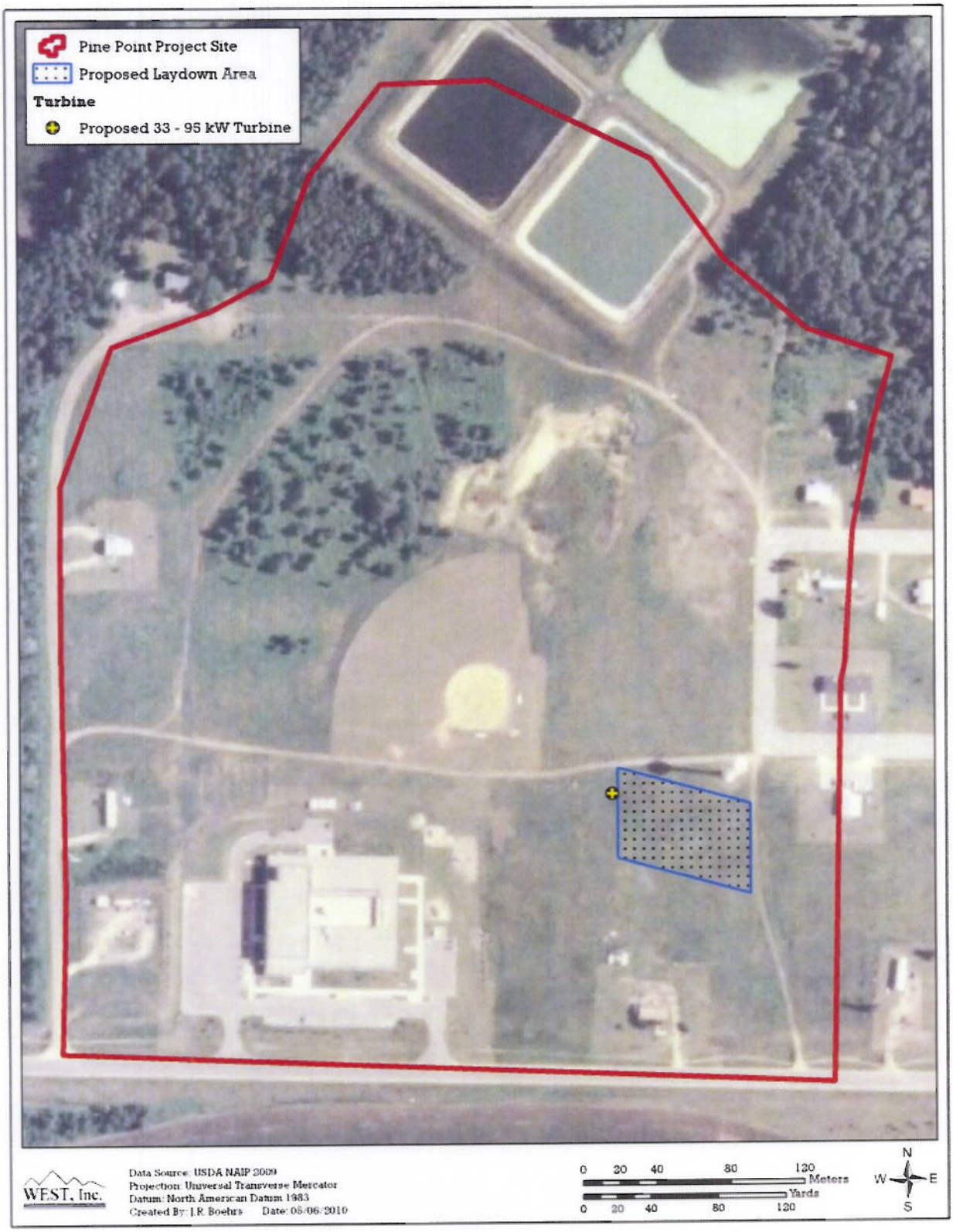

Figure 5. Proposed Pine Point Wind Turbine Configuration

NOTICE OF SCOPING

The U.S. Department of Energy (DOE) is requesting public input on the scope of environmental issues and alternatives to be addressed in the:

Environmental Assessment
White Earth nation Wind Energy Project II
Becker and Mahnomen Counties, Minnesota

The U.S. Department of Energy (DOE) has awarded Federal funding to the White Earth Nation, as represented by the White Earth Reservation Tribal Council, and is proposing to authorize the expenditure of the funding by White Earth Nation for the construction and operation of up to nine wind turbines within its tribal boundaries in northwest Minnesota (Project). An Environmental Assessment (EA) will be prepared by DOE pursuant to the requirements of the National Environmental Policy Act (NEPA). The notice of scoping and description of the proposed project is available for review at the DOE Electronic Public Reading Room at:

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

Public comments on the NEPA process, proposed action and alternatives, and environmental issues will be accepted until **January 4, 2011**. Please send comments to Laura Margason, NEPA Document Manager, 1617 Cole Blvd, Golden, CO 80401
or via email to laura.margason@go.doe.gov

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or via email to laura.margason@go.doe.gov

Public Notice
White Earth Nation Wind Turbine Project II
White Earth Reservation Tribal Council
White Earth, Minnesota

The White Earth Nation, as represented by the White Earth Reservation Tribal Council, seeks to develop viable wind resources within its boundaries to power its tribal facilities and/or for the sale of generated electrical energy to the local utility. This project is an expanded version of the previously proposed plan.

The proposed White Earth Wind Energy project involves multiple development alternatives identified for turbine placement. Potential turbine site locations include one site south of Mahnomen, three sites south of Waubun, one site at Naytahwaush, and one site at Pine Point. Power from all sites will be transported underground to appropriate electrical interconnection stations. Access roads 3-m wide will be constructed as appropriate for each site and temporary lay-down areas (1 – 3 acres in size) will be required for each turbine. Several turbine sizes are under consideration, ranging from small 33-95 kW turbines, to mid-sized 300 kW turbines, to large 1.5 MW turbines. Both federal and non-federal funds would be used for the project. Federal funding would be through the Department of Energy.

General site descriptions are as follows:

- Mahnomen – Approximately 30 acres of tribal trust land adjacent to a wildlife management area on the north. The land was historically farmed before the tribal government acquired it and converted to managed lands for wildlife and wetlands.
- Waubun (A,B,C) – All sites are located south of Waubun. Waubun-A is an area 275 m x 550 m owned by the City of Waubun, directly south of the community. The land is leased for row crop farming and serves as a buffer between residents and the waste water treatment lagoon. Waubun-B and C are on opposite sides of U.S. Hwy 59 approximately 600-700 m south of Waubun-A. Waubun-B is on tribal trust land containing an abandoned saw mill and is not maintained. Waubun-C is on manicured open space on tribal trust land along the access road to the White Earth Housing Authority.
- Naytahwaush – Approximately two acres of manicured open space on tribal trust land adjacent to a softball field between the Naytahwaush Sports Complex and paved county road.
- Pine Point – The site is behind the school on overgrown tribal trust land. The site is adjacent to the Pine Point community school, community water tower, and softball field.

One development alternative plan seeks to construction up to two 300 kW turbines and up to two 33-95 kW turbines. Under this development alternative two 300 kW turbines are proposed at either Mahnomen, Waubun-A, or one turbine at each Waubun-B and Waubun-C; with one 33-95 kW turbine proposed at one or both Waubun-B and Waubun-C, Naytahwaush, or Pine Point.

An alternative development plan proposes placement of up to two 1.5 MW turbines at Mahnomen, one 1.5 MW turbine at Waubun-A, or up to five 300 kW turbines at Waubun-A. This development plan would be in lieu of the previously described development plan and would not be constructed with federal funds.

Written comments regarding the proposed project will be accepted through May 10, 2010 at the office of Michael Triplett, Planner, White Earth Reservation Tribal Council, P.O. Box 418, White Earth, MN 56591 (218.983.4640 ext. 5906).

Minn. Chippewa Tribe awarded energy grant

Washington, D.C. - The Minnesota Chippewa Tribe (MCT) has been awarded more than $700,000 to help six reservations reduce energy use and create green jobs, Congressman Jim Oberstar announced March 30. The funding comes from a provision in American Recovery and Reinvestment Act (Recovery Act) which directs the Department of Energy to create jobs by investing in energy efficiency programs.

"This is an investment that will have an immediate return - creating jobs weatherizing homes and businesses," said Oberstar. "It will also pay long term dividends. Lowering energy costs will put more money in the pockets of home and business owners, which will stimulate economic growth and enhancing energy efficiency will help reduce our dependence on foreign oil."

The funding will be divided up among the six component reservations that make up the Minnesota Chippewa Tribe: the Bois Forte Band (Nett Lake), Fond du Lac Band, Grant Portage Band, Leech Lake Band, Mille Lacs Band and the White Earth Band.

Nationally, Recovery Act funding of energy efficiency programs will total $3.2 billion, by the end of this year. Of that, $2.7 billion will be awarded through formula grants to more than 2,300 cities, counties, states and Indian tribes.

Attention
Existing Home Owners!

Enrollees living on the White Earth Reservation in need of a new well, septic tank or drain field should contact the White Earth Public Works at 218-983-3202 for an application for these services.

WE Housing welcomes Mille Lacs elders

Photo by Gary W. Padrta

WE Housing Authority Director Robert Durant discusses how to fix plumbing problems with elders from Mille Lacs Reservation. Durant developed a program that teaches housing tenants how to fix problems from replacing a toilet to fixing holes in the wall. More than 100 elders from Mille Lacs traveled to Waubun to take part in the training and to spend time at the Shooting Star Casino.

Obituaries

George W. Goodman

George W. Goodman, 51, of Pine Point, died July 30 at Emmanuel Nursing Home in Detroit Lakes.

George William Goodman was born June 12, 1959, in Park Rapids to Eugene Stone and Corrine Goodman. He attended school in Minneapolis. He later attended Dunwoody College in Minneapolis for auto mechanics and in the mid 1980s moved back to the Ponsford area. George enjoyed drawing and spending time with family and friends.

George is survived by his wife, Judith Goodman-Fineday of Strawberry Lake; two sons: Scotty Jack of Minneapolis and George Goodman Jr., of Strawberry Lake. He is also survived by his siblings: Matthew Vieberg of Jordan, Minn., Nora Jones, Thomas Jones III, Chuck Jones Sr., and Lenora Jones all of Pine Point and Eugene Stone of Minneapolis.

He is preceded in death by his parents, one brother John Basswood and one sister, Lorena Jones.

Funeral services for George was held Aug. 5 at the old Pine Point School.

Arrangements: David-Donehower Funeral Home of Detroit Lakes.

Memories of George may be shared online at www.daviddonehower.com

"Mahkwa Baum" Marvin John Stone Sr.

"Mahkwa Baum" Marvin John Stone Sr. His name means "Bear Thigh" of the Bear Clan.

He recently resided in Eureka, Calif., where he passed away on Tuesday, Aug. 17. He was 59 years old.

Mahkwa Baum (Marvin) was born on May 14, 1951, at the White Earth Hospital. He was born to Waube Ginew (Andrew F. Stone) and Waube ish koo koo quay (Sophie H. Stone). Her maidan name was Fairbanks.

He was raised in Pine Point and Park Rapids. After graduating with his GED, Mahkwa Baum enlisted into the Armed Forces. Later on he was honorably discharged. He danced at pow wows everywhere his whole life. He was a pipe carrier and also a spiritual leader to his family, friends, and many people across the nation. He dedicated his last eight years to Sundance in South Dakota. Mahkwa Baum was also an artist. He liked to paint and play the guitar. He loved to listen to the "Blues."

His is preceeded in death by his parents; sisters: Geraldine, Maxine, and Bernadine Stone; brother, William Stone; son, Marvin John Stone Jr.; and grandson, Marvin John Stone III.

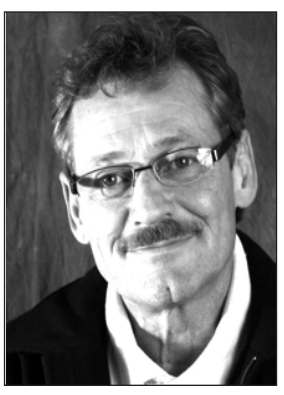
He is survived by six sisters: Elizabeth Stone of Minneapolis, Pauline Stone of Bemidji, Darlene Stone of Minneapolis, Seraphine Chosa of Walker, Irene Stone of Mahnomen, and Jolene Ajootian of Las Vegas; two brothers, Merlin Stone of McIntosh, and John Stone Jr., of Faribault, Minn.; two sons, Marshall Patrick Stone of Minneapolis and Keenan John Stone; many grandchildren and numerous nieces and nephews.

"Mahkwa Baum" Marvin John Stone Sr., will be greatly missed and much loved by his family and friends.

Kevin Borah

Kevin Borah, 55, Fargo, died July 26 at Innovis Health, Fargo, from complications following surgery.

Kevin was born Aug. 28, 1954, in Detroit Lakes to Jennings and Ardette (Bisson) Borah. He was raised in Frazee, where he graduated high school. He married Nancy Kohler Aug. 4, 1973, in Detroit Lakes. They lived in Detroit Lakes and several other Minnesota communities including Ogema before settling in the West Fargo/Fargo area in 1991.



Kevin is survived by his wife, Nancy, Fargo; sons: Matthew (Stephanie), Mark (Deanna) both Detroit Lakes, Joseph (Annie), Shorewood, Minn., Jonathan, Fargo, Christopher (Georgina), Milton Keynes, UK; daughters: Nicole Borah, Kristen Borah, Samantha Borah and Sarah Borah, all Fargo; 11 grandchildren; mother, Ardette Bisson, White Earth; brothers, Earl (Arlys), Floyd (Cyndi) and Wade (Karen); sisters, Beth Ott and Susan (Wayne) Hanks and many nieces and nephews.

He was preceded in death by his father, grandparents and nephew.

A funeral service was held July 30 at St. Andrew Lutheran Church in West Fargo.

Interment: Oak Grove Lutheran Cemetery in Detroit Lakes.

Condolences may be sent online at www.westfuneralhome.com

Shawna Marie Butcher

Shawna Marie Butcher, infant daughter of Sheena Butcher, passed away Aug. 14 at St. Mary's Innovis Health in Detroit Lakes.

Shawna is survived by her mother, Sheena Butcher of Ponsford; brother, Tyrone Butcher; grandmother, Helen Butcher; grandparents, Gilbert and Julie Stewart; aunts and uncles: Anthony, Delton, Greg, Billie Jo and Chad Stewart.

She was preceded in death by her grandfather, Lawrence Butcher I; great grandparents, Charles and Isabelle Stewart; aunt, Rochelle K. Stewart; cousin, Terrell Stewart; and two uncles: Gary Stewart and Lawrence Butcher II.

Funeral services were held Aug. 27 at the old Pine Point School in Ponsford.

Interment: Breck Memorial Episcopal Cemetery in Ponsford.

Arrangements: David-Donehower Funeral Home of Detroit Lakes.

Public Notice

White Earth Nation Wind Turbine Project II

White Earth Reservation Tribal Council
White Earth, Minnesota

The White Earth Nation, as represented by the White Earth Reservation Tribal Council, seeks to develop viable wind resources within its boundaries to power its tribal facilities and/or for the sale of generated electrical energy to the local utility. This project is in addition to the ongoing wind turbine project at White Earth village.

The proposed White Earth Wind Energy Project II involves up to seven wind turbines at several development alternative sites identified for turbine placement. Potential turbine site locations include three sites south of Waubun, one site at Naytahwaush, and one site at Pine Point. Power from all sites would be transported underground to appropriate electrical interconnection stations. Access roads 3-m wide would be constructed as appropriate for each site and temporary lay-down areas (1 – 3 acres in size) would be required for each turbine. Several turbine sizes are under consideration, ranging from small 33-95 kW turbines, to mid-sized 300 kW turbines, to large 1.5 MW turbines. Both federal and non-federal funds would be used for the project. Federal funding would be through the Department of Energy.

General site descriptions are as follows:

• Waubun (three sub-sites A,B,C) – All sites are located south of Waubun. Waubun-A is an area 275 m x 550 m owned by the City of Waubun, directly south of the community. The land is leased for row crop farming and serves as a buffer between residents and the waste water treatment lagoon. Waubun-B and C are on opposite sides of U.S. Hwy 59 approximately 600-700 m south of Waubun-A. Waubun-B is on tribal trust land containing an abandoned saw mill and is not maintained. Waubun-C is on manicured open space on tribal trust land along the access road to the White Earth Housing Authority.
• Naytahwaush – Approximately two acres of manicured open space on tribal trust land adjacent to a softball field between the Naytahwaush Sports Complex and paved county road.
• Pine Point – The site is behind the school on overgrown tribal trust land. The site is adjacent to the Pine Point community school, community water tower, and softball field.

One development alternative plan seeks to construct up to two 300 kW turbines and up to two 33-95 kW turbines. Under this development alternative two 300 kW turbines are proposed at Waubun-A, or one turbine at each Waubun-B and Waubun-C; with one 33-95 kW turbine proposed at one or both Waubun-B and Waubun-C, Naytahwaush, or Pine Point.

Another alternative development plan proposes placement of one 1.5 MW turbine at Waubun-A, or up to five 300 kW turbines at Waubun-A. This development plan would be in lieu of the previously described development plan and would not be constructed with federal funds.

Archive project for RTC building

The White Earth Natural Resources Archive program is looking to place an interactive computer at tribal headquarters as people come into the building. This computer will have the history of the Anishinabe, how the reservation was created, programs, communities and elders. We are looking for footage of elders talking about our history or life on the reservation. If you have any information or would like to display a picture of an elder on the computer please contact Mike Swan at 218-573-3007.

1.1.1.1.1.1.1.2 APPENDIX B: AGENCY CONSULTATION LETTERS

Minnesota Historical Society

STATE HISTORIC PRESERVATION OFFICE

August 12, 2011

Laura Margason, NEPA Document Manager
Department of Energy, Golden Field Office
1617 Cole Boulevard
Golden CO 80401-3393

RE: White Earth Nation Wind Energy Project II
Mahnomen and Becker Counties
SHPO Number: 2011-1733

Dear Ms Margason:

Thank you for providing the inventory forms developed for 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 realize that the Pine Point wind turbine site has been dropped from consideration; in part due to potential adverse effects on National Register eligible sites. In light of this action, it is especially important that we comment on and document your tentative determination of eligibility for the Pine Point vicinity properties. **We concur that sites BK-CAR-007 (Ponsford Community Church), BK-PNP-001 (St. Theodore's Catholic Church, Cemetery and Kateri Tekakwitha Hall) and BK-PNP-007 (Breck Memorial Episcopal Church) are eligible for listing in the National Register of Historic Places,** but due to project modifications, the project will have **no effect** on these properties. We appreciate very much the efforts to protect historic properties.

Regarding the Waubun area properties, **we concur that the Golden Rule Store (site MH-WBC-078) is eligible for the National Register**. The MStP&SSM/Soo Line/CP Railway (site MH-PGR-002) has previously been determined eligible for the National Register. We further concur with your determination that the project as proposed will have **no adverse effect** on either the Golden Rule Store or the eligible railroad corridor.

I believe this concludes our review under Sec. 106 requirements. However, if any further consultation is needed, feel free to contact me at (651) 259-3456.

Sincerely,

Mary Ann Heidemann, Manager
Government Programs and Compliance

cc: White Earth THPO
Western Ecosystems Technology, Inc.
Jenny Bring, The 106 Group

White Earth Reservation Tribal Council
P.O. Box 418
White Earth, Minnesota 56591
Tel. (218) 983-3285
Fax (218) 983-3641

June 28, 2010

Mr. Mike Triplett
White Earth Tribal Planner

Re: Proposed White Earth Wind Turbine Locations

Mr. Triplett;

I have compared your recent submission of proposed locations for wind turbines on the White Earth Reservation with the Cultural Resources Data Base. I have also completed a site visit to each of your four site locations. There are no known cultural sites which would be impacted as a result of your proposed action.

It is important to note that this does not preclude the potential to impact intact sub-surface cultural resources during the course of construction. In the event that cultural resources are uncovered during the construction phase of the project, all work must cease and my office should be contacted immediately.

If you have questions or need clarification associated with this correspondence do not hesitate to re-contact my office.

Sincerely,

Thomas McCauley
White Earth Tribal Historic Preservation Officer/Archaeologist

Minnesota Department of Natural Resources
Division of Ecological and Water Resources, Box 25
500 Lafayette Road
St. Paul, Minnesota 55155-4025
Phone: (651) 259-5109 E-mail: lisa.joyal@state.mn.us

May 26, 2011 **Correspondence # ERDB 20110463**

Ms. Elizabeth Lack
Western EcoSystems Technology, Inc.
2003 Central Avenue
Cheyenne, WY 82001

RE: Natural Heritage Review of the proposed White Earth Wind Energy Project II

County	Township (N)	Range (W)	Section(s)
Becker	141	37	32
Mahnomen	143	41	30
	143	42	25, 36
	144	39	21

Dear Ms. Lack,

As requested, the Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. Based on this query, rare features have been documented within the search area (for details, see the enclosed database reports; please visit the Rare Species Guide at http://www.dnr.state.mn.us/rsg/index.html for more information on the biology, habitat use, and conservation measures of these rare species). Please note that the following **rare features *may* be adversely affected** by the proposed project:

- The Minnesota County Biological Survey has identified several native prairie remnants in the western ½ of Waubun sub-site C (GIS shapefiles of MCBS Native Plant Communities and MCBS Railroad Rights-of-Way Prairies can be downloaded from the DNR Data Deli at http://deli.dnr.state.mn.us/). Given that more than 99% of the prairie that was present in the state before settlement has been destroyed, and more than one-third of Minnesota's endangered, threatened, and special concern species are now dependent on the remaining small fragments of Minnesota's prairie ecosystem, we feel that all prairie remnants merit protection and should be considered avoidance areas. We also recommend that turbines and other infrastructure be distant enough from native prairies as to allow for prairie management, such as prescribed burning.

  Please contact me if avoidance of these native plant communities is not feasible, as surveys for state-listed species may be required. We will need to discuss potential surveyors, survey protocol, and other requirements before any survey work for rare species is initiated. Project planning should also take into account that surveys will need to be done during the appropriate time of the year, which may be limited.

- There are also several calcareous fens in the vicinity of the Waubun Site. These fens contain known occurrences of state-listed threatened plants. A calcareous fen is a rare and distinctive peat-accumulating wetland that is legally protected in Minnesota (see the attached fact sheet). Calcareous fens are designated as "outstanding resource value waters" in water quality regulations administered by the MPCA (*Minnesota Rules*, part 7050.0180) and they are given special protection through *Minnesota Rules*, parts 8420.1010 to 8240.1060. The Wetlands Conservation Act, authorized by *Minnesota Statutes*, section 103G.223, states that calcareous

fens may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, except as provided for in a management plan approved by the commissioner of the Department of Natural Resources. Many of the unique characteristics of calcareous fens result from the upwelling of groundwater through calcareous substrates. Because of this dependence on groundwater hydrology, calcareous fens can be affected by nearby activities or even those several miles away.

The DNR would have concerns regarding any activities that might affect groundwater flows, including groundwater pumping or discharge. If the project has the potential to alter the hydrological conditions of the surrounding fens, or if you have any questions regarding calcareous fen regulations, please contact Doug Norris, DNR Wetlands Program Coordinator, at 651-259-5125 or Doug.Norris@state.mn.us. If it is determined that the project will affect any of the fens, please contact me before construction is initiated as we will need to discuss potential effects to state-listed threatened species. Minnesota's endangered species law (*Minnesota Statutes*, section 84.0895) and associated rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6134) prohibit the taking of threatened or endangered species without a permit.

- The Environmental Assessment should address whether the proposed project has the potential to adversely affect the above rare features and, if so, any avoidance or mitigation measures that will be implemented.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area.

The enclosed results include an Index Report and a Detailed Report of records in the Rare Features Database, the main database of the NHIS. To control the release of specific location information, which might result in the destruction of a rare feature, both reports are copyrighted.

The Index Report provides rare feature locations only to the nearest section, and may be reprinted, unaltered, in an environmental review document (e.g., EAW or EIS), municipal natural resource plan, or report compiled by your company for the project listed above. If you wish to reproduce the index report for any other purpose, please contact me to request written permission. **The Detailed Report is for your personal use only as it may include specific location information that is considered nonpublic data under *Minnesota Statutes*, section 84.0872, subd. 2. If you wish to reprint or publish the Detailed Report for any purpose, please contact me to request written permission.**

For environmental review purposes, the Natural Heritage letter and database reports are valid for one year; they are only valid for the project location (noted above) and the project description provided on the NHIS Data Request Form. Please contact me if project details change or if an updated review is needed.

Please note that locations of the gray wolf (*Canis lupus*), federally-listed as threatened and state-listed as special concern, and the Canada lynx (*Lynx canadensis*), federally-listed as threatened, are not currently tracked in the NHIS. As such, the Natural Heritage Review does not address these species.

Furthermore, the Natural Heritage Review does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. Additional rare features for which we have no data may be present in the project area, or there may be other natural resource concerns associated with the proposed project. For these concerns, please contact your DNR Regional Environmental Assessment Ecologist (contact information available at http://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html). Please be aware that additional site assessments or review may be required.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. An invoice will be mailed to you under separate cover.

Sincerely,

Lisa Joyal

Lisa Joyal
Natural Heritage Review Coordinator

enc. Rare Features Database: Index Report
Rare Features Database: Detail Report
Rare Features Database Reports: An Explanation of Fields
Calcareous Fen Fact Sheet

cc: Nathan Kestner
Becky Marty
Doug Norris

Links: MCBS Native Plant Communities
http://www.dnr.state.mn.us/npc/index.html

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Twin Cities Field Office
4101 American Blvd E.
Bloomington, Minnesota 55425-1665

March 18, 2011

Elizabeth Lack
West Inc.
2003 Central Avenue
Cheyenne, Wyoming 82001

Re: White Earth Nation Wind Energy Project II
Mahnomen and Becker Counties, Minnesota
FWS TAILS #32410-2011-CPA-0051

Dear Ms. Lack:

This is in response to your February 2, 2011 letter requesting our review of the proposed White Earth Nation Wind Energy Project II in Mahnomen and Becker Counties, Minnesota. The proposed project includes the installation of six wind turbines at three different sites.

- Waubun Site (4 turbines):
  - Sub-site A – Township 143 N, Range 42 W, Section 25 (Mahnomen County)
  - Sub-site B – Township 143 N, Range 41 W, Section 30 (Mahnomen County)
  - Sub-site C – Township 143 N, Range 42 W, Section 36 (Mahnomen County)
- Naytahwaush Site (1 turbine)
  - Township 144 N, Range 39 W, Section 21 (Mahnomen County)
- Pine Point Site (1 turbine)
  - Township 141 N, Range 37 W, Section 32 (Becker County)

The following comments are being provided pursuant to the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act. This information is being provided to assist the Department of Energy (DOE) and White Earth Nation in making an informed decision regarding wildlife issues, site selection, project design, and compliance with applicable laws.

The Fish and Wildlife Service supports the development of wind power as an alternative energy source. However, wind farms can have negative impacts on wildlife and their habitats if not sited and designed with potential wildlife and habitat impacts in mind. Selection of the best sites for turbine placement is enhanced by ruling out sites with known, high concentrations of birds and/or bats passing within the rotor-swept area of the turbines or where the effects of habitat fragmentation will be detrimental. In support of wind power generation as a wildlife-friendly, renewable source of power, development sites with comparatively low bird, bat, and other wildlife values would be preferable and would have relatively lower impacts on wildlife.

The proposed turbine locations appear to avoid direct impacts to fish and wildlife habitats such as streams, wetlands, forested area, and grasslands. If water resources will be directly or indirectly impacted, the St. Paul District of the Corps of Engineers should be contacted to determine whether the project requires a Section 404 permit.

Federally-listed Threatened, Endangered, and Candidate Species

Because of the potential for wind power projects to impact federally-listed species, they are subject to the Endangered Species Act (16 U.S.C. 1531-1544) section 9 provisions governing "take," similar to any other development project. "Take" incidental to a lawful activity may be authorized through the initiation of formal consultation, if a Federal agency is involved. If a federal agency, federal funding, or a federal permit are not involved in the project, an incidental take permit pursuant to section 10(a)(1)(B) of the ESA may be obtained upon completion of a satisfactory habitat conservation plan for the listed species.

Currently, the gray wolf (threatened) is listed and present within Mahnomen and Becker Counties. Our records do not indicate any records of gray wolf within or in close proximity to the proposed turbine locations. At any point during project planning, construction or operation should additional information on the gray wolf become available, consultation regarding this species should be reinitiated with the Twin Cities Field Office.

The Minnesota Natural Heritage Database indicates a record of greater prairie chickens approximately 0.3 miles southwest of the proposed Waubun Sub-site A turbine location. In 2004, the Service published a Briefing Paper recommending a five-mile buffer between wind turbines and prairie grouse leks, which would include the greater prairie chicken. At this time, the greater prairie chicken is not a federally protected species, but with the current trends in population decline and a noted correlation between the species' habitat avoidance and turbine placement, the Service recommends that White Earth Nation consider completing surveys to determine greater prairie chicken utilization of all of the proposed turbine locations.

Migratory Birds

The Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA) implements four treaties that provide for international protection of migratory birds. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. Bald and golden eagles are afforded additional legal protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). Unlike the Endangered Species Act, neither the MBTA nor its implementing regulations at 50 CFR Part 21, provide for permitting of "incidental take" of migratory birds.

The Service recommends that a raptor nest surveys be completed prior to leaf-out in the spring of the year to identify potentially active nests in close proximity to the proposed turbine locations. Monitoring of daily movement patterns of any raptors nesting close to the proposed turbine sites may be necessary to establish whether potential raptor impacts exist.

Avian surveys at proposed turbine locations may be necessary if migration or local bird movement is not fully understood within the project sites. The Service is available to assist with the review of the survey protocol or survey data.

The Service's Office of Law Enforcement serves its mission to protect federal trust wildlife species in part by actively monitoring industries known to negatively impact wildlife, and assessing their compliance with Federal law. These industries include oil/gas productions sites, cyanide heap/leach mining operations, industrial waste water sites, and wind power sites. There is no threshold as to the number of birds incidentally killed by wind power sites, or other industry, past which the Service will seek to initiate enforcement action. However, the Service is less likely to prioritize enforcement action against a site operator that is cooperative in seeking and implementing measures to mitigate take of protected wildlife.

Service-owned Lands and Conservation Lands

The Waubun Waterfowl Production Area (WPA) is located 0.17 miles to the east of the proposed Waubun Sub-site B turbine location. The Service recommends a minimum turbine setback distance of 0.5 miles from WPAs. We also recommend that no turbines be located within 0.25 miles of Conservation Reserve Program, Wetland Reserve Program, or other similar federally- or state-funded restoration projects.

Due to the close proximity of some of the proposed turbine locations to the Waubun Wildlife Management Area (WMA), we recommend that the Minnesota Department of Natural Resources (MN DNR) also be contacted for comments and recommendations.

U.S. Fish and Wildlife Service Draft Land-Based Wind Energy Guidelines

We recommend that White Earth Nation follow the Best Management Practices (BMPs) in the recently published Service Draft Land – Based Wind Energy Guidelines. The complete Service Guidelines documents can be found at http://www.fws.gov/windenergy/guidance.html.

Post-construction Surveys

The Service recommends that White Earth Nation consider post-construction monitoring to determine impacts to migratory birds and bats. A specific post-construction monitoring plan can reviewed by the Service to ensure it includes a scientifically-robust, peer-reviewed methodology of mortality surveys. **The Service recommends that annual surveys be conducted for a minimum of three years following construction to assess impacts to birds and bats.** Results of mortality surveys and other forms of monitoring should be used to adjust operations to reduce mortality if necessary and feasible, as well as improve design and siting of future wind generation facilities. **The Developer or its contractor should provide this office with copies of the annual bird/bat mortality monitoring reports by December 31 each year.**

Infrastructure Considerations

Development of transmission infrastructure associated with wind facilities also poses risks to wildlife. These risks include potential avian mortality, particularly electrocution of raptors (hawks, eagles, kites, falcons and owls), that occurs when they attempt to perch on uninsulated or unguarded power poles. Recently-published information about which types of power line poles and associated hardware (e.g., wires, transformers and conductors) pose the greatest danger of electrocution to raptors and what modifications can be made to reduce this threat can be found on the internet at http://www.aplic.org/.

Thank you for the opportunity to provide comments on this proposed project. Please contact Fish and Wildlife Biologist Rich Davis at (612) 725-3548, ext. 2214, or Deputy Field Supervisor Pete Fasbender at (612) 725-3548, ext. 2207, if we can be of further assistance.

Sincerely,

Tony Sullins
Field Supervisor

cc: Mike Swan, White Earth Reservation
Tim Patronski, USFWS

From: Norris, Doug J (DNR)
To: Elizabeth Lack
Cc: Walker, Michele (DNR); Leete, Jeanette H (DNR); Kestner, Nathan (DNR); Marty, Becky (DNR)
Subject: RE: question re: calcareous fens - further clarification
Date: Wednesday, November 02, 2011 9:38:33 AM
Attachments: image001.png
image002.png
image003.png
image004.png

Elizabeth,
We have reviewed the information you sent regarding the White Earth Nation wind turbine construction. The nearest turbine is located approximately 0.25 mi. from a calcareous fen and is hydrologically downgradient. Considering this, we would not expect temporary dewatering for constructing the turbine foundations to have an adverse impact on the fens. Although you did not specify what you consider to be temporary, we are going to stipulate that it be less than 30 days. If we need to discuss this further, please let me know. To ensure that there are no surface-water related impacts, it is essential that proper erosion control methods are employed during construction. Provided that this is done and that there are no changes to the proposed temporary dewatering, you can consider this as DNR's clearance under our calcareous fen regulatory authority (Minnesota Statutes 103G.223) and the requirement to obtain DNR sign-off on the construction stormwater (NPDES) general permit (Part B.6), assuming the general permit applies to this project. Thank you for consulting with us regarding potential calcareous fen impacts. If you have any questions regarding our response, please contact me.

Doug Norris
Wetlands Program Coordinator
Division of Ecological and Water Resources
Minnesota Dept. Natural Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155
651-259-5125
Doug.Norris@state.mn.us

From: Elizabeth Lack [mailto:elack@west-inc.com]
Sent: Thursday, October 27, 2011 7:55 AM
To: Norris, Doug J (DNR)
Subject: FW: question re: calcareous fens - further clarification

Doug,

I sent an email yesterday inquiring about potential impacts to calcareous fens near Waubun resulting from pumping groundwater for wind turbine foundations. I would like to clarify that the dewatering (pumping of groundwater) would be temporary, only occurring during construction of the foundations, if necessary (i.e., if groundwater is encountered).

Also, I have attached another figure showing the areas with the calcareous fens (occurring to information on the DNR's director's list) in relation to the project. I hope that helps.

Thanks again,

Elizabeth Lack

Environmental & Statistical Consultants
2003 Central Avenue
Cheyenne, WY 82001
(307) 634-1756 main office
(307) 632-3117 direct line
(307) 286-1144 cell
www.west-inc.com

From: Elizabeth Lack [mailto:elack@west-inc.com]
Sent: Wednesday, October 26, 2011 9:55 AM
To: 'doug.norris@state.mn.us'
Subject: FW: question re: calcareous fens

From: Elizabeth Lack [mailto:elack@west-inc.com]
Sent: Wednesday, October 26, 2011 9:43 AM
To: 'Doug.norriss@state.mn.us'
Subject: question re: calcareous fens

Hi Doug,

We have been trading a few voice messages, so I thought I would try email this time. I am writing an EA for the White Earth Nation for a small wind turbine project near Waubun. There would be 4 turbine south of town – see the attached figure. As you probably know, some calcareous fens have been indentified within approximately ¼ to ½ mile from the turbine sites. A recent geotech report for the turbine foundations indicate that since groundwater is likely within approximately 10 feet of the surface seasonally, a sump pump may need to be used. The foundations will be between 10 and 20 feet deep (depending on turbine model selected) and at most 24 feet in diameter. Would seasonal use of a sump pump affect calcareous fens over ¼ mile away?

Let me know your thoughts.

Thanks!

Elizabeth Lack

Environmental & Statistical Consultants
2003 Central Avenue
Cheyenne, WY 82001
(307) 634-1756 main office
(307) 632-3117 direct line
(307) 286-1144 cell
www.west-inc.com

1.1.1.1.1.1.1.3 APPENDIX C: WHITE EARTH NATION CULTURAL RESOURCES LETTER REPORT AND PHASE I AND II ARCHITECTURAL HISTORY SURVEY AND ASSESSMENT OF EFFECTS STUDY FOR THE WHITE EARTH NATION WIND PROJECT, BECKER AND MOHNOMEN COUNTIES, MINNESOTA

PHASE I AND II ARCHITECTURAL HISTORY SURVEY AND ASSESSMENT OF EFFECTS STUDY FOR THE WHITE EARTH NATION WIND PROJECT, BECKER AND MAHNOMEN COUNTIES, MINNESOTA

Submitted to:
Western EcoSystems Technology, Inc.

Submitted by:
The 106 Group Ltd.

April 2011

PHASE I AND II ARCHITECTURAL HISTORY SURVEY AND ASSESSMENT OF EFFECTS STUDY FOR THE WHITE EARTH NATION WIND PROJECT, BECKER AND MAHNOMEN COUNTIES, MINNESOTA

SHPO File No. Pending
Client No. Pending
106 Group Project No. 11-05

Submitted to:
Western EcoSystems Technology, Inc.
2003 Central Avenue
Cheyenne, WY 82001

Submitted by:
The 106 Group Ltd.
The Dacotah Building
37W0 Selby Avenue
St. Paul, MN 55102

Report Author:
Saleh Van Erem, M.S.

April 2011

MANAGEMENT SUMMARY

During February through April of 2011, The 106 Group Ltd. (106 Group) conducted a Phase I and II architectural history survey and assessment of effects study for the White Earth Nation Wind Project (project). The proposed project consists of the construction of wind turbines up to 260 feet tall within three project areas located within the White Earth Reservation: one near Pine Point, one near Waubun, and one near Naytahwaush, Minnesota.

This work was conducted under contract with Western EcoSystems Technology, Inc. on behalf of the White Earth Reservation Tribal Council. This project will be receiving federal funding from the United States Department of Energy (DOE) and, therefore, must comply with Section 106 of the National Historic Preservation Act of 1966 (Section 106), as amended, as well as the National Environmental Policy Act (NEPA). The White Earth Nation Tribal Historic Preservation Office (THPO) will be completing a review of archaeological resources for the project; however, the Minnesota State Historic Preservation Office (SHPO) has indicated that an architectural history survey should be completed to identify all architectural history resources within the area of potential effect (APE) for the project and determine if any of those resources are eligible for listing in the National Register of Historic Places (NRHP).

The project areas are located in Section 32, T141N, R37W of Becker County and Section 30, T143N, R41W; Sections 25, 36, T143N, R42W; and Section 21, T144N, R39W of Mahnomen County, Minnesota. The APE for architectural history accounts for any physical, auditory, or visual impacts to historic properties. According to information provided by Western EcoSystems Technology on January 27, 2011, wind turbines at all three project areas (Waubun, Pine Point, and Naytahwaush) may be up to 260 feet tall and will be constructed using bulldozers to dig foundations for the turbines; therefore, the greatest potential for the project to indirectly effect historic properties would be visual. For wind farm projects, the Minnesota SHPO suggests that the APE should vary depending on the height and location of the towers. As suggested by the SHPO, using the guidelines provided in the *Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission* (FCC 2004), for towers between 200 and 400 feet in height, SHPO recommends an APE of 0.75 miles. A larger APE may be required if a tower(s) is located in a prominent location, such as on top of a hill or bluff, where it is more visually prominent (Mary Ann Heidemann, personal communication 2011). None of the project areas are located in a prominent location and, therefore, the recommended APE for architectural history is 0.75 miles around each of the three proposed project areas. The Phase I and II architectural history survey was conducted within this recommended APE, which encompassed approximately 6,094 acres (2,466.15 hectares [ha]). Saleh Van Erem, M.S. served as principal investigator for architectural history.

During the Phase I architectural history survey, the 106 Group identified 127 architectural history properties 50 years of age or older within the APE. Of these 127 properties, seven were previously inventoried and 120 were newly identified architectural history properties. One of the properties (MH-PGR-002) was a newly inventoried segment of a previously

determined eligible railroad corridor. Seven of the 127 properties were recommended as *potentially* eligible for listing in the NRHP. The remaining 120 properties are recommended not eligible for listing in the NRHP due to a lack of historical significance and/or loss of integrity.

Following the Phase I investigation, a Phase II architectural history evaluation was conducted for the seven *potentially* eligible properties. During the Phase II evaluation, four of the properties (MH-WBC-078, BK-CAR-007, BK-PNP-001, and BK-PNP-007) were recommended as eligible for listing in the NRHP. Therefore, an assessment of effects study was conducted for the four recommended eligible properties and the previously determined eligible railroad corridor (MH-PGR-002).

The proposed project will have temporary direct and indirect effects and permanent indirect visual effects on the MStP&SSM / Soo Line / CP Railway (MH-PGR-002); the Golden Rule Store (MH-WBC-078); the Ponsford Community Church (BK-CAR-007); and the Breck Memorial Episcopal Church (BK-PNP-007). There will be temporary increases in noise and vibration, and possible effects to the air quality during construction and operation of the proposed project; however these effects will be minimal and are not anticipated to adversely affect the properties. There will also be permanent indirect visual effects to these properties from the proposed project that will slightly change the properties' integrity of setting and feeling. However, these properties are located a great distance from the proposed wind turbines and the potential visual impact will be minimized since the perceived comparative height of the turbines on the horizon will be reduced given the distance between the properties and the proposed turbines. Therefore, the proposed project will not adversely affect the ability of these properties to convey their historical significance.

The proposed project will have temporary direct and indirect effects and permanent indirect visual effects on the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall (BK-PNP-001). There will be temporary increases in noise and vibration, and possible effects to the air quality during construction and operation of the proposed project; however these effects will be minimal and are not anticipated to adversely affect this property. There will also be permanent indirect visual effects to this property from the proposed project that will adversely affect the integrity of setting and feeling of the property which will adversely affect the ability of the property to convey its historical significance.

To potentially minimize the adverse visual effects to the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall (BK-PNP-001) from the proposed project, one option may be to plant mature vegetation, particularly coniferous trees, along the western boundary of the property in order to partially screen the views from the property. If the adverse visual effect cannot be avoided or minimized, then appropriate mitigation may be required. However, the DOE as the lead federal agency will need determine the effects this project will have on historic resources and appropriate means to avoid, minimize, or mitigate any adverse effects, in consultation with the SHPO.

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1.0 INTRODUCTION

During February through April of 2011, The 106 Group Ltd. (106 Group) conducted a Phase I and II architectural history survey and assessment of effects study for the White Earth Nation Wind Project (project). The proposed project consists of the construction of wind turbines up to 260 feet tall within three project areas located within the White Earth Reservation: one near Pine Point, one near Waubun, and one near Naytahwaush, Minnesota.

This work was conducted under contract with Western EcoSystems Technology, Inc. on behalf of the White Earth Reservation Tribal Council. This project will be receiving federal funding from the United States Department of Energy (DOE) and, therefore, must comply with Section 106 of the National Historic Preservation Act of 1966 (Section 106), as amended, as well as the National Environmental Policy Act (NEPA). The White Earth Nation Tribal Historic Preservation Office (THPO) will be completing a review of archaeological resources for the project; however, the Minnesota State Historic Preservation Office (SHPO) has indicated that an architectural history survey should be completed to identify all architectural history resources within the area of potential effect (APE) for the project and determine if any of those resources are eligible for listing in the National Register of Historic Places (NRHP).

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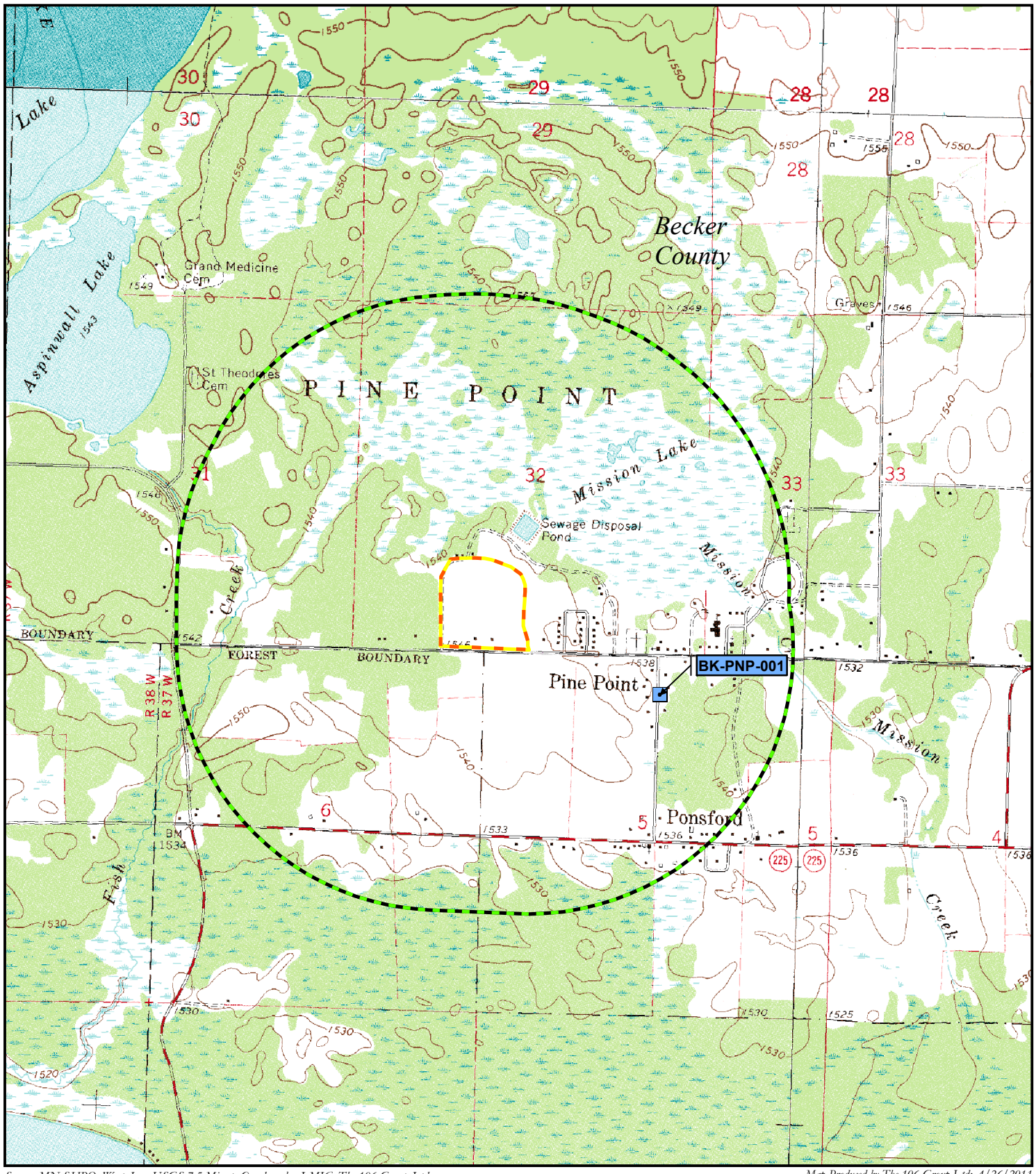
The following report describes project methodology, environmental setting, previous investigations, historical contexts, results, and recommendations. Appendix A contains the Minnesota architectural history inventory forms for all surveyed properties and Appendix B contains a list of project personnel.



Source: MN SHPO; West, Inc.; USGS 7.5 Minute Quadrangles; LMIC; The 106 Group Ltd.

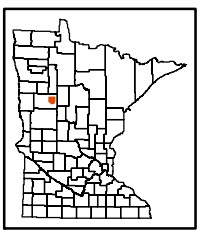
Map Produced by The 106 Group Ltd: 4/26/2011

White Earth Nation Wind Project
Phase I and II Architectural History Survey
and Assessment of Effects Study
Becker and Mahnomen Counties
Minnesota

Project Location & Previous Investigations - Pine Point

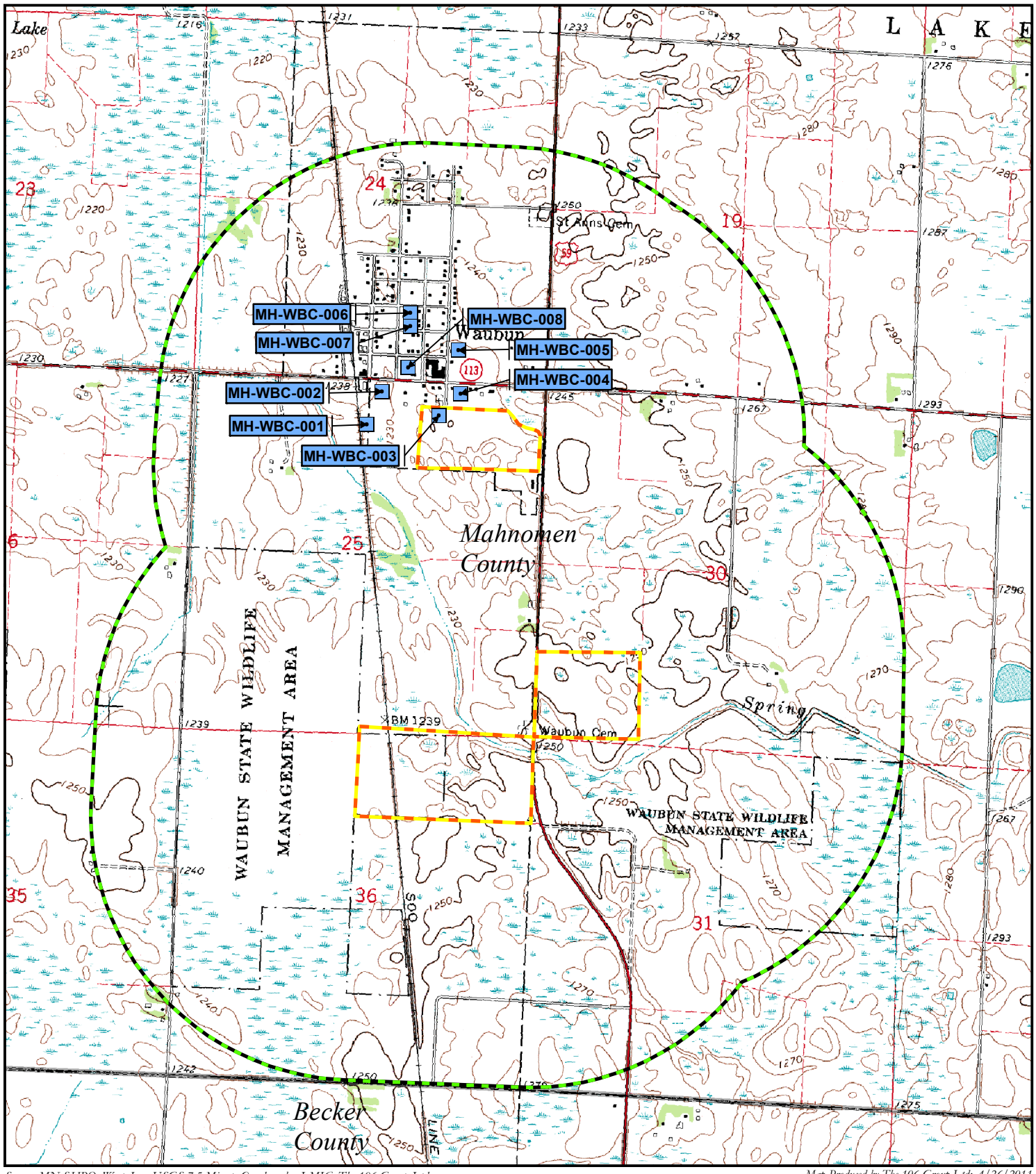
0 0.3 0.6
Kilometers
Miles
0 0.3 0.6
1:24,000

- Project Area
- Architectural History Area of Potential Effect
- Previously Inventoried Architectural History Property



N

Figure 1



Source: MN SHPO; West, Inc.; USGS 7.5 Minute Quadrangles; LMIC; The 106 Group Ltd.

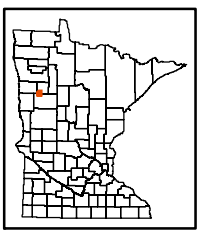
Map Produced by The 106 Group Ltd: 4/26/2011

White Earth Nation Wind Project
Phase I and II Architectural History Survey
and Assessment of Effects Study
Becker and Mahnomen Counties
Minnesota

Project Location & Previous Investigations - Waubun

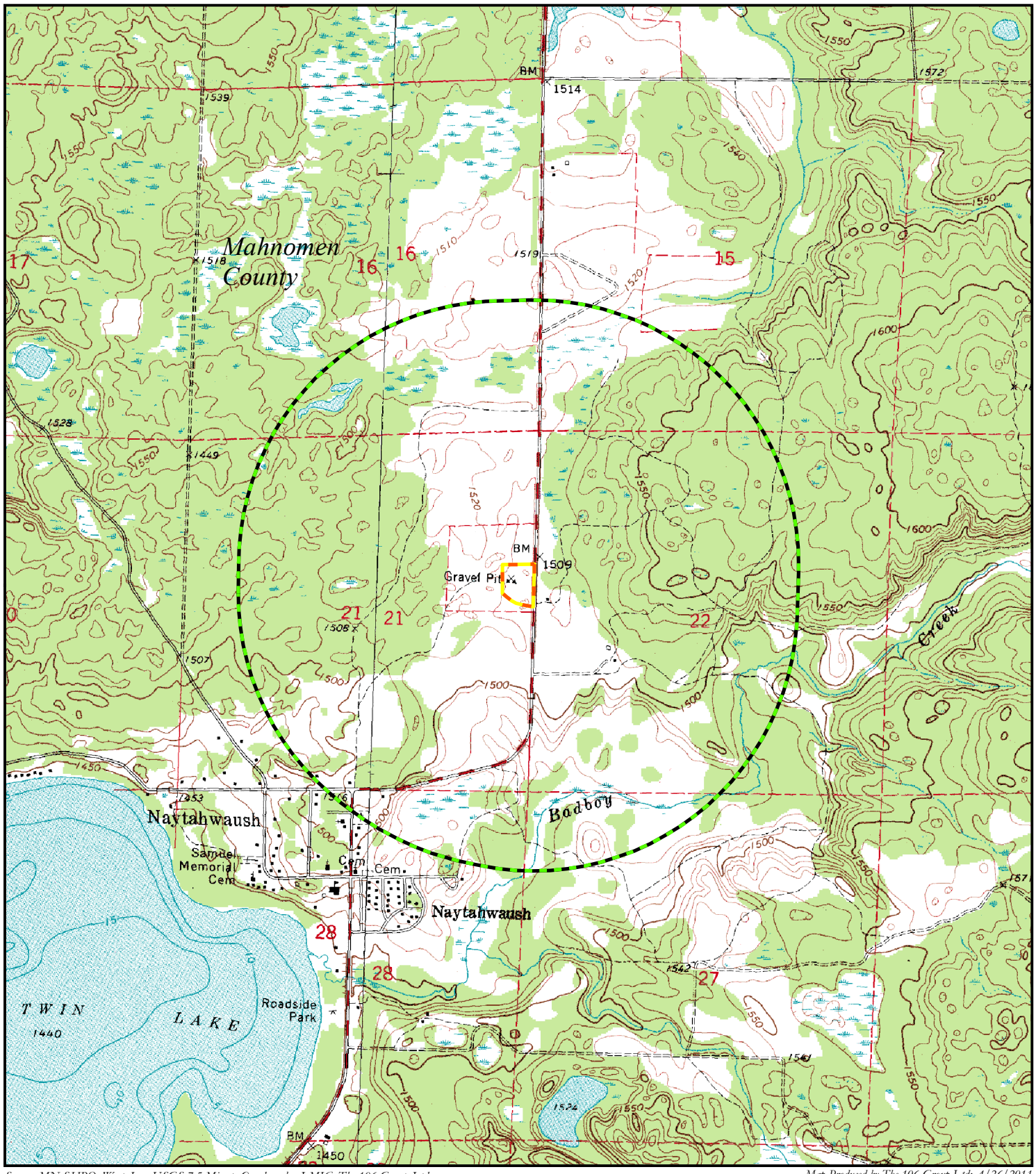
0 0.3 0.6
Kilometers
Miles
0 0.3 0.6
1:24,000

- Project Area
- Architectural History Area of Potential Effect
- Previously Inventoried Architectural History Property



N

Figure 2



Source: MN SHPO; West, Inc.; USGS 7.5 Minute Quadrangles; LMIC; The 106 Group Ltd.

Map Produced by The 106 Group Ltd: 4/26/2011

White Earth Nation Wind Project
Phase I and II Architectural History Survey
and Assessment of Effects Study
Becker and Mahnomen Counties
Minnesota

Project Location & Previous Investigations - Naytahwaush

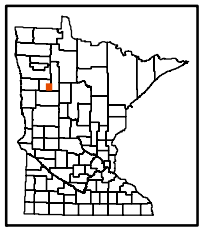
0 500 1,000 Meters

0 2,000 4,000 Feet

1:24,000

Project Area

Architectural History Area of Potential Effect



N

Figure 3

2.0 METHODS

2.1 OBJECTIVES

The purpose of this study is threefold: to conduct a Phase I architectural history survey to identify all known architectural history resources within the APE for the project that are 50 years of age or older and determine if any of those resources are *potentially* eligible for listing in the NRHP, to conduct a Phase II architectural history evaluation to determine if any properties recommended *potentially* eligible during the Phase I survey are eligible for listing in the NRHP and, if necessary, assess the effects of the White Earth Nation Wind project on those historic properties found to be eligible for listing in the NRHP. All work was conducted in accordance with the Minnesota SHPO *Guidelines for History/Architecture Projects in Minnesota* (Minnesota State Historic Preservation Office 2010) and *The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* [48 Federal Register 44716-44740] (NPS 1983).

2.2 AREA OF POTENTIAL EFFECT

The APE for architectural history accounts for any physical, auditory, or visual impacts to historic properties (see Figures 1-3). According to information provided by Western EcoSystems Technology on January 27, 2011, wind turbines at all three project areas (Waubun, Pine Point, and Naytahwaush) may be up to 260 feet tall and will be constructed using bulldozers to dig foundations for the turbines; therefore, the greatest potential for the project to indirectly effect historic properties would be visual. For wind farm projects, the Minnesota SHPO suggests that the APE should vary depending on the height and location of the towers. As suggested by the SHPO, using the guidelines provided in the *Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission* (FCC 2004), for towers between 200 and 400 feet in height, an APE of 0.75 miles is recommended to account for indirect visual effects. As indicated by SHPO, a larger APE may be required if a tower(s) is located in a prominent location, such as on top of a hill or bluff, where it is more visually prominent (Mary Ann Heidemann, personal communication 2011). None of the project areas are located in a prominent location and, therefore, the recommended APE for architectural history is 0.75 miles around all three project areas. The architectural history survey area included 6,094 acres (2,466.15 ha).

2.3 BACKGROUND RESEARCH

During the Phase I architectural history survey local research was conducted at the Detroit Lakes Public Library on February 16, 2011 and at the Becker County Historical Society on February 17, 2011. On February 22, 2011, additional research was conducted at the Minnesota Historical Society and the University of Minnesota to obtain information on previously inventoried architectural history properties and gather historical plat maps and aerial photographs.

During the Phase II architectural history evaluation additional research was conducted at the Becker County Historical Society and Detroit Lakes Public Library on March 29, 2011 to gather property-specific information. Deed research was conducted on the seven *potentially* eligible properties at the Mahnomen County Courthouse on March 30, 2011 and at the Becker County Courthouse on March 31, 2011. Additional research was conducted at St. Ann's Rectory in Waubun on March 30, 2011 to obtain information on St. Ann's church and rectory. Further research was conducted at the Minnesota Historical Society in order to obtain city directory and local newspaper information.

During the Phase I and II architectural history surveys a research visit to the Mahnomen County Museum and Historical Society could not be made because the facility does not open until Memorial Day. The curator of the facility was contacted in April to see if someone could conduct remote research on the four *potentially* eligible properties located in Mahnomen County. However, no additional information was obtained from the historical society as they do not have subject files on individual properties or city directories.

2.4 FIELD METHODOLOGY

During the Phase I architectural history survey, conducted February 15-18, 2011, an initial drive-by survey of the buildings, structures, and landscape features in the APE was conducted in order to identify those properties that appeared to be 50 years in age or older. Each of these properties was subsequently documented with field notes and digital photographs.

The Phase II architectural history evaluation and assessment of effects study of the seven *potentially* eligible properties was conducted on March 28 and 29, 2011. Saleh Van Erem, M.S. served as principal investigator for architectural history and conducted the fieldwork (see Appendix B for project personnel). During the survey, more detailed field notes and digital photographs were taken of the properties and vistas between the properties and the projects areas.

2.5 INVENTORY FORMS

A Minnesota Architecture-History Inventory Form was completed for each architectural history property of 50 years in age or older located within the APE (Appendix A).

2.6 EVALUATION

Upon completion of the fieldwork, the potential eligibility of each resource for listing in the NRHP was assessed based on the property's potential historical significance and integrity. The NRHP criteria, summarized below, were used to help assess the significance of each property:

- Criterion A – association with the events that have made a significant contribution to the broad patterns of our history;
- Criterion B – association with the lives of persons significant in our past;

- Criterion C – embodiment of the distinctive characteristics of a type, period, or method of construction; representation of the work of a master; possession of high artistic values; or representation of a significant and distinguishable entity whose components may lack individual distinction; or
- Criterion D – potential to yield information important to prehistory or history (NPS 1995).

The NPS has identified seven aspects of integrity to be considered when evaluating the ability of a property to convey its significance: location, design, setting, materials, workmanship, feeling, and association. The integrity of each property or site was assessed in regard to these seven aspects. The properties were also assessed to determine if they represent a type of resource to be evaluated for NRHP eligibility using the Criteria Considerations (NPS 1995).

3.0 LITERATURE SEARCH

3.1 PREVIOUS ARCHITECTURAL HISTORY STUDIES

Research indicated that two architectural history surveys have been conducted within the survey area. In 1987, the Minnesota SHPO conducted a countywide survey of potentially significant properties within Becker County. The countywide survey inventoried 297 potentially significant properties. The survey also identified 11 property types associated with the "Reservation and Native American Community" and five property types, with subtypes, associated with the statewide *Railroads and Agricultural Development, 1870-1940* historical context (Koop 1987a).

In 1987, the Minnesota SHPO also conducted a countywide survey of potentially significant properties within Mahnomen County. The countywide survey inventoried 89 potentially significant properties. The survey also identified 11 property types associated with the "Reservation and Native American Community" and five property types, with subtypes, associated with the statewide *Railroads and Agricultural Development, 1870-1940* historical context (Koop 1987b).

Additionally, in 2007, as part of the NRHP Multiple Property Documentation Form *Railroads in Minnesota 1862-1956* (Schmidt et al. 2007), the entire MStP&SSM / Soo Line / CP Railway corridor, running from Glenwood to Noyes, was reviewed and determined eligible for listing in the NRHP under Criterion A. A segment of this railroad corridor is located within the current APE for the Waubun project area; however, it was not previously individually documented during the MPDF study or any subsequent investigation.

3.2 PREVIOUSLY INVENTORIED ARCHITECTURAL HISTORY PROPERTIES

One property has been previously inventoried within the Pine Point APE (Table 1; Figure 1). Eight properties have been previously inventoried within the Waubun APE (Table 1; Figure 2). As stated above, the entire MStP&SSM / Soo Line / CP Railway corridor, running from Glenwood to Noyes, was reviewed as part of NRHP Multiple Property Documentation Form *Railroads in Minnesota 1862-1956* (Schmidt et al. 2007) and determined eligible for listing in the NRHP under Criterion A. A segment of this railroad corridor is located within the current APE for the Waubun project area; however, it was not previously individually documented during the MPDF study or any subsequent investigation. No properties have been previously inventoried within the Naytahwaush APE.

TABLE 1. PREVIOUSLY INVENTORIED ARCHITECTURAL HISTORY PROPERTIES

Inventory No.	Property Name	Address or TRS	NRHP Status	APE
BK-PNP-001	St. Theodore's Church	1112 Third Street	Undetermined	Pine Point
MH-WBC-001	Waubun Creamery	Northeast corner of Pleasant & First Street	Undetermined, Non-extant	Waubun
MH-WBC-002	Commercial Building	First Street	Undetermined, Non-extant	Waubun
MH-WBC-003	Waubun Public School	Corner Second & Pleasant	Undetermined	Waubun
MH-WBC-004	St. Ann's Rectory	Third Street	Undetermined	Waubun
MH-WBC-005	Residence	Corner Third & Central	Undetermined	Waubun
MH-WBC-006	Residence	Corner Main & Reserve	Undetermined	Waubun
MH-WBC-007	Residence	Corner Main & Smith	Undetermined	Waubun
MH-WBC-008	Residence	North Main Street	Undetermined	Waubun

4.0 HISTORICAL CONTEXTS

4.1 CONTEXT OVERVIEW

All potential post-contact properties within the project areas are addressed by the *Indian Communities and Reservations, 1937-1934; Railroad Development in Minnesota, 1862-1956;* and *Railroads and Agricultural Development, 1870-1940* historical contexts established by the SHPO. Additional historical contexts were developed for the geographic locations of the project areas and any additional cultural associations.

4.2 INDIAN COMMUNITIES AND RESERVATIONS, 1837-1934

This historical context was developed for the entire state with a focus on areas that historically have Native American communities and current reservations. Minnesota was predominantly occupied by two Native American tribes in the early nineteenth century, the Dakota (Sioux) and the Ojibwe (Chippewa). In 1837, the Dakota began land cession, opening land east of the Mississippi River to Euro-American settlement. In 1847, the Ojibwe began land cessions west of the Mississippi. In 1854, the first reservations were established for Ojibwe bands at Grand Portage and Fond du Lac. The Mille Lacs and Leech Lake Reservations were established in 1855, the Boise Forte Reservation in 1866, and the White Earth Reservation in 1867. Formal reservations for the Dakota were established much later. In 1887, the government began purchasing small parcels of land in Birch Coulee, Shakopee, Prairie Island, and Prior Lake for the Dakota. This land became the center of modern Dakota communities of Lower Sioux, Prior Lake, and Prairie Island. Land on the Red Lake Reservation was never ceded by the Ojibwe, the reservation was formally established in 1918. Property types associated with this historical context include ceremonial and religious sites, reservation sites, missions and churches, mission schools, trails, portages, historic village sites, and many others (SHPO 1993).

4.3 RAILROAD DEVELOPMENT IN MINNESOTA, 1862-1956

This statewide context was developed specifically for the Railroads Multiple Property Documentation Form (Railroads MPDF). In 1828, the Baltimore and Ohio Railroad began construction on the first railroad line in the United States (U.S.) (Schmidt et al. 2005:E5). By the 1830s numerous railroads were charted, and the 1840s and 1850s saw a rapid expansion in railroad construction, with railroad mileage tripling from 8,900 miles to over 30,000 miles (Schmidt 2005:E6). Due to the availability of raw materials and manpower, railroad construction ceased during the Civil War (1861-1865). The golden age of railroad construction in the U.S. occurred after the Civil War and before World War I (1917-1918). Railroad mileage quadrupled from 1868-1873, 1879-1883, and 1886-1893 (Schmidt et al. 2005:E7).

In 1862, the first railroad, the St. Paul & Pacific (StP&P) from St. Paul to St. Anthony, was completed in the state of Minnesota. The Civil War dampened initial construction efforts, but by 1865 the railroad industry was booming in Minnesota, which would last until 1893

(Schmidt 2005:E8). Many of the country's largest railroad companies, the Northern Pacific (NP), Great Northern (GN), Chicago Milwaukee St. Paul & Pacific, Illinois Central, Minneapolis, St. Paul & Sault Ste. Marie (Soo Line), and the Chicago Burlington & Quincy, have their origins in Minnesota or large extensions of track through the state. The railroads opened the state not only to settlement, but also to the lumber, iron ore, and agriculture industries.

4.4 RAILROADS AND AGRICULTURAL DEVELOPMENT, 1870-1940

This historical context was developed for the entire state with a focus on southern, mid-central, and northwestern Minnesota. These areas were characterized by large scale agricultural production, transportation, and processing facilities. The production generally consisted of family farms operated by European immigrants or American-born settlers (SHPO 1993).

The development of full-scale agricultural commerce at the end of the nineteenth century, and the subsequent emergence of the railroad, contributed to the development of larger communities. Small communities located on railroad lines quickly became regional centers, since railroads provided these towns with means to efficiently and economically transport agricultural goods from producing areas to distribution centers and markets in and out of the state. The large-scale agricultural processing facilities and distribution centers developed in urban areas. Industries such as flour milling, meat packing, and brewing were centered in the regional markets of the Twin Cities and Duluth (SHPO 1993).

Property types associated with this historical context include farmsteads; rural structures such as town halls and churches; railroad structures; and agricultural product processing, supply, and storage facilities such as grain elevators, flour mills, and creameries (SHPO 1993).

4.5 RURAL CHURCH ARCHITECTURE

In the U.S., until the mid-twentieth century rural church architecture was dominated by the vernacular form. The term vernacular refers to the lack of distinctive architectural features, ornamentation, or other characteristics that are representative of an architectural style. Vernacular architecture is traditionally designed and built by local craftsman (South Dakota State Historic Preservation Office 2002:22; Groth 1999). Vernacular churches generally have a rectangular shape, a simplified nave plan, and an exterior that is clad in wood. Vernacular architecture is not completely without ornamentation; minimal ornamentation can include Gothic Revival style windows, carved vergeboards, and decorative wood shingles (South Dakota State Historic Preservation Office 2002:22).

Some vernacular churches feature multiple Gothic Revival details. The Gothic Revival style is generally associated with European church designs and became popular in the U.S. in the mid- to late-nineteenth century. In the U.S. the elements of the style is commonly applied to residential and church architecture. Characteristics of the style include steeply pitched gabled rooflines, decorative spires and towers emphasizing the verticality, pointed arches,

cross gable plans (cruciform), decorative buttresses, and contrasting exterior cladding. Gothic Revival characteristics were often applied to rural vernacular churches in the late nineteenth and early twentieth centuries. Typically, these churches borrowed the steeply pitched gabled rooflines, decorative towers emphasizing the verticality, and pointed arched windows from the Gothic Revival style. However, unlike the Gothic Revival style, these vernacular churches generally had a simplified nave plan and exterior wood cladding (South Dakota State Historic Preservation Office 2002:23).

The Gothic Revival style inspired another type of vernacular architecture, the Carpenter Gothic style. Carpenter Gothic, also known as Rural Gothic, was popular in the mid- to late-nineteenth century. The style was popularized by pattern books, such as *Upjohn's rural architecture: Designs, working drawings and specifications for a wooden church, and other rural structures* by Richard Upjohn from 1852 or Andrew Jackson Downing's *The Architecture of County Houses* from 1850. The style applies Gothic Revival details and massing to modest wooden structures that were generally carpenter built. Board-and-batten siding and Gothic-arch windows are typically found in Carpenter Gothic style churches (South Dakota State Historic Preservation Office 2002:23).

Although vernacular is the most common style for rural churches, other architectural styles were used in some rural church designs. The Queen Anne style was popular in the U.S. from the 1880s through the early twentieth century. Although generally applied to residential architecture, the Queen Anne style can also be found in religious architecture. The style is generally characterized by an asymmetrical façade, typically with a dominant front-facing gable; an irregular shaped roof; and pedimented gables. In many variations of the style fenestration can include Palladian style windows (McAllester 2004:263).

4.6 MINNESOTA'S EARLY TWENTIETH CENTURY COUNTRY ELEVATORS

Grain elevators are constructed for two purposes, storing grains and transporting grain by moving it within the elevator, using elevating and conveying equipment. There are generally five types of elevators, a farm silo, a country elevator, a terminal elevator, a receiving elevator, and an import terminal elevator (Frame 1989:E-2). Farm silos are the most common because they are found on most grain producing farms; however country elevators are the most common large scale style of elevator. At a country elevator farmers deliver their grains in trucks and its stored, dried, and transferred to railroad cars for shipment to a terminal or receiving elevator (Frame 1989:E-2). Historically, country elevators were owned either privately, by a farmer's cooperative, by a mill, or by a grain company, known as a line elevator (Frame 1989:E-7). All types of ownership were common in Minnesota. In 1917, 39.2 percent of grain elevators were line elevators, 23.8 percent were owned by farmer's cooperatives, 14.9 percent were owned by mills, and 22.1 percent were privately owned (Frame 1989:E-11).

In the early twentieth century wood was the most common building material for country elevators. Wood as a building material was adopted in the 1870s (Frame 1989:E-12). Most extant wood elevators in Minnesota were constructed with a cribbed structure where wooden planks, up to 10 inches in width, are laid flat in the desired shape of the elevator,

with overlapping corners, and built up to the required height. The exterior was then sheathed in wood siding (Frame 1989:E-12, E-13). The practice of iron-cladding elevators was applied to wood elevators for fire protection beginning in the 1910s (Frame 1989:E-17). Other materials used in the construction of elevators includes steel, tile, and brick, however these building materials are not commonly found in early twentieth century country elevators.

4.7 WHITE EARTH RESERVATION

The White Earth Reservation is located in northwestern Minnesota and encompasses approximately 829,440 acres in all of Mahnomen County and portions of Becker and Clearwater Counties. The Reservation was established in 1867. By 1868, 150 Native Americans had been relocated to the reservation. The Reservation is named for the layer of white clay underneath the surface on the western half of the reservation. The land consists of typical prairies in the west, rolling hills and lakes in the middle, and conifer forest in the east. Native American communities include White Earth, Pine Point/Ponsford, Naytahwaush, Elbow Lake, and Rice Lake. Some European-American cities were established along the Minneapolis, St. Paul & Sault Ste. Marie Railway (MStP&SSM) line which runs north-south in the western part of the reservation, including Callaway, Ogema, Waubun, and Mahnomen (Indian Affairs Council of the State of Minnesota 2011).

4.8 BECKER COUNTY

Becker County is located in west central Minnesota. The county was established on March 18, 1858 as an act of state legislature. The county is named after Brigadier General George Loomis Becker, who was elected as one of Minnesota's first members of Congress. Becker was one of three members elected, however only two could serve in Congress. Becker relinquished his seat and because of this the next established county in the state would be named after him. Becker County is located in the states "park region," and contains over 400 lakes within its 1,440 square miles (Becker County, Minnesota 2008).

In 1867, the White Earth Reservation was established in the northern part of Becker County. By 1868, 150 Native Americans had moved to the reservation. European-American settlers began to arrive in the county in the late 1860s and greatly increased when the Northern Pacific Railroad Company (NP) built a mainline through Becker County in 1871 (Becker County, Minnesota 2008). This railroad line connected the Twin Ports of Duluth and Superior with Moorhead/Fargo (Prosser 1966:226). Also in 1871, the town of Detroit (now Detroit Lakes) was founded; the city was named the county seat in 1877 (Becker County, Minnesota 2008).

Further settlement occurred in the county when the MStP&SSM mainline was constructed through the county, connecting Glenwood and Noyes, Minnesota in 1904 (Becker County, Minnesota 2008; Prosser 1966:227). Major industries in the county include agriculture and tourism (Becker County, Minnesota 2008).

4.8.1 Pine Point Township

Pine Point Township is located in northeastern Becker County. The area was named Pine Point after the Ottertail Pillagers' name for the area, Nejingwakokawadjiw, meaning Pine Point Mountain. The mountain is a hill that is located three miles east of Ponsford. The hill historically had a projecting point of morainic drift that was covered in white pine. Around the turn of the twentieth century, the name for the area was shorted to Nejingwakokang, Pine Point (Watrin 1930:51-52). The area was opened to European-American settlement in 1879 (Becker County Historical Society n.d.). Pine Point Township was organized on May 28, 1918 and located within the White Earth Reservation (Detroit Lakes Tribune, 13 April 1970).

4.8.2 Ponsford

Ponsford is an unincorporated community located in Carsonville Township, which is in the eastern portion of Becker County. The town is located within the White Earth Reservation and was first settled by European-Americans in 1880. The town was named after Orville D. Ponsford, principal of the local Episcopal mission school from 1890-91 (Watrin 1930:50). In 1890, the first business was established in Ponsford, a general store that was operated by A.B. Hoyle. A post office was established at the store in 1891. The lumber industry boomed in the area in 1905 and many more structures were built along County Highway 26 in Ponsford. In 1904, the Ponsford Community Church was built and in 1906 the Ponsford State Bank was established in town. The lumber industry waned between World War I and World War II, and expansion in the community came to a standstill (Watrin 1930:14). Some remnants of the late nineteenth century and early twentieth century community remain today, primarily sited along County Road 26.

4.9 MAHNOMEN COUNTY

In 1867, the White Earth Reservation was established; encompassing the whole of what would become Mahnomen County. European-American settlers began to arrive in the county in the early twentieth century after the MStP&SSM mainline was constructed through the county, connecting Glenwood and Noyes, Minnesota in 1904 (Prosser 1966:227). The county was officially established in 1906, with the county seat designated as the City of Mahnomen. The county was formed from the eastern 16 townships of Norman County. The county is named after the Ojibwe word for wild rice, Mahnomin (Mahnomen County 2011). Primary industries in the county include agriculture, cattle, and lakes tourism.

4.9.1 City of Waubun

The City of Waubun was established in 1904 as the town of Bement. The community was originally located in Norman County. The town of Bement was founded by Thomas and Mary Bement, who built the first hotel in town (Mahnomen County 2011; Becker County Historical Society n.d.). In 1906, Mahnomen County was established, entirely located within the White Earth Reservation. That same year the reservation agency decided to change all

town names within the reservation to Native American names, thus Bement became Waubun, which means "rising sun" in Ojibwe (Mahnomen County 2011).

The town was built around the MStP&SSM / Soo Line which was constructed through the county in 1904. An elevator and commercial district formed along First Street, just east of the railroad tracks. Early businesses included William Bement's butcher shop, Nel Narum's general store, the Golden Rule Store, a lumberyard, the First State Bank, the Woodworth Elevator Company, the Luck Land Company, and the Cooperative Creamery (Mahnomen County 2011; Mahnomen County Historical Society 1991: 39). Waubun was incorporated as a village in 1907. A fire swept through Waubun's commercial district in June of 1912. The couple wood frame structures that were lost were quickly re-built.

The residential area of Waubun primarily developed north of County Road 113 and east of the railroad tracks. In 1914, Lucky S. Waller donated a block near the middle of town to develop a park; the Waubun City Park is still extant (Mahnomen County Historical Society: 39). The earliest houses in town are sited along the south side of County Road 113. These early twentieth century houses are some of the few in town that exhibit architectural styles such as Queen Anne and Folk Victorian. Houses constructed north of County Road 113 generally consist of circa 1910 to circa 1960 dwellings of vernacular, Craftsman, Ranch, or Modern Movement styles. Vernacular front-gabled and L-shaped houses from the 1910s and 1920s appear to be the most common residential form in Waubun.

4.9.2 Village of Naytahwaush

Naytahwaush is located in the eastern part of Mahnomen County, sited along the shores of North Twin Lake. It is an unincorporated village that is located in Twin Lakes Township, within the White Earth Indian Reservation. In the late nineteenth century the community was known as Twin Lakes. The name was changed to Naytahwaush in 1906 (Mahnomen County Historical Society 1991: 38). Naytahwaush means "smooth sailing" in Ojibwe (Mahnomen County 2011). European-American settlement in the area began in the late 1880s; however it was very limited in number. The Village of Naytahwaush was slow to develop. In 1906, a post office was established. By 1907, the community also had several sawmills, stores, and government offices. In 1911, a government school was constructed in town. In 1917, the first mission church was constructed, St. Ann's Catholic Church (Mahnomen County Historical Society 1991). The community remains relatively small today.

5.0 RESULTS

5.1 PHASE I ARCHITECTURAL HISTORY RESULTS

During the Phase I architectural history survey, the 106 Group identified 127 architectural history properties that were 50 years of age or older within the APE for the three project areas (Figures 4-6). One property, a segment of a railroad line (MH-PGR-002), is a newly inventoried segment of a previously determined eligible line (Table 2). Seven properties are recommended as *potentially* eligible for listing in the NRHP (Table 3). The remaining 120 properties are recommended as not eligible for listing in the NRHP due to a lack of historical significance and/or loss of integrity (Table 4).

5.1.1 Properties Listed in, Previously Determined Eligible, or Previously Recommended Eligible for Listing in the NRHP

One property within the APE for the Waubun project area has been previously determined eligible for listing in the NRHP (Table 2, see Figure 5). No properties within the APE have been previously listed in the NRHP.

TABLE 2. PROPERTY PREVIOUSLY DETERMINED ELIGIBLE FOR LISTING IN THE NRHP

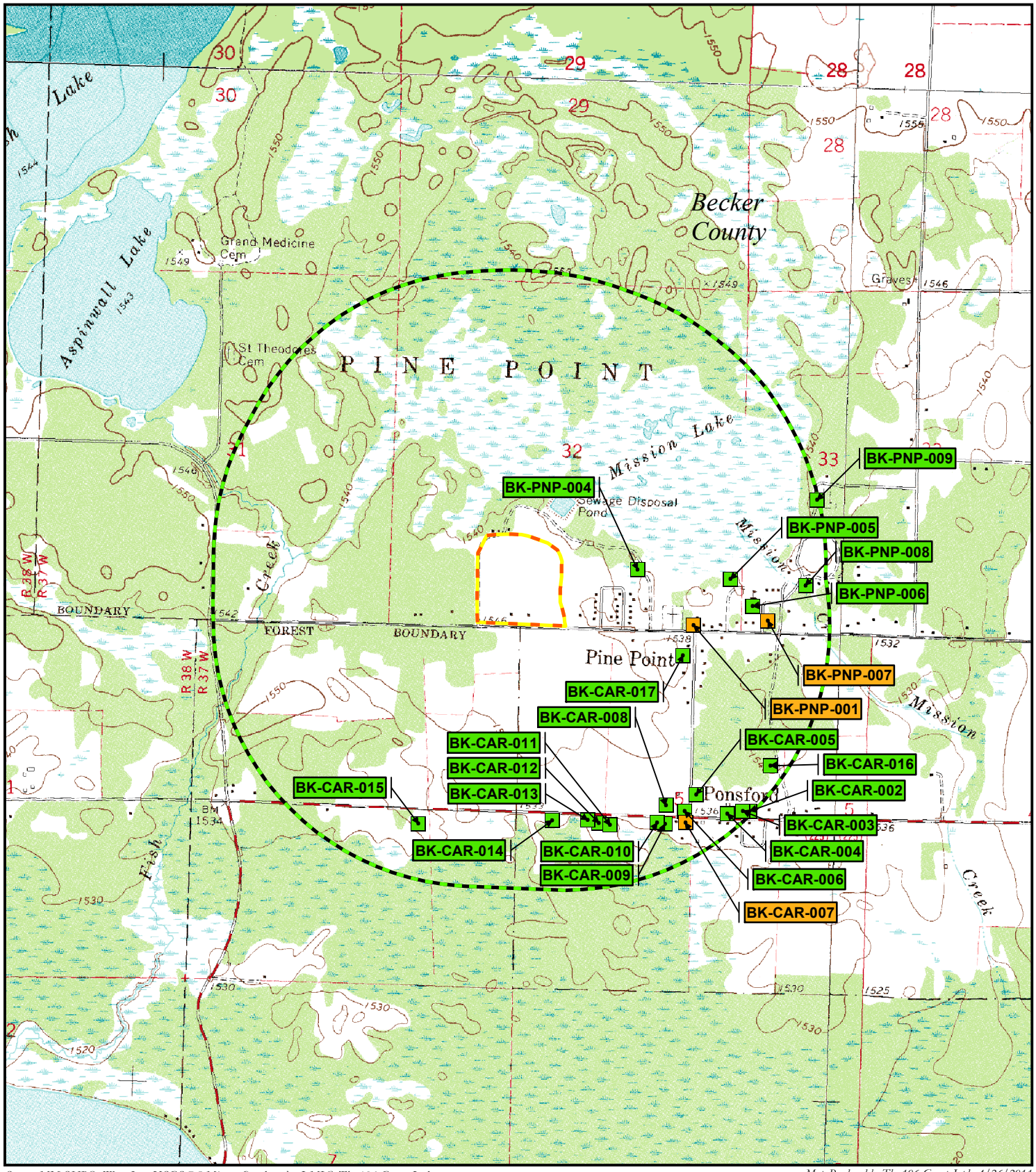
Inventory Number	Property Name	T	R	S	¼ Section	Date
MH-PGR-002	MStP&SSM / Soo Line / CP Railroad	143N	42W	25	NENW	1903-1904

5.1.1.1 Minneapolis, St. Paul & Sault Ste. Marie Railway / Soo Line Railroad / Canadian Pacific Railway, MH-PGR-002

Location: Perpendicular to County Road 113, Waubun, Mahnomen County, Minnesota, T143N R42W Section 25

Description: This railroad segment is part of the Minneapolis, St. Paul & Sault Ste. Marie Railway (MStP&SSM) mainline that was constructed from Glenwood to Noyes, Minnesota in 1903-1904. In T143N R42W Section 25, the railroad line generally runs in a north-south direction and is comprised of a single set of active tracks on a raised bed of stone ballast. The tracks consist of steel rails laid on wood ties (see Figure 7).

History: This line was constructed from Glenwood, Minnesota to Noyes, Minnesota at the Canada border in 1903-1904 by the MStP&SSM as part of the railroad's expansion efforts throughout northern Minnesota. Known as the Winnipeg Line, the corridor connected Glenwood to Noyes and opened additional areas to service in the Red River Valley, as well as providing another connection to the Canadian Pacific Railway (CP) (Schmidt et al 2007:E-114). In January of 1961, the MStP&SSM, Duluth South Shore & Atlantic Railway Company, and the Wisconsin Central Railway Company consolidated to form the Soo Line Railway Company (Prosser 1966:145). In 1990, the CP gained full control of the Soo Line.



Source: MN SHPO; West, Inc.; USGS 7.5 Minute Quadrangles; LMIC; The 106 Group Ltd.

Map Produced by The 106 Group Ltd: 4/26/2011

White Earth Nation Wind Project
Phase I and II Architectural History Survey and Assessment of Effects Study
Becker and Mahnomen Counties, Minnesota

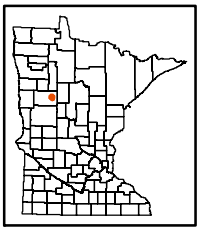
Architectural History Results - Pine Point

0 0.3 0.6 Kilometers

0 0.3 0.6 Miles

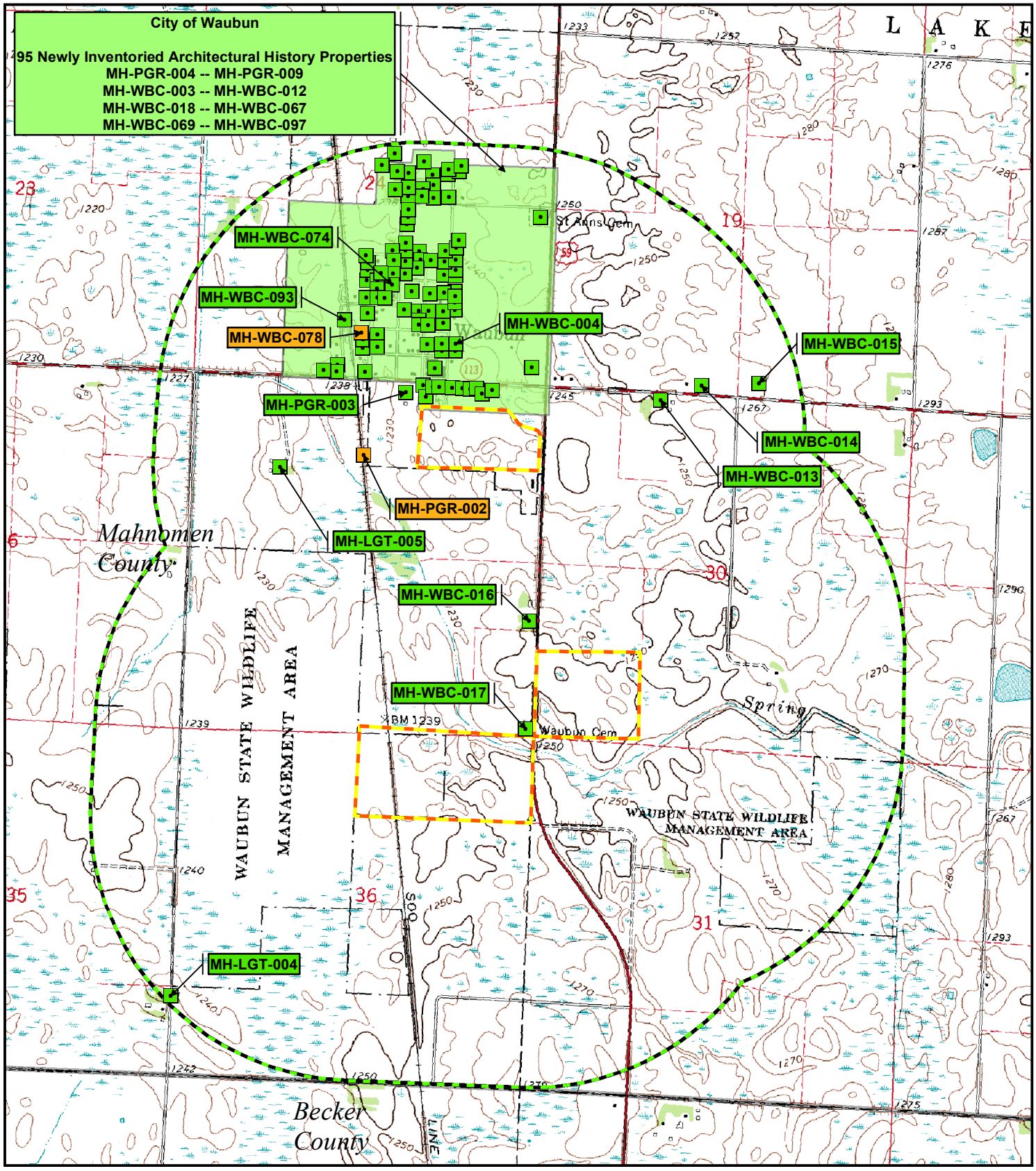
1:24,000

- Project Area
- Architectural History Area of Potential Effect
- Eligible Architectural History Property
- Not Eligible Architectural History Property



N

Figure 4



Source: MN SHPO; West, Inc.; USGS 7.5 Minute Quadrangles; LMIC; The 106 Group Ltd.

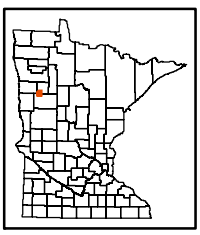
Map Produced by The 106 Group Ltd: 4/26/2011

White Earth Nation Wind Project
Phase I and II Architectural History Survey
and Assessment of Effects Study
Becker and Mahnomen Counties
Minnesota

Architectural History Results - Waubun

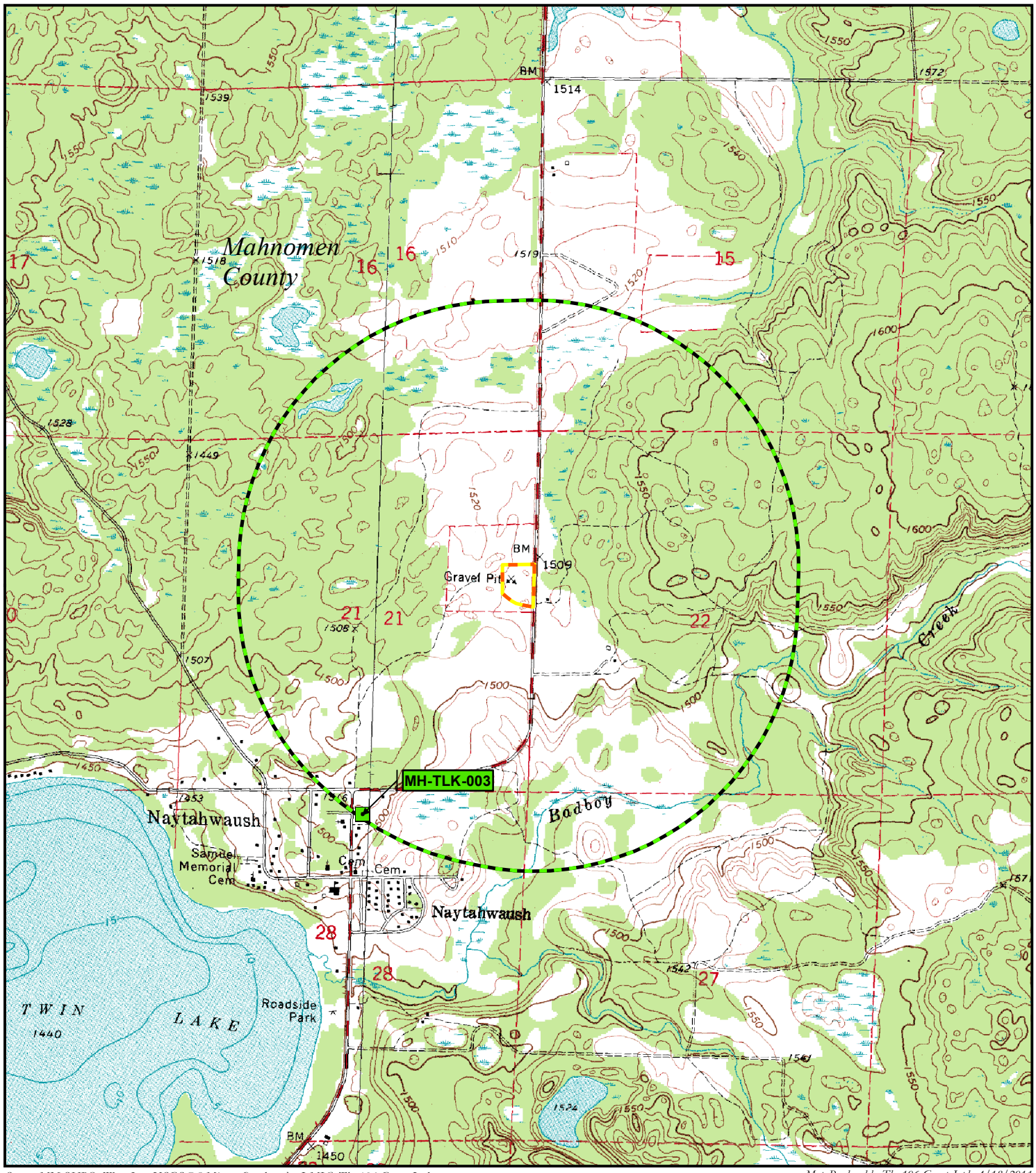
0 0.3 0.6
Kilometers
Miles
0 0.3 0.6
1:24,000

- Project Area
- Architectural History Area of Potential Effect
- Eligible Architectural History Property
- Not Eligible Architectural History Property



N

Figure 5



Source: MN SHPO; West, Inc.; USGS 7.5 Minute Quadrangles; LMIC; The 106 Group Ltd.

Map Produced by The 106 Group Ltd: 4/18/2011

White Earth Nation Wind Project
Phase I and II Architectural History Survey
and Assessment of Effects Study
Becker and Mahnomen Counties
Minnesota

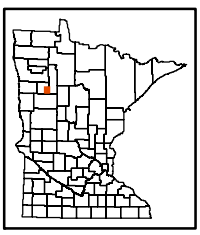
Architectural History Results - Naytahwaush

0 500 1,000 Meters

0 2,000 4,000 Feet

1:24,000

- Project Area
- Architectural History Area of Potential Effect
- Not Eligible Architectural History Property



N

Figure 6

FIGURE 7. MSTP&SSM / SOO LINE / CP RAILWAY (MH-PGR-002), FACING SOUTH

Significance: The MStP&SSM line, running from Glenwood to Noyes, was previously determined eligible for listing in the NRHP under Criterion A, within the NRHP Multiple Property Listing, *Railroads in Minnesota 1862-1956* (Schmidt et al. 2007). The property is historically significant in the areas of transportation, commerce, and agriculture (Schmidt et al 2007).

Integrity: As an operating rail line with intact tracks, this segment of the MStP&SSM / Soo Line / CP Railway continues to provide a sense of function and destination. The integrity of location, design, association, feeling, and setting is good.

Recommendation: The entire MStP&SSM / Soo Line / CP Railway corridor, running from Glenwood to Noyes, was previously determined eligible for listing in the NRHP under Criterion A, within the NRHP Multiple Property Listing, *Railroads in Minnesota 1862-1956* (Schmidt et al. 2007). The segment of this railroad corridor within the current APE was not previously individually documented; however, it has sufficient integrity to convey its historical significance and, therefore, is recommended as a contributing segment to the larger NRHP-eligible MStP&SSM / Soo Line / CP Railway corridor.

5.1.2 Properties Recommended as Potentially Eligible for Listing in the NRHP

During the Phase I architectural history survey, seven properties within the APE for the Pine Point and Waubun project areas were recommended as *potentially* eligible for listing in the NRHP (Table 3; see Figures 4 and 5). Therefore, a Phase II architectural history evaluation

was conducted to determine their eligibility. The results from the Phase II survey are presented in *Section 4.2*.

TABLE 3. PROPERTIES RECOMMENDED AS POTENTIALLY ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Property Name	T	R	S	¼ Section	Date
MH-WBC-004	St. Ann's Catholic Church & Rectory	143N	42W	24	SWSE	1912 / 1918
MH-WBC-074	Waubun Congregational Church / United Church of Christ	143N	42W	24	NWSE	1912
MH-WBC-078	Golden Rule Store	143N	42W	24	SESW	1905
MH-WBC-093	Woodworth Elevator Company & Prairie Elevator Company / Waubun Elevator Company Complex	143N	42W	24	SESW	1904 / 1906
BK-CAR-007	Ponsford Community Church	140N	37W	5	NESW	1904
BK-PNP-001	St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall	141N	37W	32	SESE	1917 / circa 1920
BK-PNP-007	Breck Memorial Episcopal Church & Rock Hall	141N	37W	33	SWSW	1892 / circa 1945

5.1.3 Properties Recommended as Not Eligible for Listing in the NRHP

During the Phase I architectural history survey, a total of 120 properties within the APE were recommended as not eligible for listing in the NRHP due to a lack of historical significance and/or loss of integrity (see Figures 4-6; Table 4). Inventory forms with additional detail pertaining to each property are provided in Appendix A.

TABLE 4. PROPERTIES RECOMMENDED AS NOT ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Address	T	R	S	¼ Sec	Property Name	Rational
MH-LGT-004	3377 150th Avenue	143N	42W	36	SWSW	Farmstead	Lack of historical significance & loss of integrity
MH-LGT-005	South side of County Road 113	143N	42W	25	SWNW	Agricultural Outbuilding	Lack of historical significance & loss of integrity
MH-PGR-003	1115 County Road 113	143N	42W	25	NWNE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-PGR-004	1204 County Road 113	143N	42W	25	NWNE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-PGR-005	902 Second Street	143N	42W	25	NWNE	House & Outbuildings	Lack of historical significance & loss of integrity

TABLE 4. PROPERTIES RECOMMENDED AS NOT ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Address	T	R	S	¼ Sec	Property Name	Rational
MH-PGR-006	1212 County Road 113	143N	42W	25	NWNE	House & Garage	Lack of historical significance & loss of integrity
MH-PGR-007	1218 County Road 113	143N	42W	25	NWNE	House	Lack of historical significance & loss of integrity
MH-PGR-008	1306 County Road 113	143N	42W	25	NWNE	House	Lack of historical significance
MH-PGR-009	1310 County Road 113	143N	42W	25	NWNE	House & Garage	Lack of historical significance & loss of integrity
MH-TLK-003	East side of County Road 4	144N	39W	28	NWNE	St. Anne's Cemetery	Lack of historical significance
MH-WBC-003	1116 County Road 113	143N	42W	24	SWSE	Waubun Public School	Loss of integrity
MH-WBC-005	1302 Third Street	143N	42W	24	SWSE	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-006	1501 Main Street	143N	42W	24	NWSE	House	Lack of historical significance & loss of integrity
MH-WBC-007	1404 Main Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-009	1314 County Road 113	143N	42W	25	NENE	House	Lack of historical significance
MH-WBC-010	1320 County Road 113	143N	42W	25	NENE	House	Lack of historical significance & loss of integrity
MH-WBC-011	1406 County Road 113	143N	42W	25	NENE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-012	1418 County Road 113	143N	42W	25	NENE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-013	1631 County Road 113	143N	41W	30	NENW	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-014	1638 County Road 113	143N	41W	19	SESW	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-015	1652 County Road 113	143N	41W	19	SWSE	Farmstead	Lack of historical significance & loss of integrity
MH-WBC-016	3259 U.S. Highway 59	143N	42W	25	NESE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-017	West side of U.S. Highway 59	143N	42W	25	SESE	Waubun Cemetery	Lack of historical significance & loss of integrity

TABLE 4. PROPERTIES RECOMMENDED AS NOT ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Address	T	R	S	¼ Sec	Property Name	Rational
MH-WBC-018	1111 Third Street	143N	42W	24	SWSE	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-019	1121 Third Street	143N	42W	24	SWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-020	1205 Third Street	143N	42W	24	SWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-021	1214 Third Street	143N	42W	24	SWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-022	1221 Third Street	143N	42W	24	SWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-023	1224 Third Street	143N	42W	24	SWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-024	1314 Third Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-025	1311 Third Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance
MH-WBC-026	1403 Third Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance
MH-WBC-027	East side of Third Street	143N	42W	24	NWSE	House	Lack of historical significance & loss of integrity
MH-WBC-028	1412 Third Street	143N	42W	24	NWSE	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-029	1421 Third Street	143N	42W	24	NWSE	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-030	1422 Third Street	143N	42W	24	NWSE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-032	1506 Third Street	143N	42W	24	NWSE	House	Lack of historical significance & loss of integrity
MH-WBC-033	1512 Third Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-034	Northwest corner of Third Street & First Avenue	143N	42W	24	SWNE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-035	1219 Second Avenue	143N	42W	24	SWNE	House & Outbuildings	Lack of historical significance & loss of integrity

TABLE 4. PROPERTIES RECOMMENDED AS NOT ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Address	T	R	S	¼ Sec	Property Name	Rational
MH-WBC-036	1810 Third Street	143N	42W	24	SWNE	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-037W	1813 Third Street	143N	42W	24	SWNE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-038	1814 Third Street	143N	42W	24	SWNE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-039W	1203 Second Avenue	143N	42W	24	SWNE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-040	1819 Second Street	143N	42W	24	SWNE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-041W	Southeast corner of Second Street & Second Avenue	143N	42W	24	SWNE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-042W	1715 Second Street	143N	42W	24	SWNE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-043	Northeast corner of Second Street & First Avenue	143N	42W	24	SWNE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-044	1119 First Avenue	143N	42W	24	SWNE	House	Lack of historical significance
MH-WBC-045	1503 Second Street	143N	42W	24	NWSE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-046	1421 Second Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-047	1422 Second Street	143N	42W	24	NWSE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-048	1411 Second Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-049	Full block between Smith Avenue, Second Street, Central Avenue, and Main Street	143N	42W	24	NWSE	Waubun City Park	Loss of integrity
MH-WBC-050	1304 Second Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance & loss of integrity

TABLE 4. PROPERTIES RECOMMENDED AS NOT ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Address	T	R	S	¼ Sec	Property Name	Rational
MH-WBC-051	Southeast corner of Second Street & Central Avenue	143N	42W	24	SWSE	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-052	1220 Second Street	143N	42W	24	SWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-053	1205 Second Street	143N	42W	24	SWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-054	1204 Second Street	143N	42W	24	SWSE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-055	1203 Second Street	143N	42W	24	SWSE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-056	1118 Prairie Avenue	143N	42W	24	SWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-057	West side of U.S. Highway 59	143N	42W	24	NESE	St. Ann's Cemetery	Lack of historical significance & loss of integrity
MH-WBC-058	Southeast corner of Main Street & Central Avenue	143N	42W	24	SWSE	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-059	1418 Main Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-060	1504 Main Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-061	East side of Main Street	143N	42W	24	NWSE	House	Lack of historical significance & loss of integrity
MH-WBC-062	1606 Main Street	143N	42W	24	NWSE	House	Lack of historical significance & loss of integrity
MH-WBC-063	1618 Main Street	143N	42W	24	NWSE	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-064	1626 Main Street	143N	42W	24	NWSE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-065	1706 Main Street	143N	42W	24	SWNE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-066	1716 Main Street	143N	42W	24	SWNE	House & Garage	Lack of historical significance & loss of integrity

TABLE 4. PROPERTIES RECOMMENDED AS NOT ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Address	T	R	S	¼ Sec	Property Name	Rational
MH-WBC-067	1105 Second Avenue	143N	42W	24	SWNE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-068	1824 Main Street	143N	42W	24	SWNE	Farmstead	Lack of historical significance & loss of integrity
MH-WBC-069	1812 Main Street	143N	42W	24	SWNE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-070	1805 Main Street	143N	42W	24	SWNE	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-071	1711 Main Street	143N	42W	24	SWNE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-072	1417 Main Street	143N	42W	24	NWSE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-073	1403 Main Street	143N	42W	24	NWSE	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-075	1001 First Street	143N	42W	24	SESW	Commercial Building	Lack of historical significance & loss of integrity
MH-WBC-076	Northwest corner of First Street & Norman Avenue	143N	42W	24	SESW	Quonset	Lack of historical significance & loss of integrity
MH-WBC-077	1111 First Street	143N	42W	24	SESW	Commercial Building	Lack of historical significance & loss of integrity
MH-WBC-079	1205 First Street	143N	42W	24	SESW	Commercial Building	Lack of historical significance & loss of integrity
MH-WBC-080	1321 First Street	143N	42W	24	SESW	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-081	1405 First Street	143N	42W	24	NESW	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-082	1421 First Street	143N	42W	24	NESW	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-083	1418 First Street	143N	42W	24	NESW	House & Outbuildings	Lack of historical significance & loss of integrity
MH-WBC-084	1412 First Street	143N	42W	24	NESW	House & Garage	Lack of historical significance & loss of integrity

TABLE 4. PROPERTIES RECOMMENDED AS NOT ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Address	T	R	S	¼ Sec	Property Name	Rational
MH-WBC-085	1402 First Street	143N	42W	24	NWSE	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-086	1324 First Street	143N	42W	24	NESW	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-087	1001 Central Avenue	143N	42W	24	SESW	Commercial Building	Lack of historical significance & loss of integrity
MH-WBC-088	North side of Central Avenue	143N	42W	24	SWSE	Luck Land Company Building	Loss of integrity
MH-WBC-089	East side of First Street	143N	42W	24	NESW	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-090	1122 First Street	143N	42W	24	SWSE	Commercial Building	Lack of historical significance & loss of integrity
MH-WBC-091	East side of First Street	143N	42W	24	SESW	Commercial Building	Lack of historical significance & loss of integrity
MH-WBC-092	1102 First Street	143N	42W	24	SWSE	Commercial Building	Loss of integrity
MH-WBC-094	819 County Road 113	143N	42W	24	SESW	House & Garage	Lack of historical significance & loss of integrity
MH-WBC-095	809 County Road 113	143N	42W	24	SESW	House	Lack of historical significance & loss of integrity
MH-WBC-096	North side of County Road 113	143N	42W	24	SESW	House & Outbuilding	Lack of historical significance & loss of integrity
MH-WBC-097	1608 County Road 113	143N	42W	24	SESE	House & Outbuilding	Lack of historical significance & loss of integrity
BK-CAR-002	48636 County Highway 26	140N	37W	5	SWNE	House	Lack of historical significance & loss of integrity
BK-CAR-003	48596 County Highway 26	140N	37W	5	SWNE	House & Outbuildings	Lack of historical significance & loss of integrity
BK-CAR-004	North side of County Highway 26	140N	37W	5	SWNE	House & Outbuildings	Lack of historical significance & loss of integrity
BK-CAR-005	C2013 County Highway 129E	140N	37W	5	SWNE	House & Outbuildings	Lack of historical significance & loss of integrity
BK-CAR-006	48424 County Highway 26	140N	37W	5	SENW	Commercial Building	Lack of historical significance & loss of integrity

TABLE 4. PROPERTIES RECOMMENDED AS NOT ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Address	T	R	S	¼ Sec	Property Name	Rational
BK-CAR-008	48404 County Highway 26	140N	37W	5	SENW	Farmstead	Lack of historical significance & loss of integrity
BK-CAR-009	48401 County Highway 26	140N	37W	5	NESW	House & Outbuildings	Lack of historical significance & loss of integrity
BK-CAR-010	48347 County Highway 26	140N	37W	5	NESW	House & Outbuildings	Lack of historical significance & loss of integrity
BK-CAR-011	48227 County Highway 26	140N	37W	5	NESW	House & Outbuildings	Loss of integrity
BK-CAR-012	48195 County Highway 26	140N	37W	5	NWSW	House & Outbuildings	Lack of historical significance & loss of integrity
BK-CAR-013	South side of County Highway 26	140N	37W	5	NWSW	House & Outbuilding	Lack of historical significance & loss of integrity
BK-CAR-014	48079 County Highway 26	140N	37W	5	NWSW	House & Outbuildings	Lack of historical significance & loss of integrity
BK-CAR-015	South side of County Highway 26	140N	37W	6	NWSE	House & Outbuildings	Lack of historical significance & loss of integrity
BK-CAR-016	48777 County Highway 26	140N	37W	5	SWNE	House & Outbuildings	Lack of historical significance & loss of integrity
BK-CAR-017	27920 County Highway 129E	140N	37W	5	NENW	House	Lack of historical significance & loss of integrity
BK-PNP-004	West side of Amik Avenue	141W	37W	32	SWSE	House	Lack of historical significance & loss of integrity
BK-PNP-005	West side of Old School Road	141W	37W	32	SESE	Pine Point Recreation Center	Lack of historical significance & loss of integrity
BK-PNP-006	North side of County Road 124	141W	37W	33	SWSW	Pine Point School	Loss of integrity
BK-PNP-008	East side of Old Ball Park Road	141W	37W	33	SWSW	House & Garage	Lack of historical significance & loss of integrity
BK-PNP-009	East side of Cemetery Road	141W	37W	33	NWSW	Cemetery	Lack of historical significance & loss of integrity

5.2 PHASE II ARCHITECTURAL HISTORY RESULTS

During the Phase I architectural history survey, seven properties were identified as being *potentially* eligible for listing in the NRHP and warranted further study. Following the completion of the Phase I survey, the 106 Group completed a Phase II evaluation of all seven properties to evaluate their significance and to determine their eligibility for listing in the NRHP. The properties that were evaluated include:

- St. Ann's Catholic Church & Rectory (MH-WBC-004)
- Waubun Congregational Church / United Church of Christ (MH-WBC-074)
- Golden Rule Store (MH-WBC-078)
- Woodworth Elevator Company & Prairie Elevator Company / Waubun Elevator Company Complex (MH-WBC-093)
- Ponsford Community Church (BK-CAR-007)
- St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall (BK-PNP-001)
- Breck Memorial Episcopal Church & Rock Hall (BK-PNP-007)

5.2.1 Properties Recommended as Eligible for the NRHP

As a result of the Phase II architectural history evaluation four properties were recommended as eligible for listing in the NRHP (Table 5; see Figures 4-5).

TABLE 5. PROPERTIES RECOMMENDED AS ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Property Name	T	R	S	¼ Section	Date
MH-WBC-078	Golden Rule Store	143N	42W	24	SESW	1905
BK-CAR-007	Ponsford Community Church	140N	37W	5	NESW	1904
BK-PNP-001	St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall	141N	37W	32	SESE	1917 / circa 1920
BK-PNP-007	Breck Memorial Episcopal Church & Rock Hall	141N	37W	33	SWSW	1892

5.2.1.1 Golden Rule Store, MH-WBC-078

Location: Southeast corner of First Street and Prairie Avenue, Waubun, Mahnomen County, Minnesota, T143N, R42W, Section 24

Description: The property located at the southeast corner of First Street and Prairie Avenue, in the heart of the Waubun commercial district, consists of a 1905 general store that was historically known as the Golden Rule Store (Figures 8-11). The one-story, rectangular-shaped building rests on a poured concrete foundation and has a front gable roof that is covered with a mixture of ribbed metal sheets and corrugated metal. The north-facing

façade is clad in wood siding and features a false-front that is faced in clapboard siding and topped by a wood cornice. The centrally-located recessed entry features Tuscan wood columns. Brick has been infilled around some of the replacement storefront windows. The secondary elevations are parged in smooth concrete.

A full-width, lean-to extension was constructed on the west elevation of the building in 1907. The extension rests on a poured concrete foundation, has a false front that is faced in vertical wood siding, and has a shed roof that is covered with corrugated metal. The extension is faced in fiber cement shingles and smooth parged concrete on the west elevation and drop siding on the south elevation. The extension features an interior brick chimney and a skylight near the southern end. The west elevation of the lean-to extension is fenestrated with a two-light sliding wood window.

FIGURE 8. GOLDEN RULE STORE (MH-WBC-078), FACING SOUTHWEST

The façade of the main block is fenestrated with a centrally located single-leaf, wood paneled door with a one-light transom. The entry door is flanked by replacement display windows. The façade of the lean-to extension is fenestrated with a single one-light fixed wood window.

The east elevation is fenestrated with (sited south to north) a six-light wood window; two sets of paired two-over-two, double-hung, wood windows; a two-light sliding window; and a one set of paired two-over-two, double-hung, wood windows.

The south elevation of the main block is fenestrated with two bi-fold, paneled, wood doors with four-lights. The south elevation of the lean-to addition is fenestrated with a double-leaf wood door that is flanked by a one-light wood window to the west and a one-over-one, single-hung, wood window on the east.

FIGURE 9. GOLDEN RULE STORE (MH-WBC-078), FACING NORTHWEST

FIGURE 10. GOLDEN RULE STORE (MH-WBC-078), FACING SOUTHEAST

FIGURE 11. GOLDEN RULE STORE (MH-WBC-078), FACING NORTHEAST

History: The town of Waubun developed around the MStP&SSM line, which was constructed through Mahnomen County in 1904. The first business in Waubun was William Bement's livery barn (Mahnomen County Historical Society 1991:39). Soon after, a commercial and industrial district formed east of the railroad tracks, mainly along First Street. Early businesses included William Bement's butcher shop (1904), Nels Narum's general store (1904), the Woodworth Elevator Company (1904), the Golden Rule Store (1905), Chadonnet's Lumber Company, the First State Bank (later known as the Waubun State Bank), the Prairie Elevator Company (1906), and the Luck Land Company (1907) (Mahnomen County 2011; Mahnomen County Historical Society 1991:39).

In 1905, the Golden Rule Store was constructed for Albert L. Fredenburg at the southeast corner of First Street and Prairie Avenue. It was the second general store constructed in Waubun. The MStP&SSM depot was historically located at the end of Prairie Avenue, just a half of a block west of the general store. Many new arrivals to Waubun would have made their first stop in town at this store. The Golden Rule Store is located on Lot 1 of Block 2 in Bement's Addition to Waubun. In 1907, Fredenburg constructed the lean-to extension on the west elevation of his store (Waubun Centennial Celebration Committee 2007:43). According to the 1910 Census, Mr. Fredenburg, who was 47 years of age at the time, resided in Waubun with his wife and five children. By 1910, Fredenburg was employed as a blacksmith (U.S. Federal Census 1910a).

Mr. Fredenburg operated the general store until 1910 when he sold it to John Chromy. Chromy operated the general store and lived in the lean-to addition with his family until 1912 when they had a home constructed in Waubun (Waubun Centennial Celebration Committee 2007:43). According to the 1910 Census, John Chromy, a shopkeeper, resided with his wife Annie and their three young children (U.S. Federal Census 1910b). On

September 10, 1921, John Chromy and his wife sold the property to Albert Narum and his wife (Chromy 1921: No. 44788).

Albert Narum and his wife did extensive interior remodeling of the building and operated a grocery business (Waubun Centennial Celebration Committee 2007:43). The Narum's owned the property for less than a year and sold it to Jacob Witz on June 23, 1922 (Narum 1922: No. 44788). The Narum's moved all of the new interior fixtures and their grocery merchandise to the Pioneer Store in Waubun (Waubun Centennial Celebration Committee 2007:43).

Jacob Wirtz rented the property to various tenants during his ownership. In 1924, Leona Vadnais operated the building as a restaurant, the "White Café." In 1926, the building became "Keils Café" and later "The Green Lantern Café" (Waubun Centennial Celebration Committee 2007:43, 46). Wirtz owned the property until his death in 1934, when his widow Alvina Wirtz sold the property to E. Ellsworth (Wirtz 1934: No. 58137W). Ellsworth and his wife sold the property to Albert J. Reller and wife on March 12, 1947, who in turn sold the property to Raymond L. and Mary Machulda on March 25th of that year (Ellsworth 1947: No. 70184; Reller 1947: No. 70208). It is unknown what the building was used for during the ownership of Ellsworth, Reller, and Machulda.

The Machulda's sold the property on August 26, 1949 to Karl Haddeland who owned the property for 45 years and used it as a woodworking shop (Machulda 1949: No. 72699; Waubun Centennial Celebration Committee 2007:43). In December of 1994, Haddeland deeded the property to his son Kaare Haddeland and Kaare's wife Kathryn, who own the vacant building today (Haddeland 1994: No. 108079).

Significance: The Golden Rule Store has local significance for listing in the NRHP, under Criterion A. The property is significant within the areas of commerce.

The Golden Rule Store appears to be one of three extant commercial buildings in Waubun that date to the early twentieth century. The other two buildings, the Luck Land Company building on the north side of Central Avenue and the commercial building at 1001 Central Avenue do not retain sufficient integrity to convey their historical significance. According to 1939 aerial photographs, Waubun's commercial district consisted of approximately 21 buildings sited along First Street, and Norman, Prairie, and Central Avenues between the railroad tracks and First Street (ASCS 1939a). About five buildings were added to this area between 1939 and 1953 (ASCS 1939a; ASCS 1953a). According to local histories of Waubun there were two known general stores in town, the Golden Rule Store and Nels Narum's general store which was built in 1904 and demolished in 1970 (Waubun Centennial Celebration Committee 2007:42-43).

The Golden Rule Store is the only known extant general store in Waubun and it retains the best integrity of any surviving commercial building in Waubun that dates to the town's development period. The Golden Rule Store's period of significance ranges from 1905 when the building was constructed until 1922, when the building was no longer operated as a general/grocery store.

Integrity: The building's integrity of materials, design, and workmanship has been slightly compromised by the alterations to the storefront. Alterations include loss of some of the paneled wood siding, replacement display windows, and partial brick infill around the replacement windows.

The lean-to addition was constructed in 1907, during the buildings period of significance, and therefore does not affect its integrity. However, the replacement window on the façade, cladding of the façade in vertical wood siding, and partial cladding of the west elevation in fiber cement shingles has slightly affected its integrity of materials, design, and workmanship.

The commercial building appears to be vacant. However, as it is located on its historic lot within the heart of the downtown Waubun it retains its integrity of setting, location, feeling, and association. Overall, the commercial building retains good integrity.

Recommendation: The Golden Rule Store is significant as the only known extant general store in Waubun. The building is also significant for retaining the best integrity of any surviving commercial building in Waubun that dates to the town's development period. Therefore, the 106 Group recommends this property as eligible for listing in the NRHP, under Criterion A within the areas of commerce and community planning and development.

5.2.1.2 Ponsford Community Church, BK-CAR-007

Location: 48453 County Highway 26, Carsonville Township, Becker County, Minnesota, T140N, R37W, Section 5

Description: The property located at 48453 County Highway 26 consists of the Ponsford Community Church and a shed (Figures 12-14). The one-story, front-gabled vernacular church was constructed in 1904. The church has a simplified nave plan. The frame structure rests on a concrete block foundation, is faced in clapboard siding, and has a front gable roof that is covered with asphalt shingles. The church has a front-gabled portico and exterior concrete block chimney on the rear elevation. The vernacular church does have some architectural details in the front gables and wood cornerboards with Tuscan details. The front gables feature a six-sided wood medallion surrounded by wood sunburst patterns.

The façade of the church is fenestrated with a centrally-located single-leaf paneled wood door. The door is flanked by a one-over-one, double-hung, wood window with ogee-molded wood surround on either side.

The basement-level of the east elevation is fenestrated with (sited north to south) three window openings that have been covered in wood and a single-leaf wood door. The main-story of the east elevation is fenestrated with three one-over-one, double-hung, wood windows with ogee-molded wood surrounds.

Fenestration on the south elevation was not visible from the public right-of-way, however because the altar is located on the south elevation there is likely no fenestration.

FIGURE 12. PONSFORD COMMUNITY CHURCH (BK-CAR-007), FACING SOUTHWEST

FIGURE 13. PONSFORD COMMUNITY CHURCH (BK-CAR-007), FACING SOUTHEAST

FIGURE 14. PONSFORD COMMUNITY CHURCH (BK-CAR-007), FACING SOUTH

The basement-level of the west elevation is fenestrated with three window openings. The southern window opening features a two-light metal sliding window while the northern two windows have been covered in wood. The main-story of the west elevation is fenestrated with three one-over-one, double-hung, wood windows with ogee-molded wood surrounds.

A one-story, late twentieth century shed is located south of the church. The shed is faced in vertical wood siding and has a front gable roof that is covered with asphalt shingles.

History: The unincorporated community of Ponsford was settled by European-American's around 1890. A general store was constructed in town that year and a post office was established in the store in 1891. A booming lumber industry in the area in the early twentieth century facilitated the growth of Ponsford (Watrin 1930:14). Soon after settlement, churches were generally one of the first and most prominent buildings to be constructed in rural areas. Churches served as both religious and social gathering centers and were a source of pride and prestige. In 1904, the Ponsford Community Church was constructed near the intersection of County Highways 26 and 129E in Ponsford. Most of the labor and materials for the church were donated by residents of the area. The community church was built for the use of any denomination. The church was also the only one ever built in Ponsford (Lake Park Area Historical Society 1976:115). Although non-denominational in use, the church was organized under the Baptist convention, because Baptist residents outnumbered other religious affiliations in the community. Therefore, the church was also known as the Community Baptist Church of Ponsford. The church never had a permanent minister; ministers from neighboring towns would travel to the area to conduct service (Watrin 1930:23).

The church was built on one acre of land that was donated by the Pine Tree Lumber Company. A conditional deed was granted to the Ponsford Community Church, the land on which the church was located would revert back to the heirs of the Pine Tree Lumber Company if the property ceased its religious use (Watrin 1930:23). In October of 1953, Robert M. and Kathryn V. Kurtz, presumably heirs of the Pine Tree Lumber Company, sold the one acre of land on which the church sits to the Community Baptist Church of Ponsford for $1,900 (Kurtz 1953: No. 198834).

The Ponsford Community Church is a good example of rural vernacular church architecture. The term vernacular generally refers to the lack of distinctive architectural features, ornamentation, or other characteristics that are representative of an architectural style. Vernacular can also represent common forms or design practices of a particular group, methods of construction, or even the use of materials (South Dakota State Historic Preservation Office 2002:22; Groth 1999). The Ponsford Community Church has typical features of rural vernacular churches, a simplified nave plan and an exterior that is clad in wood. However, vernacular architecture is not completely without ornamentation; the Ponsford Community Church features decorative wood shingles in the gable ends.

Significance: The Ponsford Community Church has local significance for listing in the NRHP, under Criteria A and C. The church is significant within the areas of social history and architecture. The property also meets Criteria Consideration A, as a religious property that derives its primary significance from architectural distinction and historical importance.

The Ponsford Community Church is important to the social history of Ponsford as the only church built in the community that served not only the religious needs of multiple groups, but also the social needs of the entire community. The church was the sole religious institution in Ponsford and a social gathering center.

The Ponsford Community Church, with its simplified nave plan, is also significant as a fine example of a vernacular country church constructed in Minnesota in the early twentieth century, shortly after the community was settled by European-Americans. The church is also a rare example of an extant non-denominational built church. The church appears to be the only remaining non-residential structure associated with the development period of the town of Ponsford.

The Ponsford Community Church's period of significance ranges from 1904 when the building was constructed until circa 1930 when the lumber industry in the area ceased and the community began to shrink in size.

Integrity: The Ponsford Community Church's integrity of design, materials, and craftsmanship has been slightly compromised by the concrete block chimney, which does not appear to be original, and the construction of a late twentieth century outbuilding. The property retains its integrity of location, setting, feeling, and association. Overall, the church retains excellent integrity.

Recommendation: The Ponsford Community Church has local significance within the areas of architecture and social history. The church is a fine example of a vernacular country church constructed in Minnesota in the early twentieth century, shortly after the community was settled by European-Americans, which retains excellent integrity. The church is also a rare example of an extant non-denominational built church. As the only religious and social facility in Ponsford, the Ponsford Community Church is also significant to the social history of the community as the only facility that served the religious needs of multiple groups and social needs of the entire community. The property also meets Criteria Consideration A, as a religious property that derives its primary significance from architectural distinction and historical importance. Therefore, the 106 Group recommends this property as eligible for listing in the NRHP, under Criteria A and C.

5.2.1.3 St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall, BK-PNP-001

Location: North side of County Road 124, Pine Point Township, Becker County, Minnesota, T141N, R37W, Section 32

Description: The property located on the north side of County Road 124, near the intersection with County Highway 129E, consists of (sited west to east) St. Theodore's Cemetery, St. Theodore's Catholic Church, a grotto, and Kateri Tekakwitha Hall (Figures 15-21). St. Theodore's Catholic Church was constructed in 1917. The vernacular church features some Gothic Revival style characteristics. The one-and-a-half-story, south-facing frame structure rests on a foundation that is parged in concrete, is faced in clapboard siding, and has a front gable roof that is covered with asphalt shingles. The church features pedimented gable ends and a centrally-located three-story bell tower on the façade. The square-shaped tower features wood vents on all four elevations just below the roof line. An octagonal conical roof with asphalt shingles covers the tower. Concrete steps and a handicap accessible ramp provide access to the main entry. A brick chimney and one-story, hipped roof wing are located on the rear (north) elevation.

FIGURE 15. ST. THEODORE'S CATHOLIC CHURCH (BK-PNP-001), FACING NORTHEAST

FIGURE 16. ST. THEODORE'S CATHOLIC CHURCH (BK-PNP-001), FACING NORTHWEST

The bell tower on the façade is fenestrated with a replacement double-leaf metal door on the first story and a gothic-arched window that has been infilled on the second story.

The east elevation of the church is fenestrated with four Gothic-arched window openings that have been infilled with one-over-one, double-hung, vinyl replacement windows. The east elevation of the rear wing is fenestrated with a single-leaf door.

The north elevation of the rear wing is fenestrated with two one-over-one, double-hung windows.

The west elevation of the church is fenestrated with four Gothic-arched window openings that have been infilled with one-over-one, double-hung, vinyl replacement windows.

St. Theodore's Catholic Cemetery is located west of the church (Figures 17-19). Established circa 1917, the rectangular-shaped cemetery features two concrete block entry posts sited along County Road 124. Slightly to the west of the main cemetery entry is a fieldstone marker that reads "ST. THEODORES CATHOLIC CEMETERY." The cemetery has a typical rural cemetery form with rows arranged in a north-south orientation and markers facing east and west. A couple mature coniferous trees are sporadically located around the boundary of the cemetery. There are approximately 200 burials in the cemetery. The headstones consist of marble and granite tablets, granite slant markers, flush markers, concrete crosses – some with fieldstone bases, and granite steles.

FIGURE 17. ST. THEODORE'S CATHOLIC CEMETERY (BK-PNP-001), FACING NORTH

FIGURE 18. ST. THEODORE'S CATHOLIC CEMETERY (BK-PNP-001), FACING NORTHEAST

A grotto constructed of fieldstone is located east of the church, sited beneath two large pine trees (Figure 19). The small triangle-shaped grotto features a southwest-facing niche with Jesus on the cross.

FIGURE 19. ST. THEODORE'S GROTTO (BK-PNP-001), FACING NORTHEAST

The circa 1920 Kateri Tekakwitha Hall is located east of the church and grotto (Figures 20-21). The one-story vernacular frame structure rests on a poured concrete foundation, is faced in clapboard siding, and has a front gable roof that is covered with ribbed metal sheets. A brick chimney is located on the ridgeline. A front-gabled portico is centrally located on the façade. The portico is supported by wood posts on a poured concrete stoop. A small wood sign that reads "KATERI TEKAKITHIA HALL" is located on the façade, west of the entry. The façade is fenestrated with a centrally-located double-leaf metal door. The four window openings on the east elevation have been infilled with wood siding. There is no fenestration on the north elevation. The west elevation is fenestrated with (sited north to south) a single-leaf door; one six-over-six, double-hung, wood window with wood surround; a centrally-located single-leaf replacement door; and two six-over-six, double-hung, wood windows with wood surrounds.

A small shed is located north of the hall (Figure 21). The one-story concrete block shed has a side gable roof that is covered with ribbed sheet metal. Two door openings are located on the north elevation.

FIGURE 20. KATERI TEKAKWITHA HALL (BK-PNP-001), FACING NORTHEAST

FIGURE 21. KATERI TEKAKWITHA HALL (BK-PNP-001), FACING NORTHWEST

History: The first Catholic service in the Pine Point area occurred in 1892, when Reverend Simon Lampe stopped in the area on his way from Red Lake to White Earth and baptized three Native American's at the home of Ignatius Broker. In 1901, Reverend Felix Nelles purchased Henry Selkirk's trading post in Pine Point and converted it into a church called Immaculate Conception (Watrin 1930:21).

In 1917, the extant Catholic Church was constructed in Pine Point as a Native American mission. Mrs. Theodore Tack (Mary Cosgrave) of New York donated $1,000 for the construction of the church. Her late husband, Theodore Tack, was the President of the American Oil Development Company in Pittsburgh before his death (Crum 1911:347). The Tack's association with the Catholic Church and the Pine Point area is unknown; however this donation may have been part of the family's broader philanthropic effort. The church was dedicated to St. Theodore in honor of Theodore Tack. St. Theodore is the Catholic patron saint of sacred images and icons of Christ (Watrin 1930:21).

St. Theodore's Catholic Church is vernacular in style and features Gothic Revival ornamentation. The Gothic Revival style is generally associated with European ecclesiastical designs and became popular in the U.S. in the mid- to late-nineteenth century. In the U.S. the style is commonly applied to residential and ecclesiastical architecture. Characteristics of the style include steeply pitched gabled rooflines, decorative spires and towers emphasizing the verticality, pointed arches, cross gable plans (cruciform), decorative buttresses, and contrasting exterior cladding. Gothic Revival characteristics were often applied to rural vernacular churches in the late nineteenth and early twentieth centuries. Typically, these churches borrowed the steeply pitched gabled rooflines, decorative towers emphasizing the verticality, and pointed arch windows from the Gothic Revival style, as can found on St. Theodore's Catholic Church. However, these vernacular churches generally had a simplified

nave plan, or standardized plan that was developed by the denomination, and exterior wood cladding (South Dakota State Historic Preservation Office 2002:23).

St. Theodore's Cemetery was likely established soon after the church was constructed, circa 1917. The dates on some of the oldest grave stones in the cemetery have worn away, so the oldest burials are unknown. The most recent burial dates to 2009. The cemetery is located on the western edge of the property.

In 1918, a parish house was constructed northeast of the church for $1,500 (Watrin 1930:21). The parish house is no longer extant and, according to historical aerial photographs, it appears the parish house was demolished after 1972 (ASCS 1972).

The Kateri Tekakwitha Hall was constructed circa 1920 on the eastern edge of the property (ASCS 1939a). It is unknown when the hall was named after Kateri Tekakwitha; however the congregation became part of the Tekakwitha Conference in the mid-twentieth century so it has likely retained that name for more than 60 years. The Tekakwitha Conference was founded in 1939 as a non-profit organization; it is the only Catholic Native American/Aboriginal Religious Organization in North America. The Conference, based in Great Falls, Montana, promotes evangelization among 500,000 Indigenous Catholics who are members of over 300 tribes and nations in the U.S. and Canada. The goals of the Tekakwitha Conference are to unify the Native Catholic identity while also respecting its diversity, empower Native Catholics to affirm their Native Catholic identity and pride in their culture and spiritual traditions (Tekakwitha Conference 2011; Maudlin 1998). The conference is named after Kateri (Catherine) Tekakwitha, a Mohawk-Algonquain from New York who lived from 1656 to 1680. She is believed to be one of the first Native American converts to Catholicism. She was declared venerable by the Catholic Church in 1943 and beautified by Pope John Paul II in 1980, the first Native American to be declared Blessed. The Blessed Kateri Tekakwitha is the patroness of ecology, nature, and the environment (Maudlin 1998).

Significance: St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall have local significance for listing in the NRHP, under Criterion A. The property is significant within the areas of ethnic heritage: Native American and social history. The property also meets Criteria Consideration A, as a religious property that derives its primary significance from historical importance.

The property was established in the early twentieth century as a mission with the primary goal of converting and serving the Native American population of Pine Point and the surrounding areas. The property is significant for its association with Native Americans, as their place of worship, a meeting place for social gatherings, and a final resting place. The social hall on the property is named after Blessed Kateri Tekakwitha, the Catholic patroness of ecology, nature, and the environment. St. Theodore's congregation is part of the Tekakwitha Conference, the only Catholic Native American/Aboriginal Religious Organization in North America. The congregation is one of only a few in the state which are members of the Conference.

The property's period of significance ranges from 1917 when the first building (St. Theodore's Catholic Church) was constructed on the property until 1961, the 50-year cutoff for listing in the NRHP.

Integrity: The integrity of materials, design, and workmanship of St. Theodore's Catholic Church has been slightly compromised by replacement windows and doors. The integrity of materials, design, and workmanship of Kateri Tekakwitha Hall has also been slightly compromised by boarding up windows on the east elevation and replacement doors. The cemetery retains good integrity materials, design, and workmanship.

The loss of the 1918 parish house has slightly affected the entire property's integrity of feeling as an early twentieth century missionary complex. Overall, the property retains good integrity of setting, association, and location.

Recommendation: St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall are significant as missionary facilities that were built in the early twentieth century to serve the Native American population of Pine Point and the surrounding areas. The property is significant for its association with Native Americans, as not only a place of worship, but also a meeting place for social gatherings and their final resting place. The property also meets Criteria Consideration A, as a religious property that derives its primary significance from historical importance. Therefore, the 106 Group recommends this property as eligible for listing in the NRHP, under Criterion A within the areas of ethnic heritage: Native American and social history.

5.2.1.4 Breck Memorial Episcopal Church & Rock Hall, BK-PNP-007

Location: East side of Breck Road, Pine Point Township, Becker County, Minnesota, T141N, R37W, Section 33

Description: The property located on the east side of Breck Road, just north of County Road 124, consists of the Breck Memorial Episcopal Church and Rock Hall (Figures 22-25). The one-story, west-facing Carpenter Gothic style church was constructed in 1892. The church is faced in horizontal drop siding below the watertable and vertical board-and-batten siding above the water table. The church has a front gable roof with clipped gables that is covered with asphalt shingles. A small bell tower is located at the top of the clipped gable on the façade. The church has a simplified nave plan with a narthex and entry porch. The one-story narthex was added to the façade circa 1920. The narthex features a flat roof with sloped sides that is covered with asphalt shingles and an interior concrete block chimney. The narthex is faced in horizontal drop siding below the watertable and vertical board-and-batten siding above the water table. A front-gabled porch is located on the façade of the narthex. The porch rests on a poured concrete stoop, is supported by wood posts, and has a front gable roof that is covered with asphalt shingles. The front gable end features diamond and fishscale shingles and a circular wood relief. Built-in wood benches are located on the north and south ends of the porch. Concrete steps and a wood handicap accessible ramp provide access to the main entry.

FIGURE 22. BRECK MEMORIAL EPISCOPAL CHURCH (BK-PNP-007), FACING SOUTHEAST

The façade of the church's narthex is fenestrated with a centrally-located double-leaf metal door that is flanked by a one-over-one, double-hung, wood window with multi-colored glass and wood surround on either side.

The south elevation of the nave is fenestrated with four one-over-one, double-hung, wood windows with multi-colored glass and wood surrounds.

The west elevation of the nave is fenestrated with a centrally-located stained glass Gothic-arch window that is flanked by a one-light fixed wood window on either side.

The north elevation of the nave is fenestrated with four one-over-one, double-hung, wood windows with multi-colored glass and wood surrounds.

FIGURE 23. BRECK MEMORIAL EPISCOPAL CHURCH (BK-PNP-007), FACING EAST

FIGURE 24. BRECK MEMORIAL EPISCOPAL CHURCH (BK-PNP-007), FACING NORTHEAST

Rock Hall is located north of the church (Figure 25). The one-story, circa 1945 building is constructed of concrete blocks and has wood siding in the gable ends. The building features

a front gable roof that is covered with asphalt shingles and an interior concrete block chimney. A poured concrete handicap accessible ramp is located on the north elevation.

The façade of Rock Hall is fenestrated with (sited north to south) a window opening that is covered by wood shutters and a single-leaf metal door. The south elevation is fenestrated with (sited west to east) three one-over-one, double-hung, vinyl windows and a double-leaf vinyl door. Fenestration on the east elevation was not visible from public right-of-way. The north elevation is fenestrated with (sited west to east) a window opening that is covered by wood shutters, a centrally-located hinged wood door, and window opening that is covered by wood shutters.

FIGURE 25. ROCK HALL & BRECK MEMORIAL EPISCOPAL CHURCH (BK-PNP-007), FACING SOUTHEAST

History: In 1888, an Episcopal Mission was established on the White Earth Reservation by Reverend J. A. Gilfillan. That same year he also started a mission school in Pine Point. The mission and the school were the first of their kind established among the Ottertail band of Pillagers, reportedly one of the first groups of Native Americans in Becker County. Financial problems with the school forced the mission to transfer it to the tribal government in 1893 (Watrin 1930:21-22). In 1891, Reverend Joseph Waukazo was appointed to the mission. Waukazo began raising money, and in 1892, the present church was constructed east of the school. The church was named in honor of missionary James Lloyd Breck (Watrin 1930:22).

The modest church was constructed in the Carpenter Gothic style. Carpenter Gothic, also known as Rural Gothic, was popular in the mid- to late-nineteenth century. The style was popularized by pattern books, such as *Upjohn's Rural Architecture: Designs, Working Drawings and Specifications for a Wooden Church, and Other Rural Structures* by Richard Upjohn from 1852

or Andrew Jackson Downing's *The Architecture of County Houses* from 1850. The style applies Gothic Revival details to modest wooden structures that were generally carpenter built (South Dakota State Historic Preservation Office 2002:23).

According to aerial photographs, Rock Hall was constructed north of the church between 1939 and 1953. The hall was used for church social events.

Significance: The Breck Memorial Episcopal Church has local significance for listing in the NRHP, under Criterion C for architecture. The property also meets Criteria Consideration A, as a religious property that derives its primary significance from architectural distinction.

The Breck Memorial Episcopal Church is significant as an excellent surviving example of a Carpenter Gothic style country church that was constructed in Minnesota in the late nineteenth century by Episcopal missionaries. The Carpenter Gothic style was popularized in the mid- to late-nineteenth century by pattern books from Richard Upjohn and Andrew Jackson Downing. The style applies Gothic Revival details to modest wooden structures that were generally carpenter built.

Rock Hall does not readily appear to have contributed to significant broad patterns of history; is not readily known to be associated with persons important in the past; is not architecturally distinguished; and has not yielded, nor is it likely to yield, information important in prehistory or history. Rock Hall is a non-contributing resource to the historic church property.

The Breck Memorial Episcopal Church's period of significance ranges from 1892, when the building was constructed until circa 1920, when the narthex was constructed.

Integrity: The circa 1920 narthex addition on the church does not affect the property's integrity of materials or workmanship as it was constructed during the property's period of significance. The addition slightly affects the original design of the church.

The property's integrity of setting and feeling have been slightly affected by the circa 1945 construction of Rock Hall. However, the construction of Rock Hall does not affect the church's integrity of materials, design, or workmanship.

The property retains good integrity of location and association. Overall, the property retains good integrity.

Recommendation: The Breck Memorial Episcopal Church is significant as an excellent surviving example of a Carpenter Gothic style country church that was constructed in Minnesota in the late nineteenth century by Episcopal missionaries. The church also meets Criteria Consideration A, as a religious property that derives its primary significance from architectural distinction. Therefore, the 106 Group recommends this property as eligible for listing in the NRHP, under Criterion C for architecture.

Rock Hall, also located on the property, does not readily appear to have contributed to significant broad patterns of history; is not readily known to be associated with persons important in the past; is not architecturally distinguished; and has not yielded, nor is it likely to yield, information important in prehistory or history. Therefore, Rock Hall is considered a non-contributing resource of this historic property.

5.2.2 Properties Recommended as Not Eligible for Listing in the NRHP

As a result of the Phase II architectural history evaluation three properties were recommended as not eligible for listing in the NRHP (Table 6; see Figures 5).

TABLE 6. PROPERTIES RECOMMENDED AS NOT ELIGIBLE FOR LISTING IN THE NRHP

Inventory Number	Property Name	T	R	S	¼ Section	Date
MH-WBC-004	St. Ann's Catholic Church & Rectory	143N	42W	24	SWSE	1912 / 1918
MH-WBC-074	Waubun Congregational Church / United Church of Christ	143N	42W	24	NWSE	1912
MH-WBC-093	Woodworth Elevator Company & Prairie Elevator Company / Waubun Elevator Company Complex	143N	42W	24	SESW	1904 / 1906

5.2.2.1 St. Ann's Catholic Church & Rectory, MH-WBC-004

Location: 1104-1112 Third Street, Waubun, Mahnomen County, Minnesota, T143N, R42W, Section 24

Description: The property located at 1104-1112 Third Street consists of a 1912 church and 1918 rectory (Figure 26). St. Ann's Catholic Church is located on the south portion of the property, at 1104 Third Street (Figures 27-28). The vernacular church features some Gothic Revival style characteristics, particularly pointed-arch windows. The one-and-a-half-story church rests on a poured concrete foundation, is faced in steel siding, and has a pedimented front gable roof that is covered with asphalt shingles. A three-story bell tower is centrally located on the façade. The tower features two Gothic-arched stained glass windows with a metal awning window below on the façade of the second-story. The third-story of the tower features Gothic arched openings with wood balustrades on all four elevations. The tower is covered by an octagonal conical roof with flared eaves that is covered with asphalt shingles. Wood brackets are located under the eaves and a metal cross sits atop the conical roof. A hipped roof entry bay is located on the northeast corner of the church. A metal staircase on the west elevation accesses the bay.

FIGURE 26. ST. ANN'S RECTORY AND CATHOLIC CHURCH (MH-WBC-004), FACING SOUTHEAST

FIGURE 27. ST. ANN'S CATHOLIC CHURCH (MH-WBC-004), FACING NORTHEAST

FIGURE 28. ST. ANN'S CATHOLIC CHURCH (MH-WBC-004), FACING NORTHWEST

The basement-level of the south elevation is fenestrated with four two-light, sliding vinyl windows. The first-story of the south elevation is fenestrated with four Gothic-arched stained glass windows with a metal awning window below.

The basement-level of the east elevation is fenestrated with (sited north to south) a window opening that has been infilled with vinyl siding and a two-light, sliding window. The first-story of the east elevation is fenestrated with two one-over-one, single-hung, wood windows and a centrally located shed roof entry which accesses the basement. The entry bay is fenestrated with a single-leaf door and four-light fixed wood window. A louvered wood vent is located in the gable end.

The basement-level of the south elevation is fenestrated with (sited west to east) three two-light, sliding vinyl windows and two window openings that has been infilled with vinyl siding. The first-story of the south elevation is fenestrated with (sited west to east) four Gothic-arched stained glass windows with a metal awning window below and a one-over-one, single-hung, wood window.

A one-story, full-width circa 1971 addition is located on the façade. The large addition rests on a poured concrete foundation, is faced in a mixture of wide-lap steel siding and vertical board-and-batten siding, and has a front gable roof that is covered with asphalt shingles. The façade is fenestrated with a centrally located double-leaf metal door that is flanked by triple vinyl casement windows on each side. Tripled vinyl casement windows are located on the north and south elevations of the addition.

St. Ann's Rectory is located on the north portion of the property, at 1112 Third Street (Figures 29-30). The two-and-a-half-story, Tudor Revival style rectory is constructed of structural tile that is faced in multi-colored, stretcher-bond brick. The building is covered by a front gable roof that is covered in asphalt shingles and has overhanging eaves on the north and south elevations that feature exposed rafter tails. The gable ends are clad in stucco and feature decorative half-timbering. The rear gable end (east elevation) features a wood vergeboard. A one-story portico is centrally located on the façade. The portico features brick piers and a front-gabled brick false front that is topped by a concrete cornice and concrete cross. The front gable roof of the portico is covered with asphalt shingles and features exposed rafter tails. A brick staircase with wood hand railings accesses the portico. A one-story, projecting bay window is located on the south elevation. The window bay has a shed roof that is covered with asphalt shingles.

FIGURE 29. ST. ANN'S RECTORY (MH-WBC-004), FACING NORTHEAST

The first-story of the façade is fenestrated with a centrally located single-leaf wood replacement door that is flanked by paired segmental-arched, three-over-one, double-hung, wood windows with rowlock sills and soldier lintels on each side. The second-story of the façade is fenestrated with a centrally located paired, one-over-one, double-hung, wood window with rowlock sills that is flanked by paired, three-over-one, double-hung, wood windows with rowlock sills on each side. The front gable end features a wood louvered vent that is flanked by a six-light, fixed wood window on each side.

FIGURE 30. ST. ANN'S RECTORY (MH-WBC-004), FACING SOUTHWEST

The basement-level of the south elevation is fenestrated with two segmental-arched, four-light, sliding wood windows with rowlock sills and soldier lintels. The first-story of the south elevation is fenestrated with (sited west to east) a triple segmental-arched, three-over-one, double-hung, wood window with a rowlock sill and soldier lintel; and the projecting bay window which is fenestrated with four three-over-one, double-hung, wood windows with rowlock sills. The second-story of the south elevation is fenestrated with (sited west to east) a standard-sized three-over-one, double-hung, wood window with rowlock sill; a small three-over-one, double-hung, wood window with rowlock sill; and standard-sized paired, three-over-one, double-hung, wood windows with rowlock sills.

A two-story, full-width wing is located on the rear (east) elevation. The only fenestration visible on the east elevation of the main block is the gable end, which features a wood louvered vent that is flanked by a six-light, fixed wood window on each side.

The basement-level of the north elevation is fenestrated with two segmental-arched, four-light, sliding wood windows with rowlock sills and soldier lintels. A landing between the basement and first-story features a (sited west to east) a centrally located single-leaf vinyl replacement door with soldier lintel and a segmental-arched, three-light, wood casement window with rowlock sill and soldier lintel. The first-story of the north elevation is fenestrated with (sited west to east) a segmental-arched, three-over-one, double-hung, wood window with rowlock sill and soldier lintel and a segmental-arched window opening that has been partially infilled with brick and a replacement two-light vinyl casement window. The window features a rowlock sill and soldier lintel. A landing between the first-story and second-story features a centrally located pentagonal-shaped window with three one-over-

one, double-hung, wood windows and a rowlock sill and soldier lintel. The second story of the north elevation is fenestrated with two three-over-one, double-hung, wood windows with soldier lintels.

The two-story, flat roof rear wing features a one-story, shed roof entry on the north elevation. The brick posts which supported the rear wing are visible on the northeast and northwest corners. The wing and entry bay are faced in vinyl siding. The south elevation of the wing is fenestrated with a nine-light, fixed wood window on the first-story and a one-over-one, double-hung, wood window on the second-story. The first-story of the east elevation is fenestrated with a single-leaf vinyl door and a one-over-one, double-hung, vinyl window. A wood staircase and landing provides access to the entry door. The second-story of the east elevation is fenestrated with two, one-over-one, double-hung, vinyl windows. There is no fenestration on the north elevation of the wing.

A one-story, circa 1960 garage addition is located on the east elevation of the rear wing. The garage extends south of the rectory and is partially visible from Third Street. The garage is faced in vinyl siding and has a shed roof that is covered with corrugated metal. Two overhead metal doors are located on the south elevation.

History: St. Ann's Catholic congregation was founded in 1908. From 1909-1910 the first Catholic Church services in Waubun were held in the Waubun State Bank by Father Magnus Hermanutz. After 1910, services were held at the Waubun Public School building. In 1912, construction of St. Ann's Church began on Lots 4-6 in Block 14 of Waubun Second Addition. Waubun Second Addition was platted by the Luck Land Company in August of 1912 (Luck Land Company 1912: No. 15913). The church was constructed by Thomas Chadonnet of Chadonnet's Lumber Company from Waubun (McDonald 1960:17). On June 20, 1912, the church held its first Holy Mass even though the interior of the building wasn't complete (St. Ann's Church 1962).

In July of 1915, the Luck Land Company sold the church property to Antonie Vauoss, Jr. for $2,100 (Luck Land Company 1915: No. 22239). In October of 1917, Vauoss sold the property for $200 to St. Ann's Church (Vauoss 1917: No. 28890). In 1917, Father Paulin Wiesner became the first resident pastor of St. Ann's (St. Ann's Church 1962). In August of 1918, Father Wiesner proposed taking up a collection in order to construct a rectory. Later that year, Carl Nelson of Mahnomen was hired to construct a brick and tile frame rectory for $8,187 (McDonald 1960:18). The rectory was constructed based on a plan by architect Silas Jacobson that was purchased for $75 (McDonald 1960:18).

Silas Jacobson was born in Minneapolis in 1880 and began practicing architecture in St. Paul in 1910. By 1916, Jacobson had become a senior draftsman in the Minnesota State Architect's Office. By 1929, he moved to Madison and worked in the Wisconsin State Architect's Office until his death in 1943. His most notable building in Minnesota is the St. Paul Fire Station on 9th Street, between Jackson and Robert Streets (Lathrop 2010:111).

In 1920, the church purchased and installed stained glass windows from Italy for $1,500 (Waubun Centennial Celebration Committee 2007:32). Father Wiesner remained at St.

Ann's until 1927. He was followed by Reverend Adrian Schmitt (1927-1940), Reverend Philip Bahmer (1940-1951), Reverend Denis Parnell (1951-1971), Reverend Rudolph Baumberger (1971-1977), Reverend Adrian Foxx (1977-1980), Reverend Clement Burns (1980-unknown), and the present Father Dwight Hoeberechts (St. Ann's Church 1980). During the tenure of Reverend Baumberger (1971-1977) the large addition on the front of the church was constructed (Mahnomen County Historical Society 1991: 39). According to aerial photographs, the addition was built before 1974 (ASCS 1966; ASCS 1974). According to aerial photographs, the garage addition on the rear of the Rectory was constructed between 1953 and 1966 (ASCS 1953a; ASCS 1966).

St. Ann's Catholic Church is vernacular in style and features Gothic Revival ornamentation. The Gothic Revival style is generally associated with European ecclesiastical designs and became popular in the U.S. in the mid- to late-nineteenth century. In the U.S. the style is commonly applied to residential and ecclesiastical architecture. Characteristics of the style include steeply pitched gabled rooflines, decorative spires and towers emphasizing the verticality, pointed arches, cross gable plans (cruciform), decorative buttresses, and contrasting exterior cladding. Gothic Revival characteristics were often applied to rural vernacular churches in the late nineteenth and early twentieth centuries. Typically, these churches borrowed the steeply pitched gabled rooflines, decorative towers emphasizing the verticality, and pointed arch windows from the Gothic Revival style, as can found on St. Ann's Catholic Church. However, these vernacular churches generally had a simplified nave plan, or standardized plan that was developed by the denomination, and exterior wood cladding (South Dakota State Historic Preservation Office 2002:23).

St. Ann's Rectory was designed in the Tudor Revival style. The style was popular in the U.S. from 1890 through the 1940s, and was generally applied to residential buildings. Tudor Revival style residences are generally characterized by side-gabled forms, hipped and front-gabled are less common; have a façade that is dominated by one or more gables, usually steeply pitched; decorative half-timbering; grouped tall and narrow windows; and large chimneys, typically crowned by chimney pots (McAllester 2004:355). St. Ann's Rectory has the typical brick wall cladding, decorative half-timbering, grouped windows, and the less common front-gabled form.

Significance: St. Ann's Catholic Church is a good example of a vernacular church with Gothic Revival style ornamentation. The church borrows the steeply pitched gabled roofline, decorative tower, and pointed arch windows from the Gothic Revival style. However, this style and form of church was commonly built in the early twentieth century for Catholic congregations.

St. Ann's Rectory is a good example of the Tudor Revival style. A circa 1945 house at 1412 Third Street features some Tudor Revival characteristics such as a side-gabled form with façade that is dominated by a prominent front gable. However, St. Ann's Rectory appears to retain the most Tudor Revival style details than any other building in Waubun. St. Ann's Rectory has the typical brick wall cladding, decorative half-timbering, grouped windows, and less common front-gabled form. This Silas Jacobson designed residence is one of the larger residences in the City of Waubun. During his 19-year career as an architect in Minnesota,

Silas Jacobson is credited as the primary designer of two structures, one being St. Ann's Rectory. As a senior draftsman in the Minnesota State Architect's Office for most of his career in Minnesota, Jacobson worked under the State Architect and assisted with building designs. The rectory does not appear to be significant for its association with architect Silas Jacobson, who is better known for his work in the Minnesota and Wisconsin State Architect's Offices. Although St. Ann's Rectory is a good example of the Tudor Revival style, and a rare surviving example of the style in Waubun, the building does not embody the Tudor Revival style, nor is it an excellent example of the style. The rectory does not feature key characteristics of the style including tall and narrow windows and a large chimney, which is typically crowned by chimney pots.

Integrity: The integrity of materials, design, and workmanship of St. Ann's Catholic Church has been compromised by the loss of the original siding material and large circa 1971 addition on the façade. The integrity of materials, design, and workmanship of St. Ann's Rectory has been slightly compromised by the cladding of the rear wing in vinyl siding and the rear garage addition.

St. Ann's Catholic Church & Rectory retain their integrity of location, association, setting, and feeling. Overall the property retains fair integrity.

Recommendation: St. Ann's Catholic Church & Rectory are good examples of their respective architectural styles; however they are not excellent examples of a vernacular church with Gothic Revival style ornamentation or the Tudor Revival style. Additionally, St. Ann's Catholic Church & Rectory do not appear to have significance for association with broad patterns of history or with any significant persons. Therefore, the 106 Group recommends St. Ann's Catholic Church & Rectory as not eligible for listing in the NRHP due to a lack of historical significance and a loss of integrity.

5.2.2.2 Waubun Congregational Church / United Church of Christ, MH-WBC-074

Location: 1319 Main Street, Waubun, Mahnomen County, Minnesota, T143N, R42W, Section 24

Description: The property located at 1319 Main Street consists of a Queen Anne style church (Figures 31-33). The one-story, square-shaped church was constructed in 1912. The building rests on a raised poured concrete basement, is faced in clapboard siding and has a cross gable roof that is covered with asphalt shingles. The church features pedimented gable ends on all four elevations and an interior brick chimney near the southeast corner of the church. A two-story, front-gabled bell tower is located in the northeast corner of the church. Towards the top of the tower there are open-air wood slats on all four elevations. A small, one-story hipped roof wing is located on the rear (west) elevation. In 1970, a one-story, front-gabled enclosed entry bay replaced the main entry staircase on the northeast corner of the façade (Waubun Centennial Celebration Committee 2007:48).

FIGURE 31. WAUBUN CONGREGATIONAL CHURCH / UNITED CHURCH OF CHRIST (MH-WBC-074), FACING WEST

FIGURE 32. WAUBUN CONGREGATIONAL CHURCH / UNITED CHURCH OF CHRIST (MH-WBC-074), FACING NORTHWEST

FIGURE 33. WAUBUN CONGREGATIONAL CHURCH / UNITED CHURCH OF CHRIST (MH-WBC-074), FACING SOUTH

The main block of the façade is fenestrated with a six-light fixed wood window in the basement level and a Palladian window on the first story. The entry bay is fenestrated with a single-leaf wood door with one three-light sidelight and a two-light wood casement window.

The main block of the north elevation is fenestrated with (sited east to west) two six-light fixed wood windows and a single-leaf metal door in the basement level. The first-story is fenestrated with (sited east to west) two one-over-one, double-hung, metal windows; a Palladian window; and a one-over-one, double-hung, metal window. The entry bay is fenestrated with a one-over-one, double-hung, vinyl window. The double-hung and Palladian windows feature ogee-molded wood surrounds.

There is no fenestration on the west elevation.

The main block of the south elevation is fenestrated with two six-light fixed wood windows in the basement level. The first-story is fenestrated with (sited east to west) two one-over-one, double-hung, metal windows; a Palladian window; and a one-over-one, double-hung, metal window. The entry bay is fenestrated with a one-over-one, double-hung, vinyl window. The double-hung and Palladian windows feature ogee-molded wood surrounds.

History: In September of 1910, the Waubun Congregational Church was organized with 15 members (Waubun Centennial Celebration Committee 2007:31). Church services were held in the second story of the Waubun State Bank until a permanent structure was built (Mahnomen County Historical Society 1991: 39). In the summer of 1912, construction began on a permanent structure (Waubun Centennial Celebration Committee 2007:31, 48). The church was constructed by the local lumberyard, Chadonnet Lumber Company. It is

unknown if the Waubun Congregational Church was designed by an architect. The lots on which the church was constructed were donated by Lucky S. Waller, owner of the Luck Land Company (McDonald 1960:16).

The church was designed in the Queen Anne style. The style was popular in the U.S. from the 1880s through the early twentieth century. Although generally applied to residential architecture, the Queen Anne style can also be found in religious architecture. The style is generally characterized by an asymmetrical façade, typically with a dominant front-facing gable; an irregular shaped, steeply-pitched roof; pedimented gables; patterned shingles; cutaway window bays and other features to avoid a smooth-walled appearance; and a partial or full-width porch in the residential versions of the style. In many variations of the style fenestration can include Palladian windows (McAllester 2004:263). The church appears to retain the best integrity of any other Queen Anne style buildings in Waubun. Two houses, located at 1212 and 1218 County Road 113 were designed in the Queen Anne style; however they do not retain sufficient integrity to convey their architectural significance.

In the early 1960s, the U.S. Congregational Church merged with the Evangelical and Reformed Churches to form the United Church of Christ (Waubun Centennial Celebration Committee 2007:48). The Waubun Congregational Church was then known as the United Church of Christ.

In 1970, the front steps were enclosed with the present front-gabled entry bay. This entry replaced the original entry, which was located within the tower and consisted of a round-arched, double-leaf wood door (Waubun Centennial Celebration Committee 2007:48; McDonald 1960:16).

Significance: The Waubun Congregational Church / United Church of Christ is a good example of the Queen Anne style and is a rare example of the style in Waubun. The church features many Queen Anne characteristics such as an asymmetrical façade with dominant front-facing gable, pedimented gables, and Palladian windows. However, the church does not embody the Queen Anne style, nor is it an excellent example of the style because it does not feature key Queen Anne style characteristics such as patterned shingles; an irregular shaped, steeply-pitched roof; or any cutaway window bays and other features that avoid a smooth-walled appearance.

Integrity: The integrity of materials, design, and workmanship of the Waubun Congregational Church / United Church of Christ have been slightly compromised by the covering of the main entry and construction of a circa 1970 enclosed vestibule. The church retains its integrity of location, association, setting, and feeling. Overall, the integrity of the church is good.

Recommendation: The Waubun Congregational Church / United Church of Christ is a good example of the Queen Anne style, however it is not an excellent example of that style. Additionally, the church does not appear to have significance for association with broad patterns of history or with any significant persons. Therefore, the 106 Group recommends

the Waubun Congregational Church / United Church of Christ as not eligible for listing in the NRHP due to a lack of historical significance.

5.2.2.3 Woodworth Elevator Company & Prairie Elevator Company / Waubun Elevator Company Complex, MH-WBC-093

Location: 1120 Dutch Street, Waubun, Mahnomen County, Minnesota, T143N, R42W, Section 24

Description: This country elevator complex is located along the west side of the MStP&SSM / Soo Line / CP Railway tracks in downtown Waubun. The complex consists of, from north to south, five grain bins; a 1904 wood elevator (Woodworth Elevator Company) that has been iron-clad; six 1979 grain bins; a 1906 wood elevator (Prairie Elevator Company) that has been iron-clad; a 1981 front-gabled office building; and five circa 1977-1978 grain bins (Figures 34-38). A railroad siding from the MStP&SSM / Soo Line / CP mainline was constructed adjacent to the east side of the elevators circa 1904 (Figure 39). The railroad siding generally runs north-south, roughly paralleling the mainline, and is comprised of a single set of active tracks on a raised bed of stone ballast. The tracks consist of steel rails laid on wood ties.

The block of five grain bins on the north portion of the complex are cylindrical-shaped, constructed of bolted corrugated metal panels, and covered by conical heavy gauge standing seam metal roofs (Figure 34). Four tall grain bins are located directly north of the Woodworth Elevator (north elevator) while one small grain bin is located directly west of the Woodworth Elevator. All of the structures are connected to the Woodworth Elevator via a metal conveyor. The northernmost two bins have metal chutes that extend over the railroad siding in order to load grain into railroad cars.

FIGURE 34. WAUBUN ELEVATOR COMPANY COMPLEX (MH-WBC-093), FACING SOUTHWEST

The Woodworth Elevator (north elevator) was constructed in 1904 of heavy timber framing (Figure 35). The elevator has a milk carton-shaped form with a gabled headhouse atop the main body of the structure. In 1970, it was sheathed in corrugated galvanized steel siding. The elevator has a shed-like structure that is semi-attached to the west elevation. This structure is likely a receiving shed, for unloading trucks. A large drying unit is located north of this elevator.

FIGURE 35. WAUBUN ELEVATOR COMPANY COMPLEX (MH-WBC-093), FACING NORTHEAST

Six grain bins are located between the Woodworth Elevator and the Prairie Elevator. The three northern bins in this group are cylindrical, constructed of bolted corrugated metal panels, and covered by conical heavy gauge standing seam metal roofs. The three southern bins are steel cylindrical hopper bins. A metal conveyor connects from the Woodworth Elevator to these six structures and ends at the Prairie Elevator.

The Prairie Elevator (south elevator) was constructed in 1906 of heavy timber framing (Figure 36). The elevator has a milk carton-shaped form with a gabled headhouse atop the main body of the structure. In 1969, it was sheathed in corrugated galvanized steel siding. The elevator has a one-story, flat-roofed receiving shed on the west elevation. Attached to the west elevation of the receiving shed is a 1981 office. The one-story office rests on a poured concrete foundation, is faced in corrugated metal siding, and has a front gable roof that is covered with corrugated metal. The west elevation of the office is fenestrated with a single-leaf, metal-frame glass door with transom and sidelights and two-light sliding metal windows. A large drying unit is located south of this elevator.

FIGURE 36. WAUBUN ELEVATOR COMPANY COMPLEX (MH-WBC-093), FACING SOUTHEAST

The block of five grain bins on the south portion of the complex are cylindrical-shaped, constructed of bolted corrugated metal panels, and covered by conical heavy gauge standing seam metal roofs (Figure 37). The tall bins are located directly south of the Prairie Elevator. The four grains bins are connected together with a metal conveyor. The northernmost bin is connected to a vertical conveyor on the west. The vertical conveyor is connected to two loading hoppers that are located southwest of the office building.

FIGURE 37. WAUBUN ELEVATOR COMPANY COMPLEX (MH-WBC-093), FACING NORTH

A metal pole building is located at the south end of the elevator complex (Figure 38). The one-story, west-facing structure is clad in vertical corrugated metal siding and has a front gable roof that is covered with corrugated metal. An overhead metal door is located on the façade.

FIGURE 38. WAUBUN ELEVATOR COMPANY COMPLEX (MH-WBC-093), FACING NORTHWEST

FIGURE 39. WAUBUN ELEVATOR RAILROAD SIDING (MH-WBC-093), FACING SOUTH

History: Grain elevators are constructed for two purposes, storing grains and transporting grain by moving it within the elevator, using elevating and conveying equipment. The Waubun Elevator, and its predecessors, is a country elevator, where farmers deliver their grains in trucks and it's stored, dried, and transferred to railroad cars for shipment to a terminal or receiving elevator (Frame 1989:E-2). Historically, country elevators were either privately owned, operated by a farmer's cooperative, owned by a mill, or owned by a grain company, known as a line elevator (Frame 1989:E-7). All types of ownership were common in Minnesota. In 1917, 39.2 percent of grain elevators were line elevators, 23.8 percent were owned by farmer's cooperatives, 14.9 percent were owned by mills, and 22.1 percent were privately owned (Frame 1989:E-11). The Waubun Elevator Company, and its predecessors, were privately owned and operated.

Wood as a building material for elevators was adopted in the 1870s (Frame 1989:E-12). Most extant wood elevators in Minnesota were constructed with a cribbed structure. In a cribbed structure, wooden planks, up to 10 inches in width, are laid flat in the desired shape of the elevator, with overlapping corners, and built up to the required height. The exterior was then sheathed in wood siding (Frame 1989:E-12, E-13). The Prairie and Woodworth Elevators are wood frame structures that were sheathed in corrugated galvanized steel siding (known as iron-clad in the industry) in 1969 and 1970. The practice of iron-cladding elevators was applied to wood elevators for fire protection beginning in the 1910s (Frame 1989:E-17).

The arrival of the MStP&SSM /Soo Line / CP Railway in Waubun in 1904 created the need for a country elevator. On August 6, 1904, B.H. Woodworth leased property from the railroad and constructed the north elevator adjacent to the west side of the railroad tracks, known as the Woodworth Elevator Company. The Woodworth Elevator Company was a private company owned and operated by B.H. Woodworth until 1930 (Waubun Centennial Celebration Committee 2007:51).

In 1906, the south elevator was constructed by the Prairie Elevator Company, a private company (Waubun Centennial Celebration Committee 2007:51). In 1917, the elevator name changed to Atlantic Elevator and later became the Waubun Elevator Company. In 1915, L. Edgar Moore was the owner of the elevator, from 1916-1926 it was owned by C.E. Kelty, in 1926 C.Y. Miller became a partial owner, and in 1928 H.S. Krostue and Olaf Olson became partial owners. In 1930, C.Y. Miller and the other owners of the Waubun Elevator Company purchased the holdings of the Woodworth Elevator Company and the two elevators became one complex under the Waubun Elevator Company name. This consolidation does not appear to be part of a larger trend of private elevator consolidations. On August 1, 1952, the Waubun Elevator Company was purchased by Elmer Skatvold. On January 1, 1961, the company was purchased by Earl C. Herby, the manager of the elevator under Skatvold (Waubun Centennial Celebration Committee 2007:52).

According to aerial photographs, the extant grain bins were added to the complex between 1953 and 1966 (ASCS 1953b; ASCS 1966). In 1969, the structure of the Prairie Elevator was

shored up and it was clad in steel sheets. In 1970, the Woodworth Elevator was clad in steel sheets (Waubun Centennial Celebration Committee 2007:52).

In July of 1972, the U.S., under the Nixon Administration, made a deal with the Soviet Union to sell them millions of bushels of grain over a three-year period. During July and August of 1972, the Soviet's purchased 440 million bushels of wheat for approximately 700 million dollars. This was more than U.S. commercial wheat exports from the previous year. After the agreement was made, often referred to as the "Russian Wheat Deal," U.S. grain prices began to increase which created a need for moving grain faster from the farm, to the country elevator, to the terminals. Grain prices in the U.S. remained relatively high until an economic recession in the early 1980s (Luttrell 1973).

To speed up the grain distribution process at the Woodworth Elevator Company & Prairie Elevator Company / Waubun Elevator Company Complex many upgrades and new facilities were added in the mid- to late-1970s. In 1974, the wood leg in the Prairie Elevator was replaced with a 6,000 bushel per hour steel leg and elevator pan. In 1975, a 3,000 bushel per hour steel leg and pan were added to the Woodworth Elevator. In 1976, a 400 bushel capacity dryer was constructed. In 1977, two 15,000 bushel steel bins with 3,000 bushel per-hour outside leg were constructed. Two more steel bins were added in 1978, and in 1979 three steel bins were added between the two elevators. In 1980, two truck loading hopper bins were constructed. The final expansion of the complex came in 1981 when a 15 foot by 48 foot front-gabled office was constructed just west of the north elevator. This office building replaced one that had been constructed in 1957 (Waubun Centennial Celebration Committee 2007:52-53).

Significance: The Woodworth Elevator Company & Prairie Elevator Company / Waubun Elevator Company Complex has local significance for listing in the NRHP under Criteria A, within the statewide historical context *Railroads and Agricultural Development, 1870-1940*. The complex has significance within the areas of agriculture, commerce, and industry. The development of agricultural commerce at the end of the nineteenth century and the emergence of the railroad in Mahnomen County in 1904 contributed to the development of Waubun. The railroad provided Waubun with a means to efficiently and economically transport agricultural goods from producing areas to distribution centers and allowed the city to become one of many important regional centers in Mahnomen County along the MStP&SSM / Soo Line / CP Railway. This elevator complex appears to be one of a few in Mahnomen County that were independently owned and operated. The large elevator complexes along the MStP&SSM / Soo Line / CP Railway in neighboring Callaway and Mahnomen are owned and operated by CHS, a nationwide energy, grains, and foods company.

As an elevator complex developed during the early twentieth century and greatly expanded in the late twentieth century, this property represents wheat production, storage, and shipment practices during those periods, which was a primary industry in northwestern Minnesota. The period of significance ranges from 1904, when the first elevator was built until 1930, when the two elevators in Waubun were consolidated into the Waubun Elevator Company.

A second potential period of significance ranges from 1974, when the elevator complex began a large expansion in order to meet the U.S. increased grain needs for export to Russia, until 1981 when the complex reached its current configuration. This second potential period of significance is less than 50 years old and therefore needs to be evaluated under Criteria Consideration G. Although this second potential period of significance is important to the elevator complex, because it was during that period that is greatly expanded and reached its current configuration, it does not currently appear to meet exceptional importance for achieving significance within the last fifty years. The expansion of elevator complexes in the 1970s to meet the increased need for grain production was relatively common in Minnesota and the Upper Midwest.

Integrity: The re-cladding of the Woodworth Elevator (north elevator) in steel sheets slightly affects its integrity of materials. The design and workmanship of the elevator have been compromised by the enlarged receiving house, extension to the top of the headhouse, and non-historic conveyors.

The re-cladding of the Prairie Elevator (south elevator) in steel sheets slightly affects its integrity of materials. The design of the elevator has been slightly compromised by the office addition. This elevator retains good integrity of workmanship.

The under structures, wood legs, elevator pans, and other interior equipment of the elevators have been replaced. However, since interior elevator equipment was often replaced without altering the elevator structure, it is not necessary for an elevator to retain this equipment to retain integrity (Frame 1989:F-15). The two elevators retain good integrity of location and setting. As part of an operational elevator complex, the two elevators retain excellent integrity of feeling and association.

The MStP&SSM railroad siding retains its integrity of materials, design, workmanship, location, setting, feeling, and association. The buildings and structures constructed within the 1904-1930 period retain good integrity. However, because a majority of the complex was constructed in the late 1970s, outside of this period of significance, the overall integrity of the complex is fair.

The elevator complex was greatly expanded during the mid-1970s to early 1980s. A pole building and office building, and multiple grain bins, loading hoppers, and drying units were constructed during this period. These newer facilities affect the complex's overall integrity of materials, design, workmanship, feeling, and association.

To retain integrity, the elevator must retain integrity of the element considered significant. For country elevators, this generally means structural integrity of the entire elevator complex, including storage bins, the elevator, headhouse, office building, and other attached exterior structures (Frame 1989:F-15). Overall, the complex retains fair to poor integrity.

Recommendation: The Woodworth Elevator Company & Prairie Elevator Company / Waubun Elevator Company Complex has local significance within the areas of agriculture, commerce,

and industry. However, the overall integrity of the property has been compromised so that it does not convey its historical significance as an early twentieth century elevator complex.

The property retains enough integrity to convey its significance as an elevator complex that was significantly expanded in the mid-1970s to early 1980s in order to increase production and shipments to meet the U.S. increased grain needs for export to Russia. However, as this expansion was common practice in Minnesota and the Upper Midwest the property does not meet NRHP Criterion Consideration G as a property that has achieved significance within the last fifty years. Therefore, the 106 Group recommends this property as currently not eligible for listing in the NRHP due to a loss of integrity. We would recommend evaluating the property's overall significance when the second potential period of significance reaches the 50-year age cutoff for listing in the NRHP.

6.0 ASSESSMENT OF EFFECTS STUDY

6.1 PROJECT DESCRIPTION

The assessment of effects study focused on the impacts that the proposed project may have on the five properties within the APE for the project that are either previously determined eligible or were recommended as eligible for listing on NRHP as a result of the Phase II architectural history survey.

Effects to the following previously determined or newly recommended eligible architectural history resources were studied:

- Minneapolis, St. Paul & Sault Ste. Marie Railway / Soo Line Railroad / Canadian Pacific Railway (MH-PGR-002)
- Golden Rule Store (MH-WBC-078)
- Ponsford Community Church (BK-CAR-007)
- St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall (BK-PNP-001)
- Breck Memorial Episcopal Church (BK-PNP-007)

The White Earth Reservation Tribal Council proposes constructing wind turbines within three project areas located within the White Earth Reservation: near Pine Point, Waubun, and Naytahwaush, Minnesota. According to information provided by Western EcoSystems Technology, Inc. on January 27, 2011, one 33-95 kW turbine is proposed for Pine Point, two 300 kW and two 35-95 kW turbines are proposed for Waubun, and one 33-95 kW turbine is proposed for Naytahwaush. All of the turbines will not exceed 260 feet in height, including the hub and rotor. The construction method will include the use of bulldozers to dig foundations for the turbines. The project areas are located in Section 32, T141N, R37W of Becker County and Section 30, T143N, R41W, Sections 25, 36, T143N, R42W, and Section 21, T144N, R39W of Mahnomen County, Minnesota. Table 7 below identifies the project area associated with each eligible property, as well as the number of turbines proposed within each project area.

TABLE 7. ELIGIBLE PROPERTIES AND ASSOCIATED PROJECT AREAS

Property Name (SHPO Number)	Project Area	Proposed Turbines
Minneapolis, St. Paul & Sault Ste. Marie Railway / Soo Line Railroad / Canadian Pacific Railway (MH-PGR-002)	Waubun	4
Golden Rule Store (MH-WBC-078)	Waubun	4
Ponsford Community Church (BK-CAR-007)	Pine Point	1
St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall (BK-PNP-001)	Pine Point	1
Breck Memorial Episcopal Church (BK-PNP-007)	Pine Point	1

6.2 ASSESSMENT OF EFFECTS

6.2.1 Minneapolis, St. Paul & Sault Ste. Marie Railway / Soo Line Railroad / Canadian Pacific Railway, MH-PGR-002

NRHP Status: The MStP&SSM / Soo Line / CP Railway, running from Glenwood to Noyes, was previously determined eligible for listing in the NRHP under Criterion A, within the NRHP Multiple Property Listing, *Railroads in Minnesota 1862-1956* (see Figure 5). The property is historically significant in the areas of transportation, commerce, and agriculture.

Noise, Vibration, and Air Quality Effects: During construction of the proposed project there will be temporary increases in noise and vibration, and possible effects to the air quality. Any potential increase in noise during construction would be limited in duration and is not likely to affect an active railroad corridor. Any potential increase in dust during construction would be limited in duration and amounts generated would not be any greater than dust generated by wind storms. Any temporary direct effects from vibrations during construction, caused by tractor trailers unloading materials or bulldozers moving earth, will likely not be greater than the vibration of freight traffic within the active railroad corridor. Therefore, the proposed construction activity is not anticipated to have any temporary adverse direct or indirect effect on the MStP&SSM / Soo Line / CP Railway.

During operation of the proposed project, any noise generated by the wind turbines will be minimal and is not anticipated to increase ambient noise levels in the area. Operation of the proposed project will not result in any permanent atmospheric effects that would impact the railroad corridor. In addition, any vibrations from the operation of the wind turbines will be minimal. Therefore, the operation of the proposed project is not anticipated to have any adverse permanent direct vibration or indirect noise or air quality effects on the MStP&SSM / Soo Line / CP Railway.

Visual Effects: The proposed construction of four wind turbines east of the railroad corridor in Waubun will be visible from many areas of the corridor (Figure 40). However, the proposed wind turbines will not compromise the ability of the railroad line to convey its sense of direction, which is a primary characteristic of a linear corridor to convey its significance. The turbine will introduce an out-of-scale feature to the general rural landscape along this stretch of the railroad line; however, this segment is only a small portion of a much longer historic resources and, given that the proposed turbine will only be visible from this short stretch, potential effects to this small portion of the line will be negligible to the larger whole.

FIGURE 40. VIEW FROM THE RAILROAD TOWARDS THE PROJECT AREAS, FACING SOUTHEAST

Recommendation: The 106 Group recommends that although the proposed construction of wind turbines will have permanent indirect visual effects on the MStP&SSM / Soo Line / CP Railway, the effects will not result in an adverse effect to the property or its ability to convey its historical significance.

6.2.2 Golden Rule Store, MH-WBC-078

NRHP Status: The 106 Group recommends the Golden Rule Store as eligible for listing in the NRHP, under Criterion A within the areas of commerce and community planning and development (see Figure 5). The Golden Rule Store is significant as the only known extant general store in Waubun. The building is also significant for retaining the best integrity of any surviving commercial building in Waubun that dates to the town's development period.

Noise, Vibration, and Air Quality Effects: During construction of the proposed project there will be temporary increases in noise and vibration, and possible effects to the air quality. Any potential increase in noise during construction would be limited in duration and is not likely to be greater than the noise generated by traffic on nearby County Road 113 or freight traffic on the nearby railroad. Any potential increase in dust during construction would be limited in duration and amounts generated would not be any greater than dust generated by wind storms. Any temporary direct effects from vibrations during construction, caused by tractor trailers unloading materials or bulldozers moving earth, would likely be dissipated by the land area (approximately 1,445 feet) separating the nearest project area from the commercial building. Therefore, the proposed construction activity is not anticipated to have any temporary adverse direct or indirect effect on the Golden Rule Store.

During operation of the proposed project, any noise generated by the wind turbines will be minimal and, since the nearest wind turbine will be located approximately 2,685 feet away, it is not anticipated to increase ambient noise levels in the area. Operation of the proposed project will not result in any permanent atmospheric effects that would impact the commercial building. In addition, any vibrations from the operation of the wind turbines will be minimal and again, given the distance of the nearest project area from the Golden Rule Store, the project is not anticipated to have any vibration effects on the property. Therefore, the operation of the proposed project is not anticipated to have any adverse permanent direct vibration or indirect noise or air quality effects on the Golden Rule Store.

Visual Effects: The proposed construction of four wind turbines southeast of the Golden Rule Store will be visible from the historic property. The turbines will be visible due to the relatively flat topography and lack of significant mature trees between the nearest project area and the building (Figure 41).

Given the overall larger height of the proposed wind turbines compared to the existing buildings and structures that surround the commercial building, the proposed turbines will result in a new out-of-scale element being introduced into the landscape, causing a visual effect to the Golden Rule Store. The proposed turbines will alter some of the views to and from the building, thereby slightly affecting the integrity of the small town setting and feeling of the store. The nearest proposed wind turbine will be approximately 2,685 feet away. The potential visual impact will be somewhat minimized since the perceived comparative height on the horizon will be reduced given this distance. In addition, the turbines will occupy only a small portion of the views to and from the building. Additionally, the wind turbines will not impact any significant view to and from the property.

FIGURE 41. VIEW FROM EAST OF THE COMMERCIAL BUILDING TOWARDS PROJECT AREAS, FACING SOUTHEAST

The proposed wind turbines will not affect the integrity of materials, design, workmanship, location, or association of the commercial building. Moreover, the significance of the building is due to its associations with commerce. Therefore, the proposed wind turbines will not compromise the ability of the Golden Rule Store to convey its historical significance as the only known extant general store in Waubun and as a surviving commercial building with the best integrity of any buildings that date to the town's development period.

Recommendation: The 106 Group recommends that although the proposed construction of wind turbines will have permanent indirect visual effects on the Golden Rule Store, the effects will not result in an adverse effect to the property or its ability to convey its historical significance.

6.2.3 Ponsford Community Church, BK-CAR-007

NRHP Status: The 106 Group recommends this property as eligible for listing in the NRHP, under Criteria A and C (see Figure 4). The Ponsford Community Church has local significance within the areas of architecture and social history. The church is a fine example of a vernacular country church constructed in Minnesota in the early twentieth century, shortly after the community was settled by European-Americans, which retains excellent integrity. The church is also a rare example of an extant non-denominational built church.

Noise, Vibration, and Air Quality Effects: During construction of the proposed project there will be temporary increases in noise and vibration, and possible effects to the air quality. Any potential increase in noise during construction would be limited in duration and is not likely to be greater than the noise generated by traffic on County Highway 26, which is located directly north of the church. Any potential increase in dust during construction would be limited in duration and amounts generated would not be any greater than dust generated by wind storms. Any temporary direct effects from vibrations during construction, caused by tractor trailers unloading materials or bulldozers moving earth, would likely be dissipated by the land area (approximately 3,465 feet) separating the project area from the church. Therefore, the proposed construction activity is not anticipated to have any temporary adverse direct or indirect effect on the Ponsford Community Church.

During operation of the proposed project, any noise generated by the wind turbines will be minimal and, since the nearest wind turbine will be located approximately 4,060 feet away, is not anticipated to increase ambient noise levels in the area. Operation of the proposed project will not result in any permanent atmospheric effects that would impact the church. In addition, any vibrations from the operation of the wind turbines will be minimal and again, given the distance of the nearest project area from the Ponsford Community Church, the project is not anticipated to have any vibration effects on the property. Therefore, the operation of the proposed project is not anticipated to have any adverse permanent direct vibration or indirect noise or air quality effects on the Ponsford Community Church.

Visual Effects: The nearest proposed wind turbine will be approximately 4,060 feet away from the Ponsford Community Church. The proposed construction of one wind turbine northwest of the church will be visible from the historic property due to the relatively flat topography between the nearest project area and the building (Figure 42). Given the overall larger height of the proposed wind turbine compared to the existing buildings, structures, and trees that surround the church, the proposed turbine will result in a visual effect to the Ponsford Community Church. The proposed turbine will alter some of the views to and from the building, thereby slightly affecting the integrity of the rural setting and feeling. The potential visual impact will be somewhat minimized since the perceived comparative height on the horizon will be reduced given the distance between the church and the proposed project area. In addition, the turbines will occupy only a small portion of the views to and from the building. Additionally, the wind turbines will not impact any significant view to and from the property.

FIGURE 42. VIEW FROM NORTH OF THE CHURCH TOWARDS PROJECT AREA, FACING NORTHWEST

As a property that is significant for its architectural style and social history the integrity of materials, design, workmanship, feeling, setting, and association are the most important aspects of integrity. The proposed wind turbine will not compromise the church's integrity of materials, design, and workmanship or its ability to convey its significance as a fine example of a vernacular country church which retains excellent integrity.

However, the proposed wind turbine may slightly compromise the property's integrity of feeling and setting and affect its ability to convey its historical significance as a rare example of an extant non-denominational built church. The introduction of a large, non-historic structure within the rural setting of the historic property may slightly affect the property's integrity of setting and feeling. However, the potential visual impact will be somewhat minimized since the perceived comparative height on the horizon will be reduced given the

distance between the property and the proposed turbine. In addition, the wind turbine will not impact any significant views to and from the property; therefore, it is unlikely to have an adverse visual effect on the church.

Recommendation: The 106 Group recommends that although the proposed construction of a wind turbine will have permanent indirect visual effects on the Ponsford Community Church, the effects will be minor and will not result in an adverse effect to the property or its ability to convey its historical significance.

6.2.4 St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall, BK-PNP-001

NRHP Status: The 106 Group recommends this property as eligible for listing in the NRHP, under Criterion A within the areas of ethnic heritage: Native American and social history (see Figure 4). St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall are significant as missionary facilities that were built in the early twentieth century to serve the Native American population of Pine Point and the surrounding areas. The property is significant for its association with Native Americans, as their place of worship, a meeting place for social gatherings, and their final resting place.

Noise, Vibration, and Air Quality Effects: During construction of the proposed project there will be temporary increases in noise and vibration, and possible effects to the air quality. Any potential increase in noise during construction would be limited in duration and is not likely to be greater than the noise generated by traffic on nearby County Road 124. Any potential increase in dust during construction would be limited in duration and amounts generated would not be any greater than dust generated by wind storms. Any temporary direct effects from vibrations during construction, caused by tractor trailers unloading materials or bulldozers moving earth, would likely be dissipated by the land area (approximately 1,935 feet) separating the project area from the historic property. Therefore, the proposed construction activity is not anticipated to have any temporary adverse direct or indirect effect on the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall.

During operation of the proposed project, any noise generated by the wind turbines will be minimal and, since the nearest wind turbine will be located approximately 2,280 feet away, it is not anticipated to increase ambient noise levels in the area. Operation of the proposed project will not result in any permanent atmospheric effects that would impact the property. In addition, any vibrations from the operation of the wind turbines will be minimal and again, given the distance of the nearest project area from the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall, the project is not anticipated to have any vibration effects on the property. Therefore, the operation of the proposed project is not anticipated to have any adverse permanent direct vibration or indirect noise or air quality effects on the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall.

Visual Effects: The nearest wind turbine will be located approximately 2,280 feet west of the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall. The proposed construction of one wind turbine to the west will be visible from the historic property. The turbine will be visible due to the relatively flat topography and lack of trees between the nearest project area and the property (Figure 43).

Given the overall larger height of the proposed wind turbine compared to the existing buildings and structures near the property, the proposed turbine will introduce a new out-of-scale element to the landscape and result in a visual effect to the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall. The proposed wind turbine will be significantly taller and have a greater massing than the surrounding landscape, including the Pine Point water tower (see Figure 43). The water tower is located on the eastern edge of the Pine Point project area and is approximately 250 feet east of the proposed wind turbine location. Based on the approximate height of the water tower, the proposed wind turbine would be more than twice the height of the water tower on the landscape. The proposed turbine will also alter some significant views of the property when approaching it from the west on County Road 124 and views from the property when facing west, thereby affecting the integrity of setting and feeling. The proposed wind turbine will not affect the integrity of materials, design, workmanship, location, or association of the property.

FIGURE 43. VIEW FROM CHURCH PARKING LOT (BETWEEN CHURCH AND CEMETERY) TOWARDS PROJECT AREA, FACING WEST

As a property that is significant for its ethnic heritage and social history the integrity of feeling, setting, and association are the most important three aspects of integrity. The proposed wind turbine will not compromise the property's integrity of association with the Native American congregation and Tekakwitha Conference. However, the proposed wind turbine may compromise the property's integrity of feeling and setting and affect its ability to

convey its historical significance as a missionary complex that was built in the early twentieth century to serve the Native American population of Pine Point. The loss of the 1918 parish house associated with the property has already slightly affected the property's integrity of feeling as an early twentieth century missionary complex. The introduction of a large, out-of-scale, and clearly visible structure within the setting of the historic property will further affect the property's feeling and will affect its setting as a rural religious property.

Recommendation: The proposed project will have permanent adverse indirect visual effects on St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall. The integrity of setting and feeling of the property will be negatively altered by the proposed project which will adversely affect the ability of the property to convey its historical significance as an early twentieth century missionary complex that was built to serve the Native American population of Pine Point.

6.2.5 Breck Memorial Episcopal Church & Rock Hall, BK-PNP-007

NRHP Status: The 106 Group recommends this property as eligible for listing in the NRHP, under Criterion C for architecture (see Figure 4). The Breck Memorial Episcopal Church is significant as an excellent surviving example of a Carpenter Gothic style country church that was constructed in Minnesota in the late nineteenth century by Episcopal missionaries.

Noise, Vibration, and Air Quality Effects: During construction of the proposed project there will be temporary increases in noise and vibration, and possible effects to the air quality. Any potential increase in noise during construction would be limited in duration and is not likely to be greater than the noise generated by traffic on nearby County Road 124. Any potential increase in dust during construction would be limited in duration and amounts generated would not be any greater than dust generated by wind storms. Any temporary direct effects from vibrations during construction, caused by tractor trailers unloading materials or bulldozers moving earth, would likely be dissipated by the land area (approximately 3,050 feet) separating the project area from the church. Therefore, the proposed construction activity is not anticipated to have any temporary adverse direct or indirect effect on the Breck Memorial Episcopal Church.

During operation of the proposed project, any noise generated by the wind turbines will be minimal and, since the nearest wind turbine will be located approximately 3,375 feet away, it is not anticipated to increase ambient noise levels in the area. Operation of the proposed project will not result in any permanent atmospheric effects that would impact the church. In addition, any vibrations from the operation of the wind turbines will be minimal and again, given the distance of the nearest project area from the Breck Memorial Episcopal Church, the project is not anticipated to have any vibration effects on the property. Therefore, the operation of the proposed project is not anticipated to have any adverse permanent direct vibration or indirect noise or air quality effects on the Breck Memorial Episcopal Church.

Visual Effects: The proposed wind turbine will be located approximately 3,375 feet west of the church. The proposed construction of one wind turbine west of the Breck Memorial Episcopal Church will be slightly visible from the historic property. The topography is relatively flat between the project area and the church; however there are some mature trees that provide a partial visual buffer (Figure 44). Given the overall larger height of the proposed wind turbine compared to the existing buildings and structures that surround the church, the proposed turbine will introduce an out-of-scale element to the landscape and result in a visual effect to the Breck Memorial Episcopal Church. The proposed turbine will alter some of the views to and from the church, thereby slightly affecting the integrity of setting and feeling. However, the potential visual impact will be somewhat minimized since the perceived comparative height on the horizon will be reduced given the distance between the church and the proposed project area.

FIGURE 44. VIEW FROM WEST OF THE CHURCH TOWARDS PROJECT AREA, FACING WEST

The proposed wind turbine will not affect the integrity of materials, design, workmanship, location, or association of the church. As a property that is significant for its architectural style the integrity of materials, design, and workmanship are the three most important aspects of integrity. The proposed wind turbine will not compromise the church's integrity of materials, design, and workmanship or its ability to convey its significance as an excellent example of a Carpenter Gothic style country church that was constructed in Minnesota in the late nineteenth century by Episcopal missionaries.

Recommendation: The 106 Group recommends that although the proposed construction of one wind turbine will have permanent indirect visual effects on the Breck Memorial Episcopal Church, the effects will not result in an adverse effect to the property or its ability to convey its historical significance.

7.0 RECOMMENDATIONS

7.1 RESULTS

During the Phase I architectural history survey, the 106 Group identified 127 architectural history properties 50 years of age or older within the APE for the three proposed project areas. Of these 127 properties, seven were previously inventoried and 120 were newly identified architectural history properties. One of the properties (MH-PGR-002) was a newly identified segment of a previously determined eligible railroad corridor. Seven of the 127 properties were recommended as *potentially* eligible for listing in the NRHP. The remaining 120 properties are recommended not eligible for listing in the NRHP due to a lack of historical significance and/or loss of integrity.

Following the Phase I investigation, a Phase II architectural history evaluation was conducted for the seven *potentially* eligible properties. During the Phase II evaluation, four of the properties (MH-WBC-078, BK-CAR-007, BK-PNP-001, and BK-PNP-007) were recommended as eligible for listing in the NRHP. Therefore, an assessment of effects study was conducted for the four recommended eligible properties and the previously determined eligible railroad corridor (MH-PGR-002).

7.2 EFFECTS

The proposed project will have temporary direct and indirect effects and permanent indirect visual effects on the MStP&SSM / Soo Line / CP Railway (MH-PGR-002); the Golden Rule Store (MH-WBC-078); the Ponsford Community Church (BK-CAR-007); and the Breck Memorial Episcopal Church (BK-PNP-007). There will be temporary increases in noise and vibration, and possible effects to the air quality during construction and operation of the proposed project; however these effects are not anticipated to adversely affect these properties. There will also be permanent indirect visual effects to the properties from the proposed project that will slightly change their integrity of setting and feeling. However, these properties are located a great distance from the proposed wind turbines (the closest being 2,280 feet away). The potential visual impact will be minimized since the perceived comparative height of the turbines on the horizon will be reduced given the distance between the properties and the proposed turbines. Therefore, the proposed project will not adversely affect their ability to convey their historical significance. Based on this analysis, it is recommended that the proposed project will have no adverse effect on the MStP&SSM / Soo Line / CP Railway (MH-PGR-002); the Golden Rule Store (MH-WBC-078); the Ponsford Community Church (BK-CAR-007); and the Breck Memorial Episcopal Church (BK-PNP-007).

The proposed project will have temporary direct and indirect effects and permanent indirect visual effects on the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall (BK-PNP-001). There will be temporary increases in noise and vibration, and possible effects to the air quality during construction and operation of the proposed project; however these effects are not anticipated to adversely affect this property. There will also be

permanent indirect visual effects to the property from the proposed project. The overall larger height of the proposed wind turbine compared to the existing buildings and structures near the property will introduce a new out-of-scale element to the landscape and result in a visual effect to the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall. The proposed wind turbine will be significantly taller and have a greater massing than the surrounding landscape, including the Pine Point water tower (see Figure 43). The proposed turbine will also alter some significant views of the property when approaching it from the west on County Road 124 and views from the property when facing west, thereby adversely affecting the integrity of setting and feeling of the property which will adversely affect the ability of the property to convey its historical significance. Therefore, it is recommended that the proposed project will have an adverse effect on the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall (BK-PNP-001).

To potentially minimize the adverse visual effects to the St. Theodore's Catholic Church, Cemetery, and Kateri Tekakwitha Hall (BK-PNP-001) from the proposed project, one option may be to plant mature vegetation, particularly coniferous trees, along the western boundary of the property in order to partially screen the views from the property. If the adverse visual effect cannot be avoided or minimized, then appropriate mitigation may be required. However, the DOE as the lead federal agency will need determine the effects this project will have on historic resources and appropriate means to avoid, minimize, or mitigate any adverse effects, in consultation with the SHPO.

8.0 REFERENCES CITED

Agricultural Stabilization and Conservation Service (ASCS)

1939a Aerial Photography of Mahnomen County, Minnesota. Agricultural Stabilization and Conservation Service, Washington, D.C. On file at the John R. Borchert Map Library, Minneapolis, Minnesota.

1939b Aerial Photography of Becker County, Minnesota. Agricultural Stabilization and Conservation Service, Washington, D.C. On file at the John R. Borchert Map Library, Minneapolis, Minnesota.

1953a Aerial Photography of Mahnomen County, Minnesota. Agricultural Stabilization and Conservation Service, Washington, D.C. On file at the John R. Borchert Map Library, Minneapolis, Minnesota.

1953b Aerial Photography of Becker County, Minnesota. Agricultural Stabilization and Conservation Service, Washington, D.C. On file at the John R. Borchert Map Library, Minneapolis, Minnesota.

1965 Aerial Photography of Becker County, Minnesota. Agricultural Stabilization and Conservation Service, Washington, D.C. On file at the John R. Borchert Map Library, Minneapolis, Minnesota.

1966 Aerial Photography of Mahnomen County, Minnesota. Agricultural Stabilization and Conservation Service, Washington, D.C. On file at the John R. Borchert Map Library, Minneapolis, Minnesota.

1972 Aerial Photography of Becker County, Minnesota. Agricultural Stabilization and Conservation Service, Washington, D.C. On file at the John R. Borchert Map Library, Minneapolis, Minnesota.

1974 Aerial Photography of Mahnomen County, Minnesota. Agricultural Stabilization and Conservation Service, Washington, D.C. On file at the John R. Borchert Map Library, Minneapolis, Minnesota.

Becker County Historical Society

n.d. *City of Waubun, Vertical File.* On file at the Becker County Historical Society, Detroit Lakes, Minnesota.

n.d. *Pine Point Township, Vertical File.* On file at the Becker County Historical Society, Detroit Lakes, Minnesota.

Becker County, Minnesota

2008 Becker County History. Electronic document, http://www.co.becker.mn.us/our_county/history.aspx, accessed April 2011.

Chromy, John and wife (Grantor)
1921 Warranty Deed No. 42450: John Chromy and wife (Grantor) and Albert J. Narum (Grantee). September 10, Book 43 Page 572. On file at the Mahnomen County Recorder's Office, Mahnomen, Minnesota.

Crum, A.R. (editor)
1911 *Romance of American Petroleum and Gas: Volume I.* The Derrick Publishing Company, Oil City, Pennsylvania.

Delaware State Historic Preservation Office (SHPO)
2003 *Assessing Visual Effects.* State of Delaware, Department of State, Division of Historical and Cultural Affairs, Dover, Delaware.

Detroit Lakes Tribune
1970 "Pine Point Was Named By Indians." 13 April. Detroit Lakes, Minnesota.

Ellswoth, E. and wife (Grantor)
1947 Warranty Deed No. 70184: E. Ellsworth and wife (Grantor) and Albert J. Reller and wife (Grantee). March 12, Book 64 Page 301. On file at the Mahnomen County Recorder's Office, Mahnomen, Minnesota.

Federal Communications Commission (FCC)
2004 *Nationwide Programmatic Agreement for the Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission.* Electronic document, Federal Communications Commission website, http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-222A3.pdf, accessed January 25, 2010.

Frame, Robert M., III
1989 *Grain Elevators in Minnesota National Register of Historic Places Multiple Property Documentation Form.* On file at the Minnesota State Historic Preservation Office, St. Paul, Minnesota.

Groth, Paul
1999 "Making New Connections in Vernacular Architecture." *The Journal of the Society of Architectural Historians* 58, no. 3 (September): 444-451.

Haddelund, Karl and Gudrun (Grantor)
1994 Quit Claim Deed No. 108079: Karl and Gudrun Haddeland (Grantor) and Kaare and Kathryn Haddelund (Grantee). December 29, Book 105 Page 62. On file at the Mahnomen County Recorder's Office, Mahnomen, Minnesota.

Indian Affairs Council of the State of Minnesota
2011 Tribes: White Earth. Electronic document, http://www.indianaffairs.state.mn.us/tribes_whiteearth.html, accessed April 2011.

Koop, Michael
1987a *Becker County Historic Sites Survey.* On file at the Minnesota State Historic Preservation Office, St. Paul, Minnesota.

1987b *Mahnomen County Historic Sites Survey.* On file at the Minnesota State Historic Preservation Office, St. Paul, Minnesota.

Kurtz, Robert M. and Kathryn V. (Grantor)
1953 Warranty Deed No. 198834: Robert M. and Kathryn V. Kurtz (Grantor) and Community Baptist Church of Ponsford (Grantee). October 13, Book 153 Page 487. On file at the Becker County Recorder's Office, Detroit Lakes, Minnesota.

Lake Park Area Historical Society
1976 *People's History of Becker County.* Taylor Publishing Company, Dallas, Texas.

Lathrop, Alan K.
2010 *Minnesota Architects, A Biographical Dictionary.* University of Minnesota Press, Minneapolis, Minnesota.

Luck Land Company (Grantor)
1912 Plat of Waubun Second Addition No. 15913: Luck Land Company (Grantor) and The Public (Grantee). August 30, Book 1 Page 17. On file at the Mahnomen County Recorder's Office, Mahnomen, Minnesota.

1915 Warranty Deed No. 22239: Luck Land Company (Grantor) and Antoine Vauoss, Jr. (Grantee). July 12, Book 27 Page 324. On file at the Mahnomen County Recorder's Office, Mahnomen, Minnesota.

Luttrell, Clifton B.
1973 *The Russian Wheat Deal – Hindsight vs. Foresight.* Federal Reserve Bank of St. Louis, St. Louis, Missouri. Available online at http://research.stlouisfed.org/publications/review/73/10/Russian_Oct1973.pdf.

Machulda, Raymond L. and Mary (Grantor)
1949 Warranty Deed No. 72699: Raymond L. and Mary Machulda (Grantor) and Karl Haddeland (Grantee). August 26, Book 70 Page 190. On file at the Mahnomen County Recorder's Office, Mahnomen, Minnesota.

Mahnomen County
2011 Mahnomen County, Minnesota History. Electronic document, http://www.co.mahnomen.mn.us/history.html, accessed March 2011.

Mahnomen County Historical Society
1991 *Mahnomen County Heritage, written by the people of Mahnomen County, Minnesota.* Mahnomen County Historical Society, Mahnomen, Minnesota.

Maudlin, Reverend Stanislaus
1998 *Short History of Kateri Tekakwitha Conference 1939-1997.* Electronic document, http://www.bluecloud.org/k-tekakwitha.html, accessed April 2011.

McAlester, Virginia and Lee
1991 *A Field Guide to American Houses.* Alfred A. Knopf, New York, New York.

McDonald, Blanche Fabre
1960 *Waubun, Minnesota "Chippewa's Rising Sun."* On file at St. Ann's Catholic Rectory, Waubun, Minnesota.

Minnesota State Historic Preservation Office (SHPO)
1993 Tier II: Post Contact Period Contexts (1837-1945). In *Preserving Minnesota: A Comprehensive Planning Process.* On file at the Minnesota State Historic Preservation Office, St. Paul, Minnesota.

2010 Guidelines for History/Architecture Projects in Minnesota. Minnesota Historical Society, St. Paul, Minnesota.

Narum, Albert J. and wife (Grantor)
1922 Warranty Deed No. 44788: Albert J. Narum and wife (Grantor) and Jacob Wirtz (Grantee). June 23, Book 46 Page 187. On file at the Mahnomen County Recorder's Office, Mahnomen, Minnesota.

National Park Service (NPS)
1983 Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. *Federal Register* 48(190):44716-44740.

1995 *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation.* Government Printing Office, Washington, D.C.

Prosser, Richard S.
1966 *Rails to the North Star, One hundred years of railroad evolution in Minnesota.* Dillon Press, Minneapolis, Minnesota.

Reller, Albert J. and wife (Grantor)
1947 Warranty Deed No. 70208: Albert J. Reller and wife (Grantor) and Raymond L. and Mary Machulda (Grantee). March 25, Book 64 Page 303. On file at the Mahnomen County Recorder's Office, Mahnomen, Minnesota.

St. Ann's Church
1962 *Saint Ann's Church, Waubun, Minnesota, 1912-1963.* On file at St. Ann's Rectory, Waubun, Minnesota.

1980 *Saint Ann's Church, Waubun, Minnesota, 1980.* On file at St. Ann's Rectory, Waubun, Minnesota.

Schmidt, Andrew J., Andrea C. Vermeer, Betsy H. Bradley, and Daniel R. Pratt
2007 *Railroads in Minnesota, 1862-1956 National Register of Historic Places Multiple Property Documentation Form*. Minnesota Historical Society, St. Paul. On file at the Minnesota State Historic Preservation Office, St. Paul.

South Dakota State Historic Preservation Office
2002 *Churches in South Dakota.* South Dakota State Historic Preservation Office, Pierre, South Dakota.

Tekakwitha Conference
2011 *Tekakwitha Conference.* Electronic document, http://www.tekconf.org/index.html, accessed April 2011.

United State Federal Census
1910a *Thirteenth Federal Census of the United States.* Popple Grove, Mahnomen County, Minnesota. Roll T624_710; Page 1A; Enumeration District 0089; Image 64. Accessed online at ancestry.com.

1910b *Thirteenth Federal Census of the United States.* Popple Grove, Mahnomen County, Minnesota. Roll T624_710; Page 1B; Enumeration District 0089; Image 65. Accessed online at ancestry.com.

Vauoss, Antoine, Jr. and wife (Grantor)
1917 Warranty Deed No. 28890: Antoine Vauoss, Jr. and wife (Grantor) and St. Ann's Church (Grantee). October 18, Book 24 Page 188. On file at the Mahnomen County Recorder's Office, Mahnomen, Minnesota.

Waubun Centennial Celebration Committee
2007 *City of Waubun: Celebrating 100 Years. Waubun Centennial Celebration and All School Reunion July 13-17, 2007.* Waubun Centennial Celebration Committee, Waubun, Minnesota.

Watrin, Reverend Benno (compiler)
1930 *The Ponsfordian, 1880-1930.* Press of the Park Rapids Enterprise, Park Rapids, Minnesota.

Wirtz, Alvina (Grantor)
1934 Warranty Deed No. 58137: Alvina Wirtz, widow (Grantor) and E. Ellsworth (Grantee). December 29, Book 53 Page 207. On file at the Mahnomen County Recorder's Office, Mahnomen, Minnesota.

APPENDIX A: MINNESOTA ARCHITECTURE-HISTORY INVENTORY FORMS

APPENDIX B: PROJECT PERSONNEL

LIST OF PERSONNEL

Project Manager	Jennifer Bring, B.A.
Principal Investigator	Saleh Van Erem, M.S.
Field Historians	Saleh Van Erem, M.S. Max Schorman, B.A.
Graphics and GIS	Nathan Moe, B.A.

PHASE I AND II ARCHITECTURAL HISTORY SURVEY AND ASSESSMENT OF EFFECTS STUDY FOR THE WHITE EARTH NATION WIND PROJECT, BECKER AND MAHNOMEN COUNTIES, MINNESOTA

ADDENDUM I

Submitted to:
Western EcoSystems Technology, Inc.

Submitted by:
The 106 Group Ltd.

May 2011

PHASE I AND II ARCHITECTURAL HISTORY SURVEY AND ASSESSMENT OF EFFECTS STUDY FOR THE WHITE EARTH NATION WIND PROJECT, BECKER AND MAHNOMEN COUNTIES, MINNESOTA

ADDENDUM I

SHPO File No. Pending
Client No. Pending
106 Group Project No. 11-05

Submitted by:
The 106 Group Ltd.
The Dacotah Building
37W0 Selby Avenue
St. Paul, MN 55102

Report Author:
Saleh Van Erem, M.S.

May 2011

1.0 INTRODUCTION

During February through April of 2011, The 106 Group Ltd. (106 Group) conducted a Phase I and II architectural history survey and assessment of effects study for the White Earth Nation Wind Project (project). Since the *Phase I and II Architectural History Survey and Assessment of Effects Study for the White Earth Nation Wind Project, Becker and Mahnomen Counties, Minnesota* (Van Erem 2011) report was completed the United States Department of Energy (DOE) and the White Earth Nation have revised the scope of the proposed undertaking. This addendum report was prepared in order to provide a description of the current proposed undertaking and the effect the proposed revisions would have on historic properties. This work was conducted under contract with Western EcoSystems Technology, Inc. on behalf of the White Earth Reservation Tribal Council. This project will be receiving federal funding from the DOE and, therefore, must comply with Section 106 of the National Historic Preservation Act of 1966 (Section 106), as amended, as well as the National Environmental Policy Act (NEPA).

The current project areas are located in Section 30, T143N, R41W; Sections 25, 36, T143N, R42W; and Section 21, T144N, R39W of Mahnomen County, Minnesota (Figure 1). According to information provided by Western EcoSystems Technology on May 17, 2011, the Pine Point project area that was surveyed and documented in the original report is being eliminated and the wind turbines at the two remaining project areas (Waubun and Naytahwaush) are being lowered from a previous maximum height of 260 feet to a height ranging between 105 to 187 feet tall. Three sizes of wind turbines are being considered at the two remaining project areas: a 10 kilowatt (kW), 40 kW,

and 300 kW wind turbine. The wind turbines will be installed on self-supporting monopole or lattice towers and the holes for the turbine bases would be excavated with a large backhoe or similar heavy equipment. The hub heights would range from 80 to 160 feet above ground level, and the total height would range from 105 to 187 feet, depending on the size used. The Waubun site consists of three subsites (see Figure 1). Up to four turbines are proposed to be constructed within the two project areas, either all four within the Waubun site or three within the Waubun site and one at the Naytahwaush site.

The APE for architectural history accounts for any physical, auditory, or visual impacts to historic properties. The greatest potential for the proposed project to indirectly effect historic properties would be visual. For wind farm projects, the Minnesota SHPO suggests that the APE should vary depending on the height and location of the towers. As suggested by the SHPO, using the guidelines provided in the *Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission* (FCC 2004), for towers 200 feet or less in overall height, an APE of 0.5 miles is recommended. A larger APE may be required if a tower(s) is located in a prominent location, such as on top of a hill or bluff, where it is more visually prominent (Mary Ann Heidemann, personal communication 2011). None of the project areas are located in a prominent location and, therefore, the recommended current APE for architectural history is 0.5 miles around both of the Waubun and Naytahwaush project areas. The previous Phase I and II architectural history survey was conducted within a 0.75 mile APE because wind turbines of up to 260 feet in height were proposed. The original survey encompassed approximately 6,094 acres (2,466.15 hectares [ha]) (Van Erem 2011). The current APE covers approximately 2,428.5 acres (982.79 ha), all of which was included in the previous Phase I and II architectural history survey (Figures 2-3).

THE 106 GROUP LTD.
370 SELBY AVE, STE 206
ST. PAUL, MN 55102

July 28, 2011

Mary Ann Heidemann, Manager
Government Programs and Compliance
State Historic Preservation Office
Minnesota Historical Society
345 Kellogg Boulevard West
St. Paul, MN 55102

Re: *White Earth Nation Wind Energy Project – Architecture-History Inventory Forms*
Mahnomen and Becker Counties, Minnesota
Minnesota SHPO Number: 2011-1733

Dear Ms. Heidemann,

As requested in your letter dated July 22, 2011, concerning the White Earth Nation Wind Energy Project II (SHPO No. 2011-1733), please find enclosed the architecture-history inventory forms for properties surveyed during the Phase I and II architectural history investigation.

As indicated by the U.S. Department of Energy (DOE) in their letter dated June 10, 2011, a Phase I and II architectural history survey and assessment of effects study was completed in April 2011. Subsequent to completion of that survey, the proposed project was modified to drop the Pine Point site from consideration and reduce the height of the proposed turbines at the Naytahwaush and Waubun sites. Based on the reduced height of the proposed turbines, the area of potential effect (APE) was reduced from 0.75 miles to 0.5 miles, which you have concurred with. Since the Phase I and II architectural history survey for the larger APE had already been completed, including inventory forms with associated SHPO inventory numbers, an addendum report was prepared to document the changes to the proposed project and their potential effects on properties listed in or eligible for listing in the National Register within the revised APE.

Therefore, since the original Phase I and II survey and inventory forms were completed all forms are enclosed with this letter; however, they have been separated to clearly identify which properties are within the revised (smaller) APE, and which were documented in the original survey but are no longer within the revised APE.

Hopefully this provides you with the additional documentation you requested. However, if you have any questions or need additional information to facilitate your review, please feel free to contact Laura Margason at the DOE.

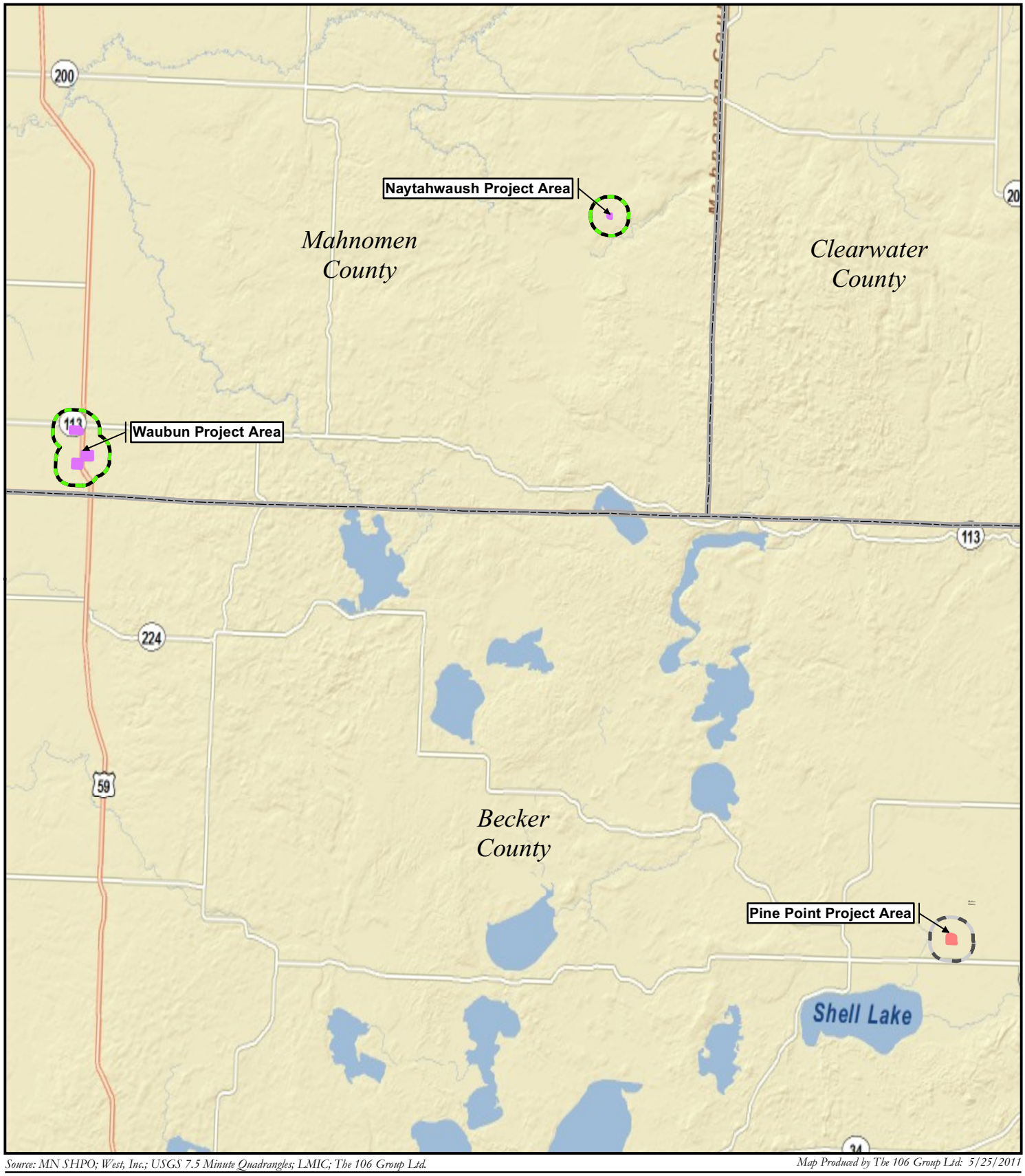
Sincerely,

THE 106 GROUP LTD.

Jennifer Bring
Senior Cultural Resources Planner/Project Manager

Enclosures: Architecture-History Inventory Forms for the Revised (Smaller) APE
Architecture-History Inventory Forms No Longer within the Revised APE

CC: Laura Margason, Department of Energy
Elizabeth Lack, WEST



Source: MN SHPO; West, Inc.; USGS 7.5 Minute Quadrangles; LMIC; The 106 Group Ltd.

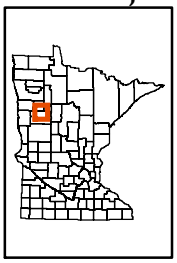
Map Produced by The 106 Group Ltd: 5/25/2011

White Earth Nation Wind Project
Phase I and II Architectural History Survey
and Assessment of Effects Study
Addendum I
Becker and Mahnomen Counties
Minnesota

0 2.5 5
Kilometers
Miles
0 2.5 5
1:240,000

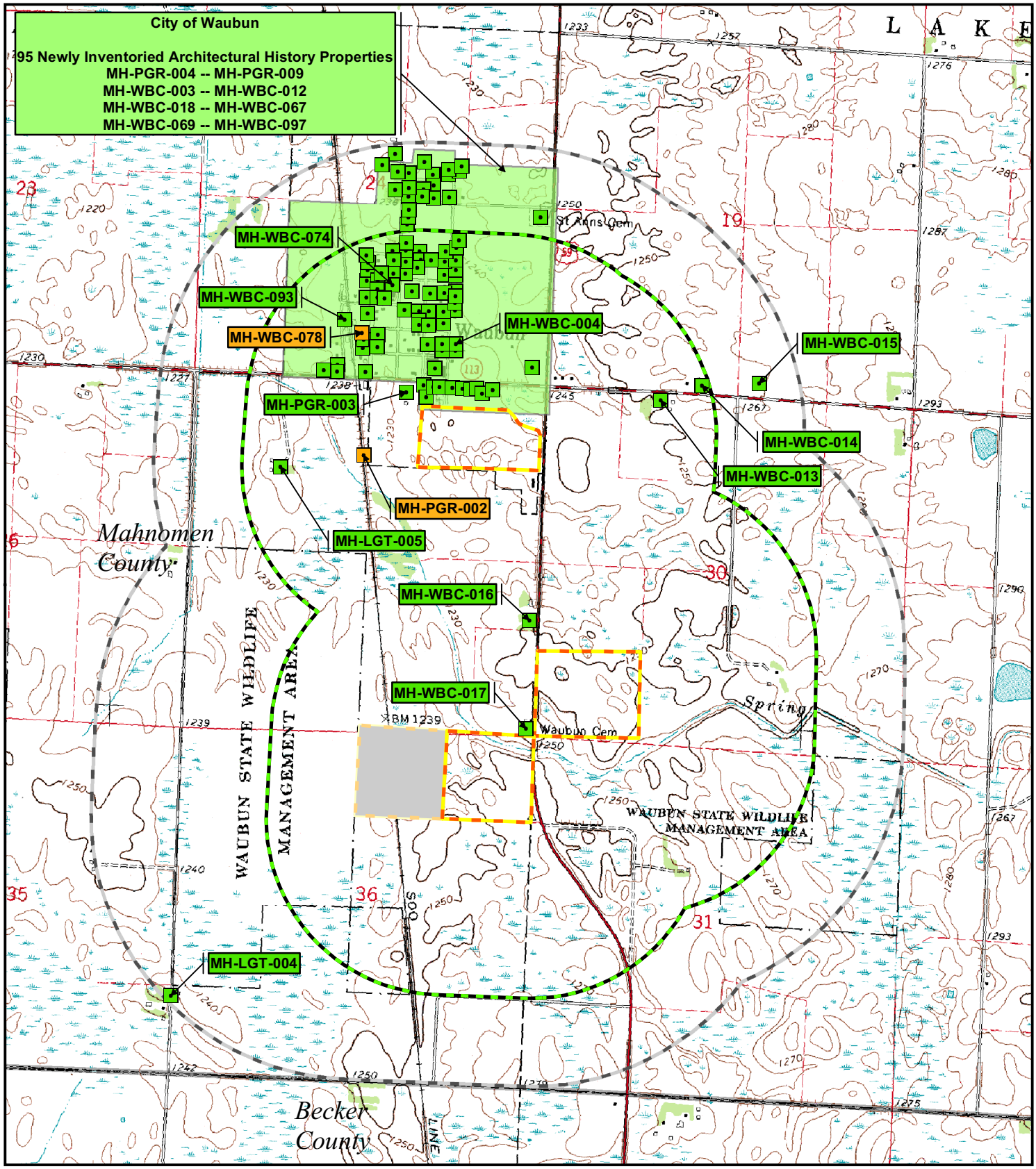
- Current Proposed Project Area
- Previous Proposed Project Area
- Current Architectural History Area of Potential Effect
- Previous Architectural History Area of Potential Effect

Project Overview



N

Figure 1



Source: MN SHPO; West, Inc.; USGS 7.5 Minute Quadrangles; LMIC; The 106 Group Ltd.

Map Produced by The 106 Group Ltd: 5/25/2011

White Earth Nation Wind Project
Phase I and II Architectural History Survey
and Assessment of Effects Study
Addendum I
Becker and Mahnomen Counties
Minnesota

Architectural History Results - Waubun

0 350 700 Meters

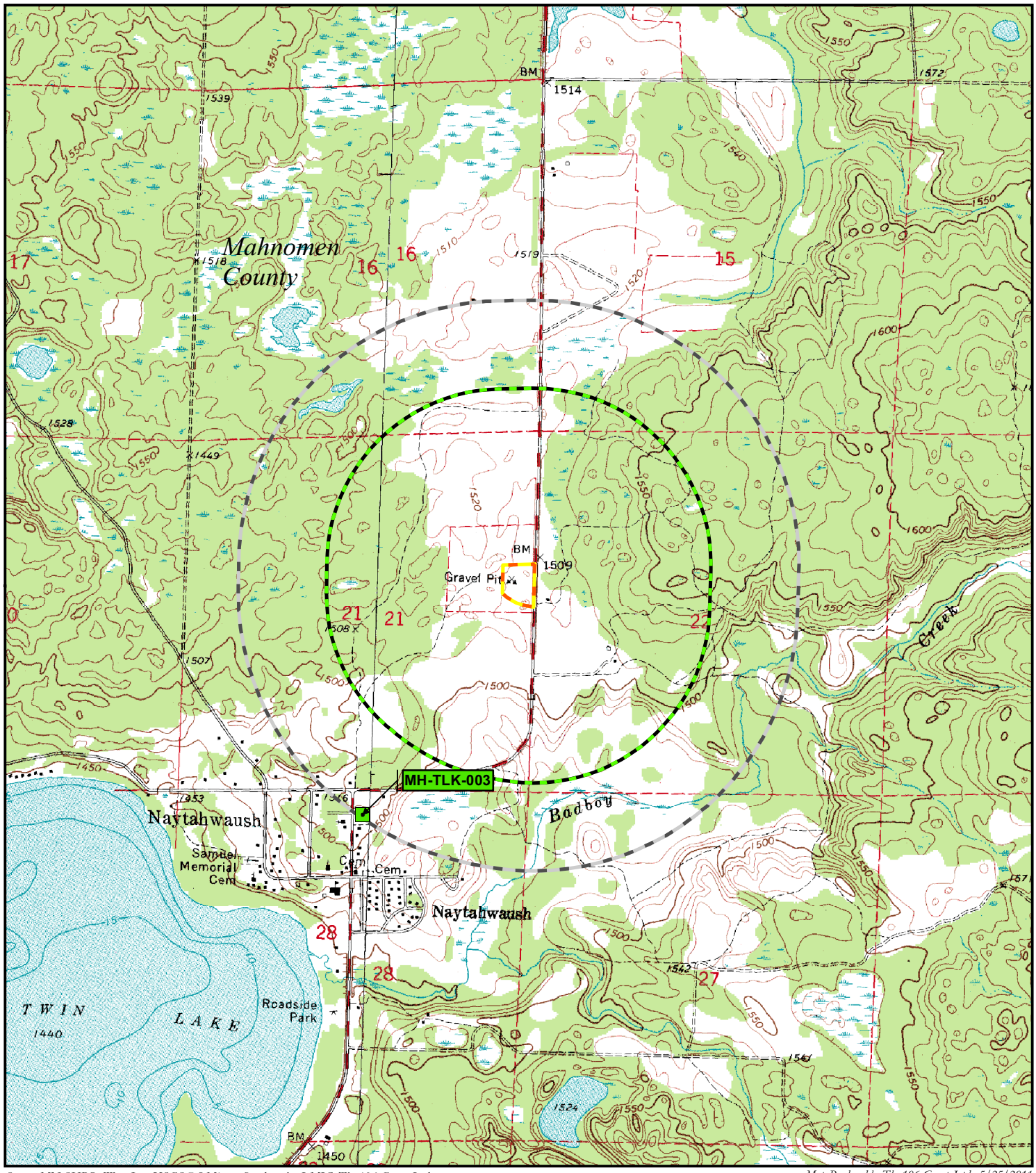
0 1,300 2,600 Feet

1:24,000

- Current Project Area
- Previous Portion of the Project Area
- Current Architectural History Area of Potential Effect
- Previous Architectural History Area of Potential Effect
- Eligible Architectural History Property
- Not Eligible Architectural History Property

N

Figure 2



Source: MN SHPO; West, Inc.; USGS 7.5 Minute Quadrangles; LMIC; The 106 Group Ltd.

Map Produced by The 106 Group Ltd: 5/25/2011

White Earth Nation Wind Project
Phase I and II Architectural History Survey
and Assessment of Effects Study
Addendum I
Becker and Mahnomen Counties
Minnesota

Architectural History Results - Naytahwaush

0 400 800
Meters
Feet
0 1,400 2,800

1:24,000

- Current Project Area
- Current Architectural History Area of Potential Effect
- Previous Architectural History Area of Potential Effect
- Not Eligible Architectural History Property

N

Figure 3

2.0 RESULTS AND RECOMMENDATIONS

2.1 RESULTS

During the previous Phase I architectural history survey, the 106 Group identified 127 architectural history properties 50 years of age or older within the APE for the three previously proposed project areas. Of these 127 properties, seven were previously inventoried and 120 were newly identified architectural history properties. One of the properties (MH-PGR-002) was a newly identified segment of a previously determined eligible railroad corridor (see Figure 2). Seven of the 127 properties were recommended as *potentially* eligible for listing in the NRHP. The remaining 120 properties are recommended not eligible for listing in the NRHP due to a lack of historical significance and/or loss of integrity. Following the Phase I investigation, a Phase II architectural history evaluation was conducted for the seven *potentially* eligible properties. During the Phase II evaluation, four of the properties were recommended as eligible for listing in the NRHP, one within the Waubun APE (MH-WBC-078) and three within the Pine Point APE (BK-CAR-007, BK-PNP-001, and BK-PNP-007). Therefore, an assessment of effects study was conducted for the four recommended eligible properties and the previously determined eligible railroad corridor (Van Erem 2011).

Revisions to the project undertaking have eliminated the Pine Point project area from consideration and lowered the height of the proposed wind turbines, therefore requiring a slightly smaller APE. All architectural history properties 50 years of age or older within the current APE were previously documented during the Phase I and II architectural history survey (see Figures 2-3).

2.2 EFFECTS

Revisions to the project undertaking have eliminated the Pine Point project area from consideration; therefore, there will be no effect to the three recommended eligible properties within the Pine Point APE (BK-CAR-007, BK-PNP-001, and BK-PNP-007). Therefore, this addendum focuses on the potential effects to the two remaining eligible properties within the Waubun APE (MH-WBC-078 and MH-PGR-002).

The current proposed project will have temporary direct and indirect effects and permanent indirect visual effects on the MStP&SSM / Soo Line / CP Railway (MH-PGR-002) and the Golden Rule Store (MH-WBC-078). There will be temporary increases in noise and vibration, and possible effects to the air quality during construction and operation of the proposed project; however these effects are not anticipated to adversely affect these properties. There will also be permanent indirect visual effects to the properties from the proposed project that will slightly change their integrity of setting and feeling (Van Erem 2011). However, the proposed wind turbines will not compromise the ability of the MStP&SSM / Soo Line / CP Railway (MH-PGR-002) to convey its sense of direction, which is a primary characteristic of a linear corridor to convey its significance. The turbines will introduce an out-of-scale feature to the general rural landscape along this stretch of the railroad line; however, this segment is only a small portion of a much longer historic resource and, given that the proposed turbine will only be visible from this short stretch, potential effects to this small portion of the line will be negligible to the larger whole.

As for the Golden Rule Store (MH-WBC-078), the proposed construction of up to four wind turbines southeast of the building will be visible from the historic property. The turbines will be visible due to the relatively flat topography and lack of significant mature trees between the nearest project area and the building. Given the overall larger height of the proposed wind turbines compared to the existing buildings and structures that surround the commercial building, the proposed turbines will result in a new out-of-scale element being introduced into the landscape, causing a visual effect to the Golden Rule Store. The proposed turbines will alter some of the views to and from the building, thereby slightly affecting the integrity of the small town setting and feeling of the store. The nearest proposed wind turbine will be located more than a half mile from the building (approximately 2,685 feet away). The potential visual impact will be minimized since the perceived comparative height on the horizon will be reduced given the distance between the property and the proposed turbines, as well as the reduced proposed height of the turbines. In addition, the turbines will occupy only a small portion of the views to and from the building and they will not impact any significant view to and from the property. The proposed wind turbines will not affect the integrity of materials, design, workmanship, location, or association of the commercial building. Moreover, the significance of the building is due to its associations with commerce. Therefore, the proposed wind turbines will not compromise the ability of the Golden Rule Store to convey its historical significance as the only known extant general store in Waubun and as a surviving commercial building with the best integrity of any buildings that date to the town's development period.

Based on this analysis, it is recommended that the proposed project will have no adverse effect on the MStP&SSM / Soo Line / CP Railway (MH-PGR-002) and the Golden Rule Store (MH-WBC-078).

3.0 REFERENCES

Federal Communications Commission (FCC)

2004 *Nationwide Programmatic Agreement for the Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission*. Electronic document, Federal Communications Commission website, http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-222A3.pdf, accessed January 25, 2010.

Van Erem, Saleh

2011 *Phase I and II Architectural History Survey and Assessment of Effects Study for the White Earth Nation Wind Project, Becker and Mahnomen Counties, Minnesota.* Prepared by the 106 Group Ltd., St. Paul, Minnesota. Submitted to Western EcoSystems Technology, Inc., Cheyenne, Wyoming.

1.1.1.1.1.1.1.4 APPENDIX D: FARMLAND IMPACT RATING FORM

WEST Inc.
Environmental & Statistical Consultants

NATURAL RESOURCES • SCIENTIFIC SOLUTIONS

December 1, 2010

Mahnomen Service Center
200 N U.S. Highway 59
Mahnomen, MN 56557

Dear Sir or Madam;

The White Earth Nation has requested federal funds through the Department of Energy (DOE) for a wind energy project, which could include up to eight wind turbines at four different sites in Mahnomen County, as well as one turbine at a site in Becker County. Prior to making a funding decision, the DOE must evaluate the environmental effects of the project in an Environmental Assessment (EA). Our firm, WEST Inc., is assisting in preparation of the EA.

As part of the analysis in the EA, we are evaluating effects of farmland conversation and request your assistance with the enclosed "Farmland Conversion Impact Rating" form. I have filled out the "Federal Agency" portions to the best of my abilities and have included the background material I used for reference. I have also included an overview map and a detail map of each of the four sites in Mahnomen County, labeling them Sites A – D.

Per Step 3 of the instructions, please make a determination as to whether the sites contain prime, unique, statewide or local important farmland. Please return the original form to me within 10 working days to the address below and retain a copy for your records. If you have any questions, please do not hesitate to call or email me.

Elizabeth Lack
WEST Inc.
2001 Central Ave.
Cheyenne, WY 82001
307-632-3117
elack@west-inc.com

Thank you very much in advance for you assistance.

Sincerely,

Elizabeth Lack

cc: Laura Margeson, project manager, DOE
Mike Tripplet, project manager, White Earth Nation

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)		Date Of Land Evaluation Request	21 January 2011
Name Of Project	White Earth Wind Energy Project II	Federal Agency Involved	Department of Energy
Proposed Land Use		County And State	Becker, MN
PART II (To be completed by NRCS)		Date Request Received By NRCS	1/25/11

Does the site contain prime, unique, statewide or local important farmland? (If no, the FPPA does not apply -- do not complete additional parts of this form).	Yes ☒	No ☐	Acres Irrigated —	Average Farm Size 329
Major Crop(s): Corn, Spring Wheat	Farmable Land In Govt. Jurisdiction Acres: 604,896 % 72		Amount Of Farmland As Defined in FPPA Acres: 579,059 % 62	
Name Of Land Evaluation System Used: Minnesota Crop Productivity Index	Name Of Local Site Assessment System: —		Date Land Evaluation Returned By NRCS: 2/9/11	

PART III (To be completed by Federal Agency)	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	0.3			
B. Total Acres To Be Converted Indirectly	1			
C. Total Acres In Site	~~0.0~~ 37	0.0	0.0	0.0
PART IV (To be completed by NRCS) Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	—			
B. Total Acres Statewide And Local Important Farmland	0.3			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.0001			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	73.1%			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)	~~0~~ 49	0	0	0

PART VI (To be completed by Federal Agency) Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b)	Maximum Points				
1. Area In Nonurban Use	15	14			
2. Perimeter In Nonurban Use	10	5			
3. Percent Of Site Being Farmed	20	0			
4. Protection Provided By State And Local Government	20	0			
5. Distance From Urban Builtup Area	15	0			
6. Distance To Urban Support Services	15	0			
7. Size Of Present Farm Unit Compared To Average	10	0			
8. Creation Of Nonfarmable Farmland	10	0			
9. Availability Of Farm Support Services	5	3			
10. On-Farm Investments	20	0			
11. Effects Of Conversion On Farm Support Services	10	0			
12. Compatibility With Existing Agricultural Use	10	1			
TOTAL SITE ASSESSMENT POINTS	160	~~0~~ 23	0	0	0
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)	100	0	0	0	0
Total Site Assessment (From Part VI above or a local site assessment)	160	~~0~~ 23	0	0	0
TOTAL POINTS (Total of above 2 lines)	260	~~0~~	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☑

Reason For Selection:

(See Instructions on reverse side)

Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff

1.1.1.1.1.1.1.5 APPENDIX E: SITE CHARACTERIZATION REPORT

Site Characterization Study
White Earth Energy Project II
Mahnomen and Becker Counties, Minnesota

Prepared for:

White Earth Nation

Prepared by:

Elizabeth Lack, Clayton Derby, and Luke Martinson

Western **E**co**S**ystems **T**echnology, Inc.

2003 Central Avenue
Cheyenne, Wyoming

February 2010

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1.0 Introduction

At the request of the White Earth Nation (White Earth), Western EcoSystems Technology Inc. (WEST) has prepared this Site Characterization Study (SCS) for the proposed White Earth Wind Energy Project II. The project consists of four separate sites: Mahnomen, Waubun, and Naytahwaush sites in Mahnomen County, and Pine Point site in Becker County, Minnesota (Figure 1.0-1). White Earth proposes to put a wind turbine for power generation at each of the four sites; the turbine size will be between 33 and 300 kilowatts (KW).

This Site Characterization Study was conducted to evaluate each of the four sites for a variety of resources that could affect, or be affected by, the proposed wind energy project. Specifically, this SCS include evaluation of the following components:

- Evaluation of site maps to identify and characterize key resources and land cover descriptions at each site;
- Identification of documented aquatic resources potentially subject to U.S. Army Corps of Engineers permitting, including wetlands, lakes, rivers, and streams;
- Identification of recorded cultural and/or historic resources within each site boundary;
- Characterization of avian and bat species potentially affected by the project;
- Evaluation of other sensitive or protected biological resources potentially affected by the project, including state and federally listed terrestrial, aquatic, and herbaceous species;
- Identification of potential communication, radar, and aviation related issues.

2.0 Methods

The evaluation area for each site included the four sites identified by White Earth for development plus a ¼ mile buffer around each site boundary. For most resources, each site was characterized and the results are reported for each site individually. Other resources are described collectively. For example, since wildlife, and in particular birds and bats, are mobile and generally have broad ranges in which they occur (e.g. to feed, migrate, etc), wildlife resources were evaluated and reported at a broader, regional scale encompassing the four sites. Similarly, communication, radar, and aviation issues are described collectively.

Data for this SCS were collected from an onsite field visit and from a variety of exiting sources. The field visit was conducted on November 20, 2009 by Clayton Derby of WEST and Mike Triplett of the White Earth Nation. The field visit included an evaluation of existing habitat at each site, potential for avian migratory pathways, and a search for raptor nests, prey populations, and other biological resources. Wildlife observations were recorded. Photographs of each site were taken during the visit (Appendix A).

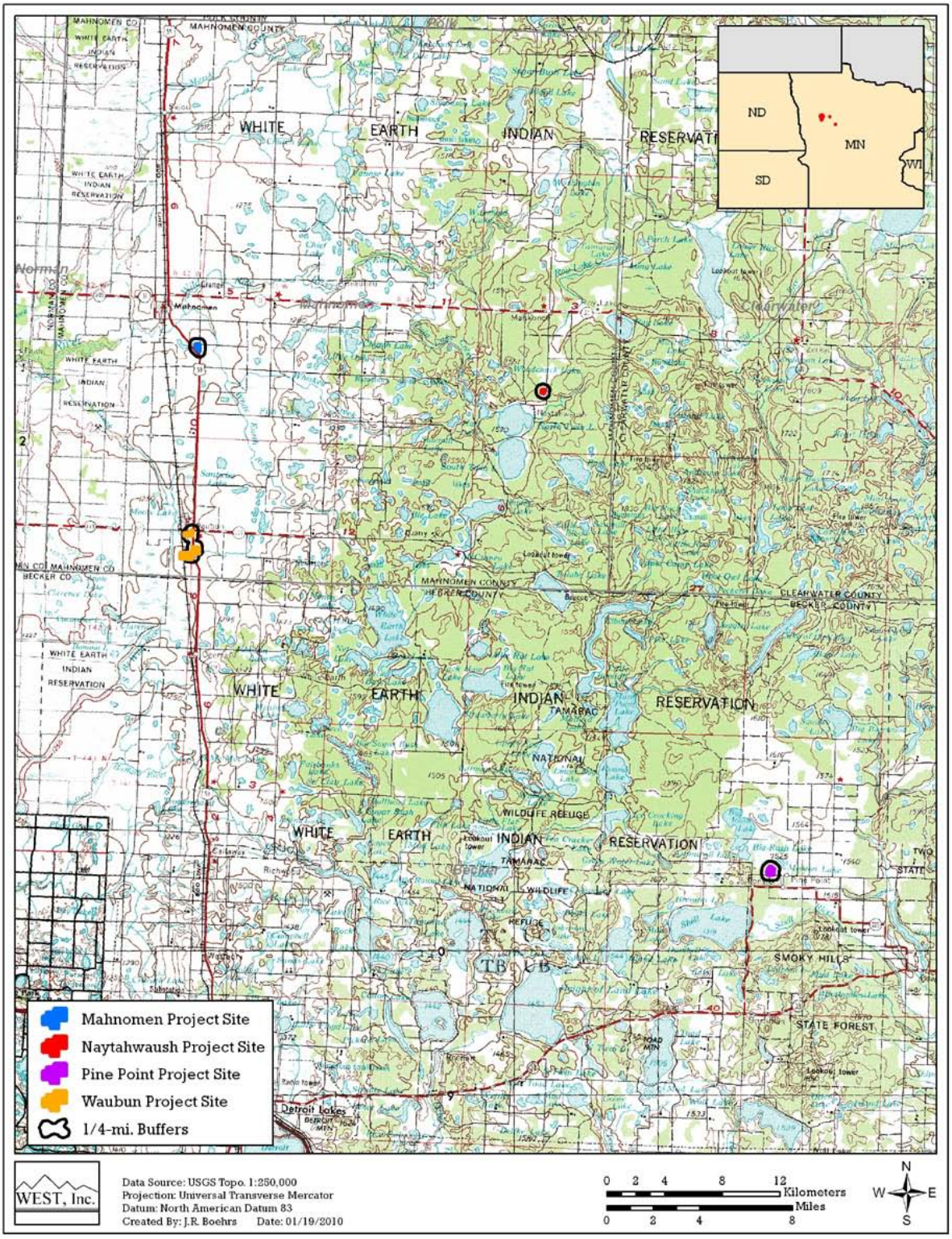


Figure 1.0-1 White Earth Energy Project II Overview

A "desktop" analysis of each site was also conducted based on a wide range of existing data. This analysis included a GIS mapping task that consisted of a review of topographic maps, aerial photographs, elevational maps, land cover maps from Minnesota GAP database, and National Wetland Inventory (NWI) maps for each site evaluation area. Existing regional water resources and U.S. Geological Survey (USGS) Breeding Bird Survey (BBS) routes were also mapped regionally. In addition, data was requested from the U.S. Fish and Wildlife Service (USFWS) and the Minnesota Department of Natural Resources (MNDNR) for a review of the proposed site locations and information concerning potentially impacted significant species. Other data resources consulted include:

- U.S. Environmental Protection Agency's (EPA) ecoregion descriptions;
- MNDNR's ecological classification system and wildlife database;
- wildlife management area locations;
- native prairie locations;
- USFWS endangered species review;
- Audubon's Important Bird Areas of Minnesota;
- the National Register of Historic Places online database;
- the Federal Aviation Administration's online "Radar Pre-Screening Tool";
- USGS Birding Bird Survey database;
- Bat Conservation International (BCI) database; and
- general a literature review.

3.0 Individual Site Descriptions

3.1 Mahnomen Site

3.1.1 Setting

The Mahnomen site encompasses approximately 25 acres of tribal lands on the White Earth Reservation in Mahnomen County, Minnesota, two miles southeast of the town of Mahnomen along Highway 59 (Figure 3.1-1). A railroad line runs through the town of Mahnomen, approximately 1.5 miles west of the site.

The site is located in the North Central Hardwoods ecoregion (USEPA 2007), characterized as a transitional area between the predominantly forested Northern Lakes and Forests to the north and the agricultural ecoregions to the south.

The MNDNR further classifies the site as on the eastern edge of the Red River Prairie subsection, a subunit within their ecological classification system (MNDNR 2010). Historically, the tallgrass prairies were found to the west and the northern hardwood forests to the east. The Red River Prairie subsection is characterized by a glacial lake plain with silty, sandy, and clayey lake deposits. It is generally level and uniform, broken by wetlands, meandering waterways, and old beach ridges. This subsection drains to the north into Canada via the Red River and its

tributaries. Flooding is common in the spring due to the level topography. Tallgrass and wet prairie were the dominant vegetation prior to settlement. Native flora exists in patches, but much of the subsection has been ditched and drained for agriculture.

Currently, the project site consists of restored grassland and is enrolled in the Environmental Quality Improvement Program (EQIP) funded by the Natural Resource Conservation Service (NRCS). The EQIP program provides incentives to landowners for conservation of farmed lands (NRCS 2009). Species diversity appears to be high, with a mix of grasses and forbs with moderate shrub cover. The area surrounding the project site consists of tilled fields (Figure 3.1-2; Appendix A – Photographs). The site is generally flat with some areas of gently rolling hills. Elevation at the site is approximately 1,200 feet (370 m) above mean sea level (MSL); land to the east contains more topographic relief (Figure 3.1-3).

3.1.2 Land Cover

According to the Minnesota Gap Analysis Program (GAP), which provides land cover data, the 23.43-acre Mahnomen site is composed primarily of cropland (98.5%; Table 3.1-1, Figure 3.1-4). The remainder of the area consists of lowland shrub. Since the GAP data was compiled, the site has been restored to grassland under the EQIP program.

The broader evaluation area (¼ mile buffer surrounding the site boundary) includes areas of marsh (8.0%), grassland (2.4%), and lowland shrub (0.4%), though the dominant land cover type is cropland (89.2%; Table 3.1-1; Figure 3.1-4).

Table 3.1-1
Land Cover Types – Mahnomen Site

	Site		Evaluation Area	
Land cover Type	Acres	% Composition	Acres	% Composition
Cropland	23.43	98.5%	251.87	89.2%
Grassland	0.00	0.0%	6.78	2.4%
Lowland Shrub	0.36	1.5%	1.11	0.4%
Marsh	0.00	0.0%	22.57	8.0%
Total	**23.79**	**100.0%**	**282.34**	**100.0%**

3.1.3 Waterbodies and Wetlands

Based on NWI mapping, there are no waterbodies or wetlands within the Mahnomen site itself; however, these features are found in the larger evaluation area, including 26.92 acres of emergent wetlands on the eastern edge of the site, 2.24 acre of pond, and 0.34 acre of forested/shrub wetland (Table 3.1-2; Figure 3.1-5). Beyond the evaluation area, the White Earth River is located within one mile to the east of the site and the White Earth River flows into the Wild Rice River; the confluence of these two rivers is approximately one mile northwest of the site (Figure 3.1-1). In addition, the Mahnomen sewer lagoons are located approximately 1.5 miles west of the site (Figure 3.1-1).

Table 3.1-2
Wetlands - Mahnomen Site

	Project Area		Evaluation Area	
Wetland Type	**Acres**	**% Comp.**	**Acres**	**% Comp.**
Emergent Wetland	0	0	26.92	90.0
Forested/Shrub Wetland	0	0	0.34	0
Pond	0	0	2.24	10.0
Total	**0**	**0**	**29.50**	**100**

3.1.4 Cultural Resources

A review of the National Registrar of Historic Places online database did not show any registered sites within the Mahnomen site or evaluation area. Three sites were located within the town of Mahnomen, approximately two miles northwest of the site. Further cultural resource searches will be completed at a later date by a White Earth representative.

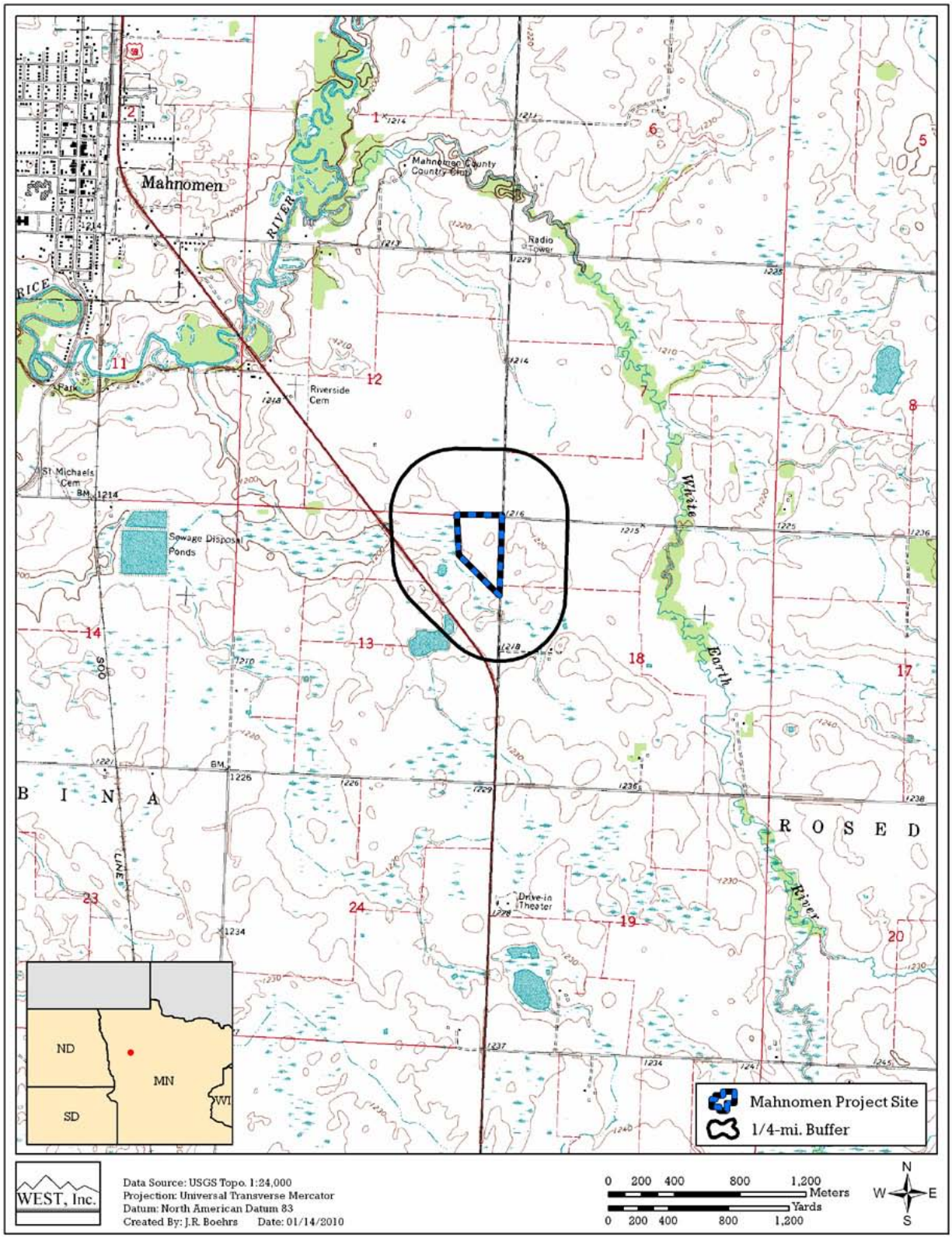


Figure 3.1-1 Mahnomen Topography

Figure 3.1-2 Mahnomen Aerial Photo

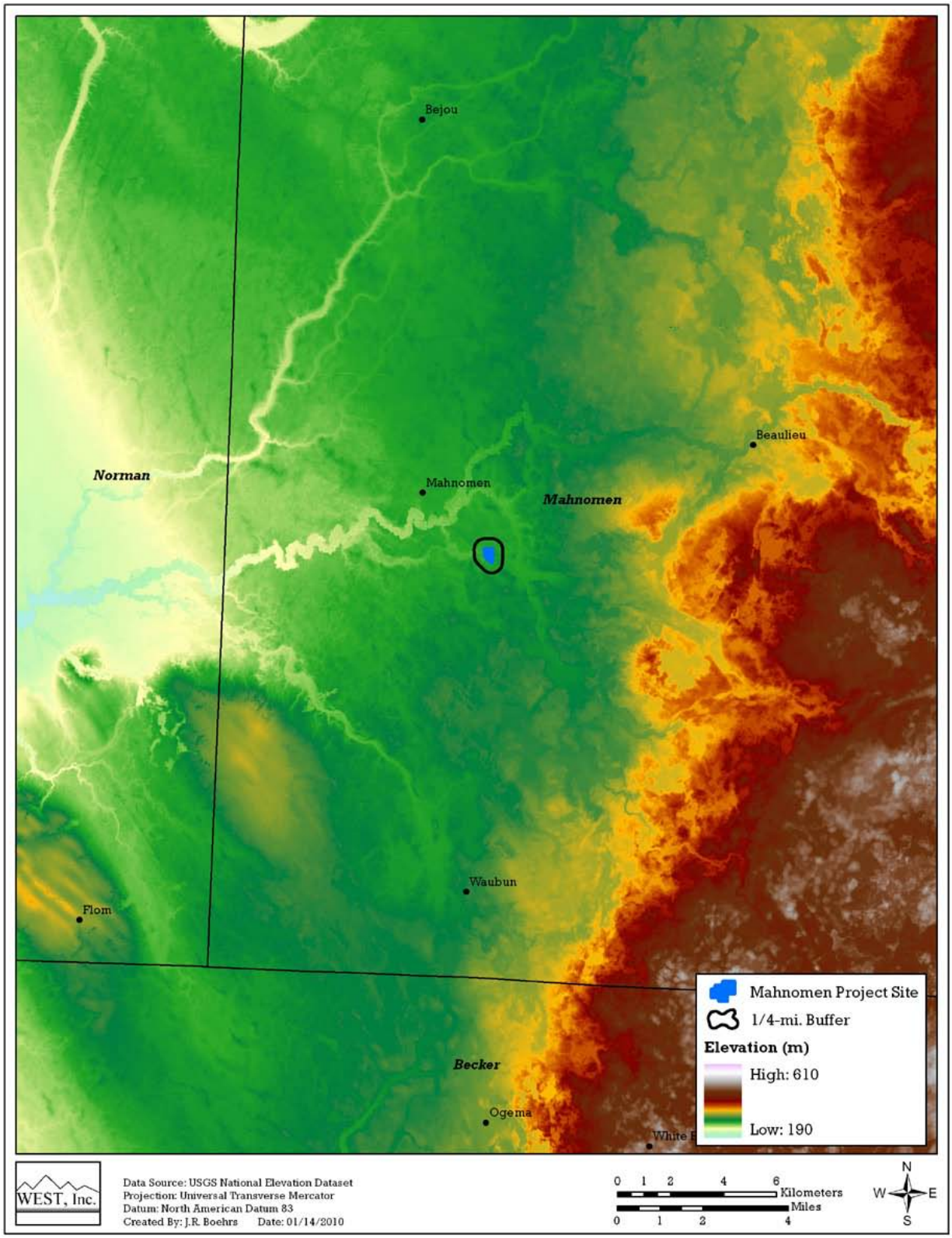


Figure 3.1-3 Mahnomen Elevation

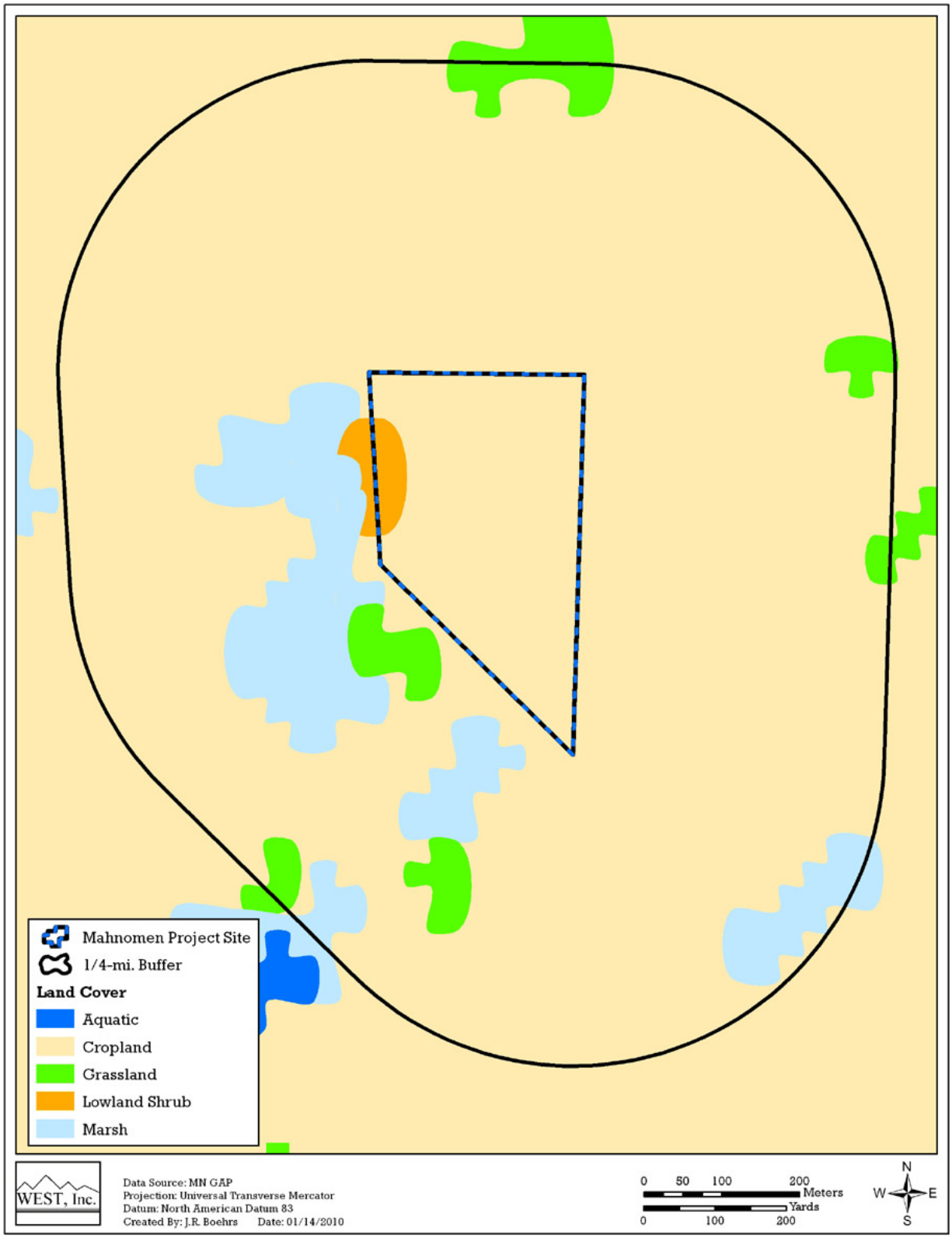


Figure 3.1-4 Mahnomen Land Cover

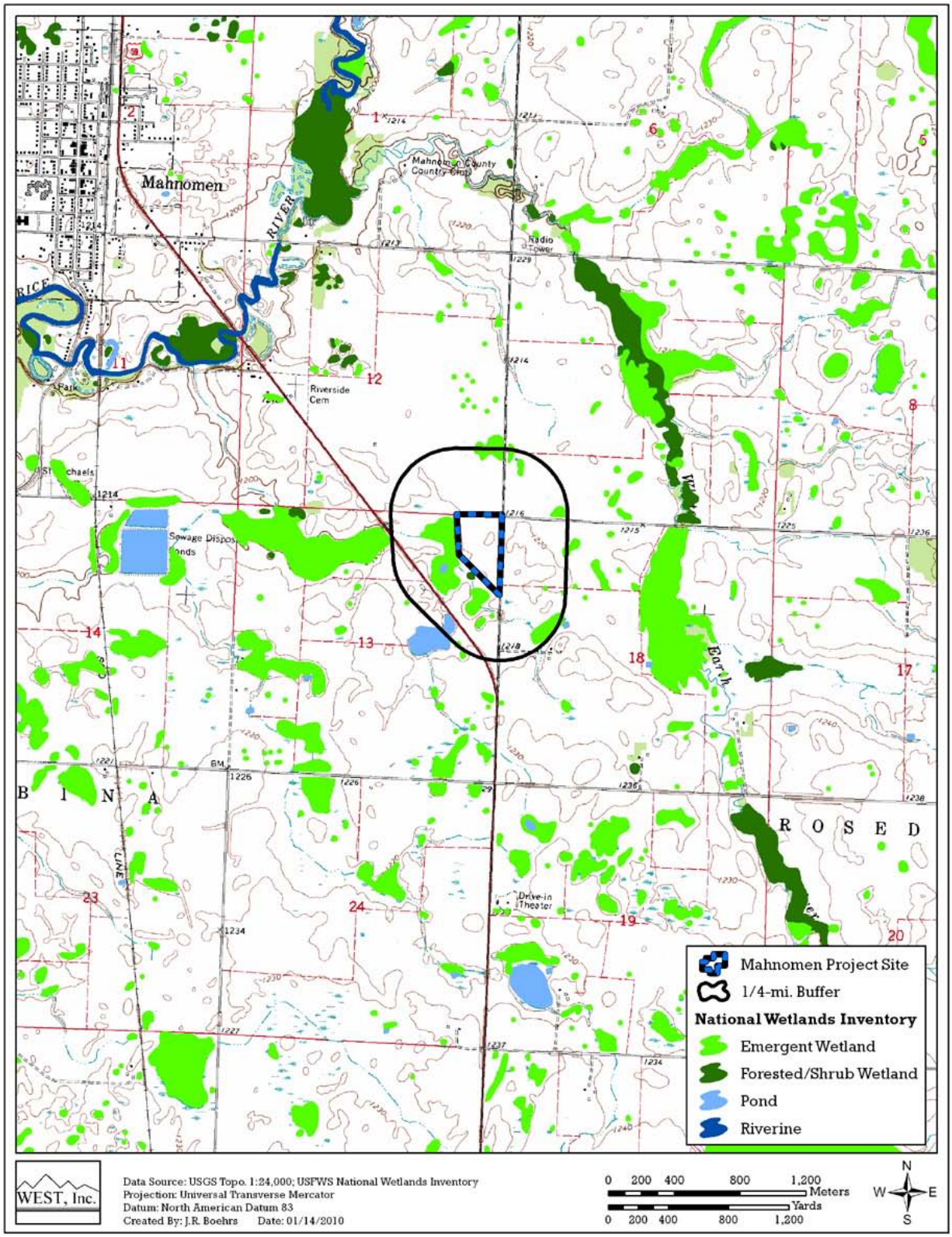


Figure 3.1-5 Mahnomen Wetlands

3.2 Waubun Site

3.2.1 Setting

The Waubun site encompasses three separate sites (A, B, and C) totaling 145.47 acres of tribal lands on the White Earth Reservation in Mahnomen County, Minnesota, 1.5 miles southeast of the town of Waubun along Highway 59 (Figure 3.2-1).

The Waubun site is located in the North Central Hardwoods ecoregion (USEPA 2007), characterized as a transitional area between the predominantly forested Northern Lakes and Forests to the north and the agricultural ecoregions to the south.

Like the Mahnomen site, the Waubun site is on the eastern edge of the Red River Prairie subsection, a subunit of MNDRN's ecological classification system (MNDNR 2010). This subsection is described above in Section 3.1.1.

Currently, the project sites consist of previous or existing agricultural lands (Figure 3.2-2; Appendix A – Photographs). Site A, located south of an existing electrical substation, is an agricultural field that was planted in soybeans in 2009. Site B is partially developed and contains a transfer station, lumber yards, and garbage transfer station. The site was previously used as a saw mill and now contains significant debris. The eastern part of the site had been enrolled in the Conservation Reserve Program (CRP). CRP is a NRCS program that encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. The site was tilled in the fall of 2009, however, indicating it is no longer in CRP. Site C primarily consists of maintained fields, but also includes the tribal housing authority office and a road crosses through the western part of the site. The overall area is generally flat with some areas of gently rolling hills. Elevation at the sites average approximately 1,250 feet (400 m) above mean sea level (MSL); land to the east contains more topographic relief (Figure 3.2-3).

3.2.2 Land Cover

According to the Minnesota GAP, the 145.47-acre Waubun site (including the three sub-sites) is composed primarily of cropland (81.0%; Table 3.2-1, Figure 3.2-4). The remainder of the area consists of grassland, lowland shrub, and marsh. Sites A and B are nearly 100% cropland, while site C transitions from cropland in the east to a mix of grassland, marsh, and lowland shrub habitat in the western half. The Minnesota GAP data are from 1993, and as described above in Section 3.2.1, conditions have changed somewhat at some of the sub-sites. For example, Sites B and C have some development and Site C is no long used as cropland.

According to the Minnesota GAP data, the broader evaluation area (¼ mile buffer surrounding the site boundary) is dominated by cropland (58.5%), but also contains grasslands (18.5%), marsh (15.6%), developed (4.6%), lowland shrub (1.7%), and aquatic (1.2%; Table 3.2-1; Figure 3.2-4).

Table 3.2-1
Land Cover Types – Waubun Site

	Site		Evaluation Area	
Land cover Type	Acres	% Composition	Acres	% Composition
Aquatic	0	0	10.67	1.2%
Cropland	117.81	81.0%	541.94	58.5%
Developed	0	0	42.44	4.6%
Grassland	15.59	10.7%	171.03	18.5%
Lowland Shrub	3.87	2.7%	15.66	1.7%
Marsh	8.20	5.6%	143.98	15.6%
Total	**145.47**	**100.0%**	**925.73**	**100.0%**

3.2.3 Waterbodies and Wetlands

According to NWI mapping, there are 18.19 acres of emergent wetland and 0.96 acres of forested/shrub wetlands within the three proposed sites. The majority of wetlands are within sites B and C; only a small percentage of emergent wetland is designated within site A. A much larger coverage of wetland and other waterbodies are found within the evaluation area including 236.33 acres of emergent wetlands, 10.78 acres of pond, and 3.49 acres of forested/shrub wetland (Table 3.2-2; Figure 3.2-5). Sewer lagoons are located directly south of site A (Figure 3.2-2), making up the majority of pond wetlands within that evaluation area. An extensive marsh system is located in the surrounding region outside of the project/evaluation area.

Table 3.2-2
Wetlands - Waubun Site

	Project Area		Evaluation Area	
Wetland Type	**Acres**	**% Comp.**	**Acres**	**% Comp.**
Emergent Wetland	18.19	95.0%	236.33	94.3%
Forested/Shrub Wetland	0.96	5.0%	3.49	1.4%
Pond	0	0	10.78	4.3%
Total	**19.15**	**100.0%**	**250.60**	**100.0%**

3.2.4 Cultural Resources

A review of the National Registrar of Historic Places online database did not show any registered sites within the Waubun site or evaluation area. Further cultural resource searches will be completed at a later date by a White Earth representative.

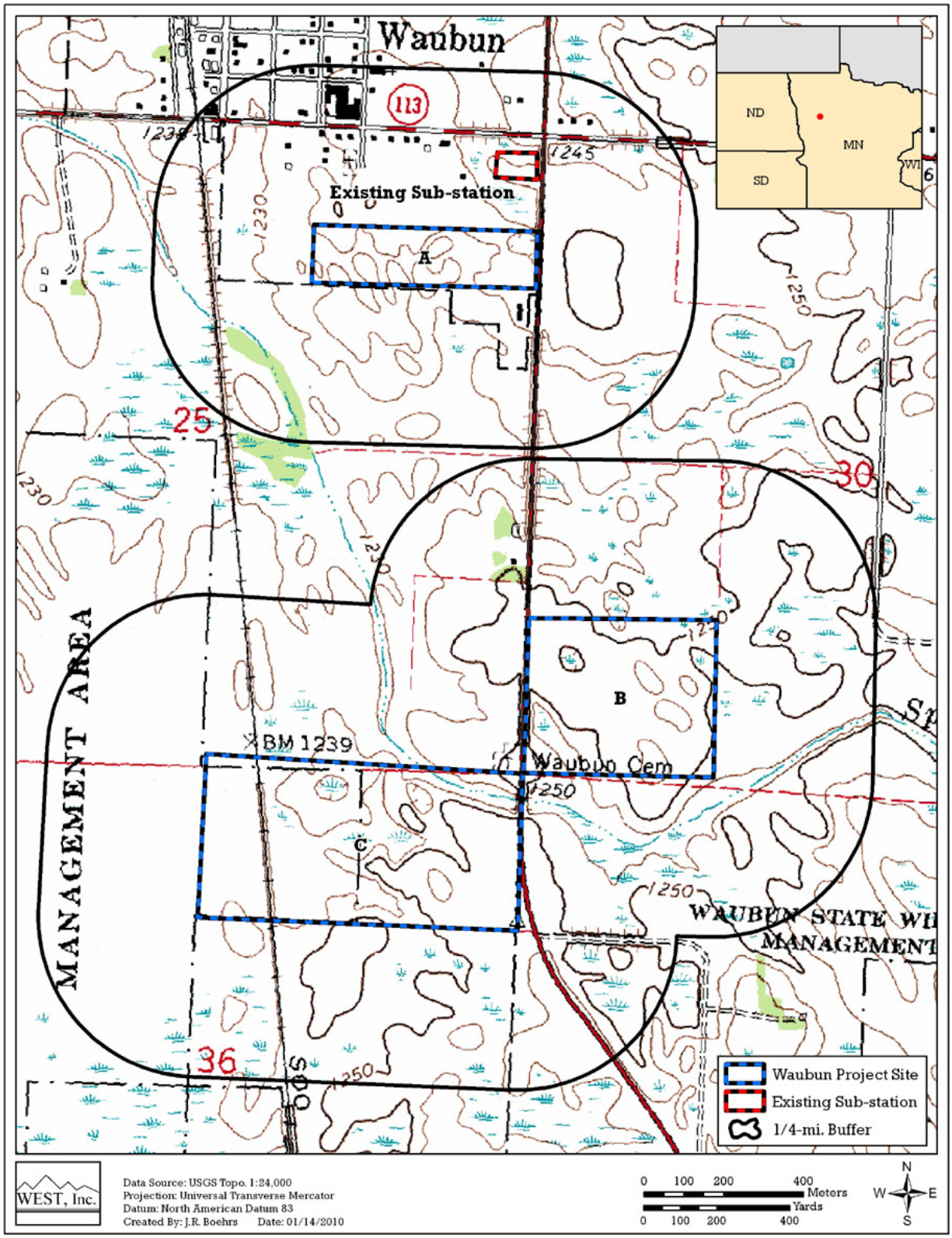


Figure 3.2-1 Waubun Topography

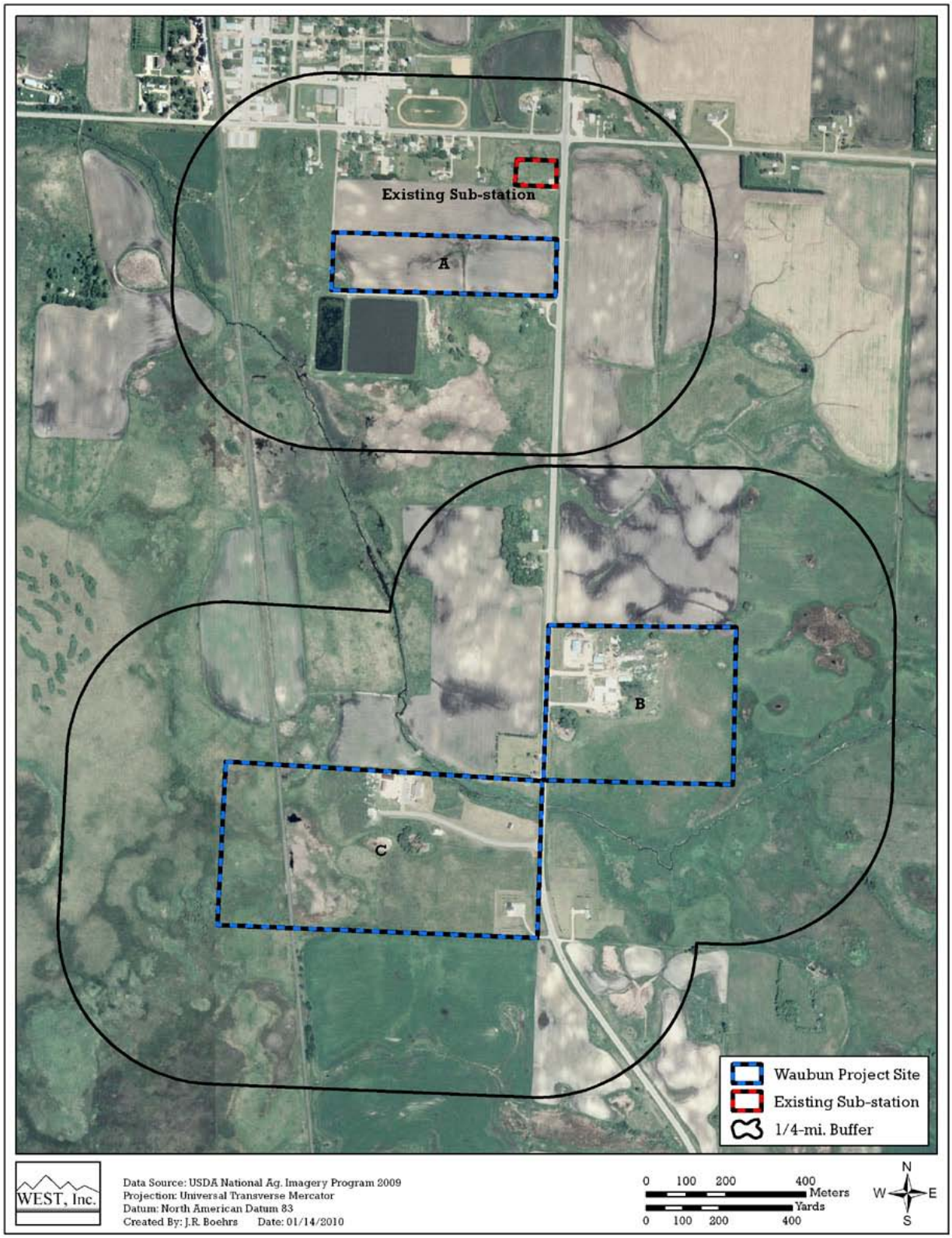


Figure 3.2-2 Waubun Aerial Photograph

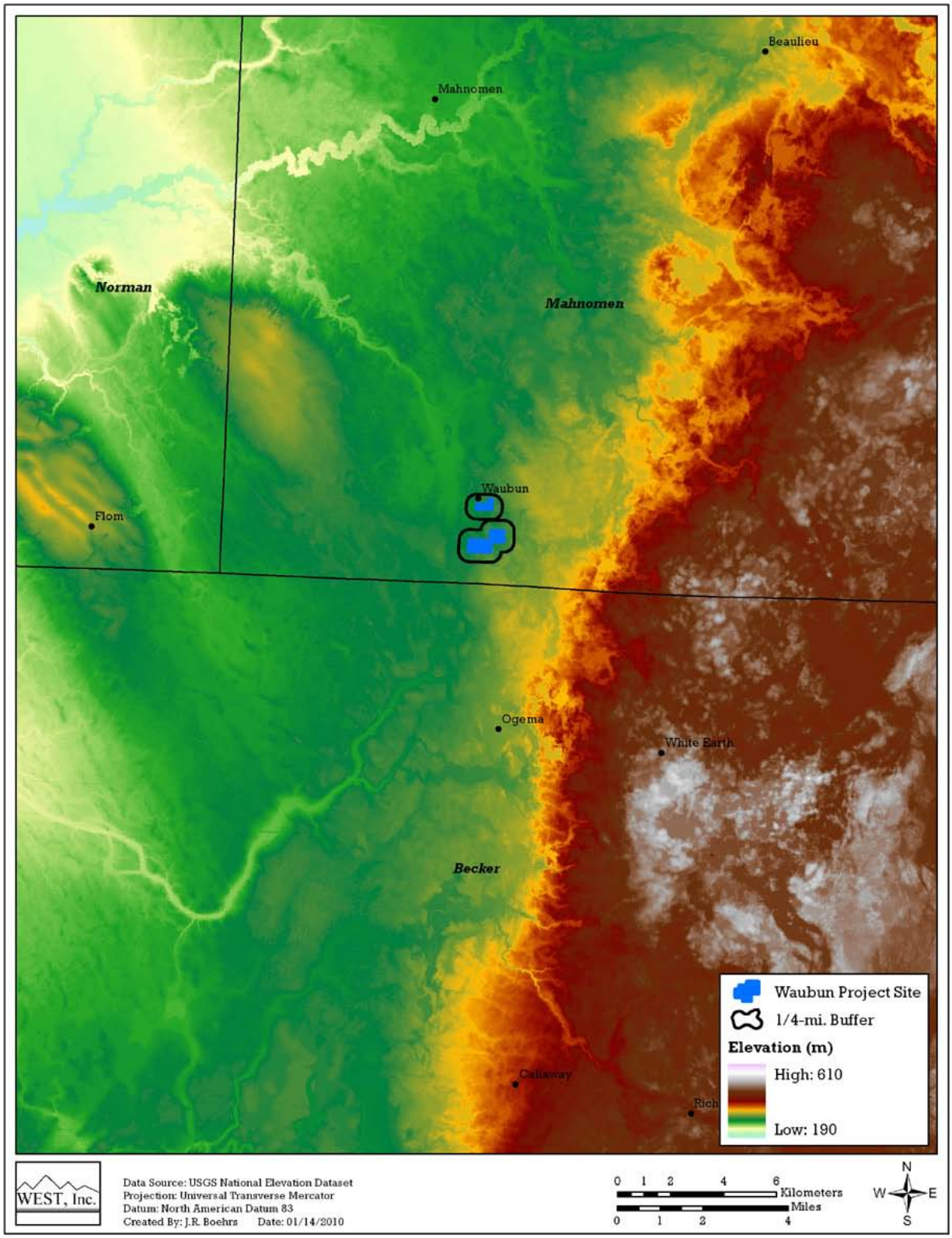


Figure 3.2-3 Waubun Elevation

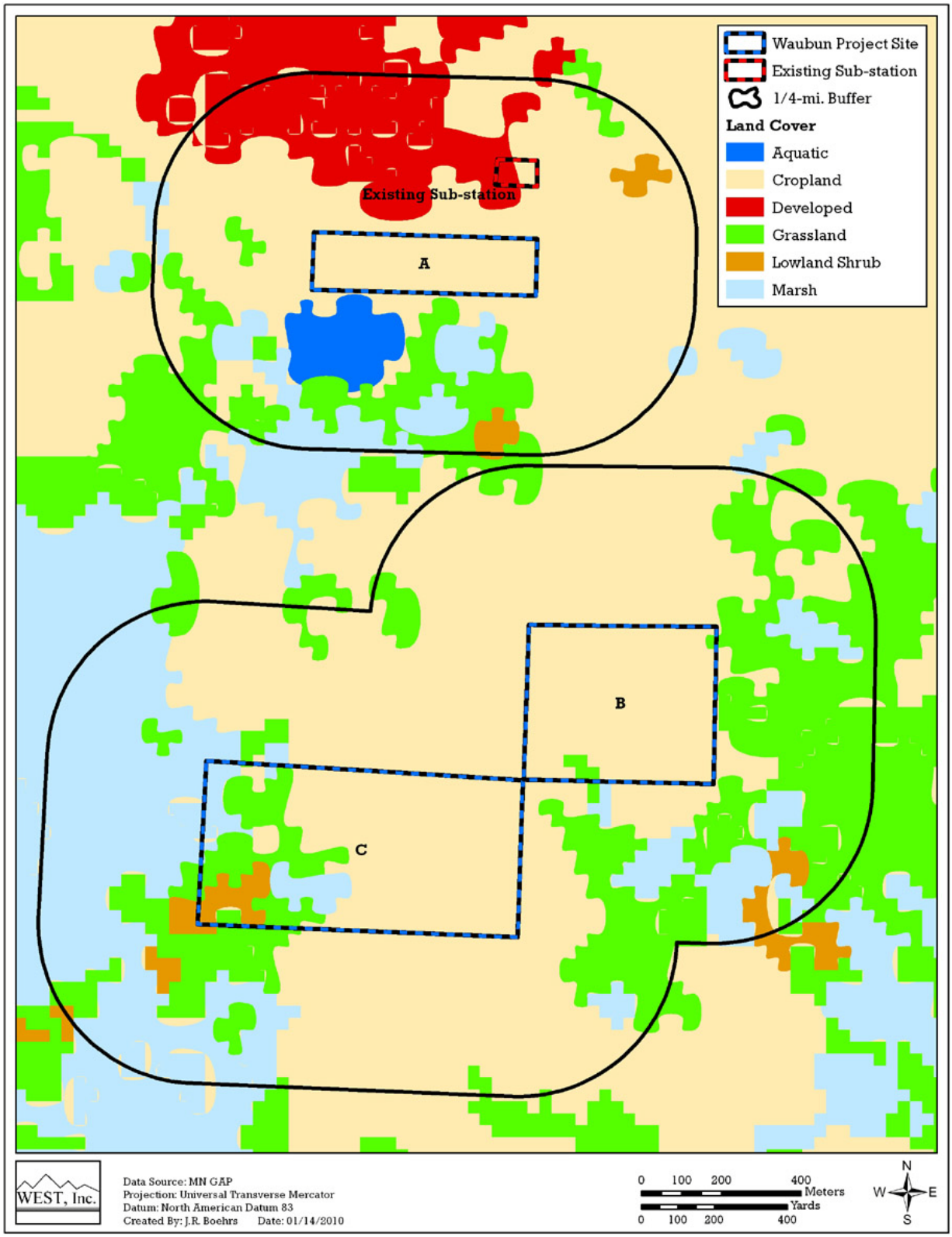


Figure 3.2-4 Waubun Land Cover

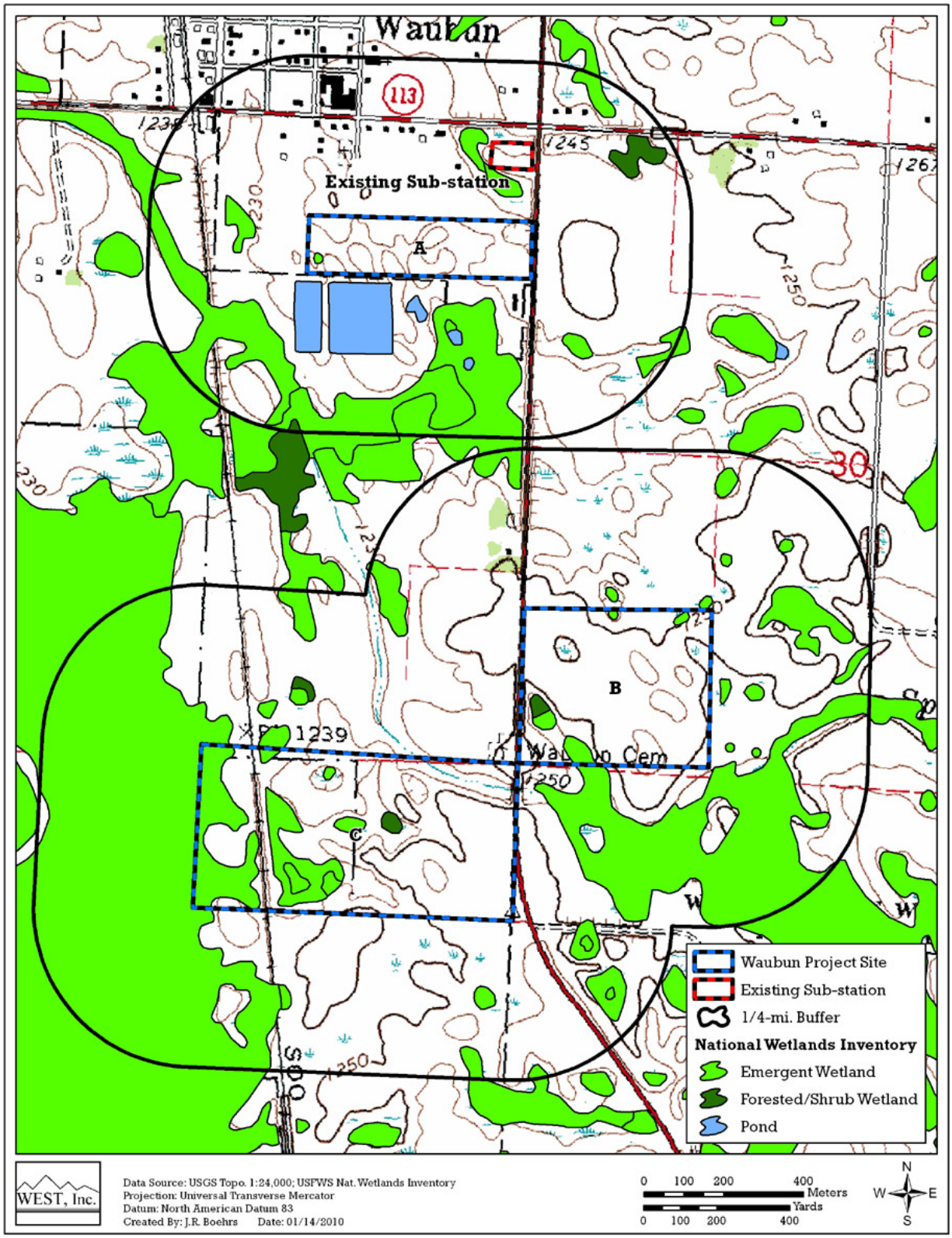


Figure 3.2-5 Waubun Wetlands

3.3 Naytahwaush Site

3.3.1 Setting

The Naytahwaush site encompasses approximately six acres of tribal lands on the White Earth Reservation in Mahnomen County, Minnesota, one mile northeast of the town of Naytahwaush along County Road 4 (Figure 3.3-1).

The Naytahwaush Site is located in the Northern Lakes and Forests ecoregion (USEPA 2007), characterized as a region of nutrient poor glacial soils, coniferous and northern hardwood forests, undulating till plains, morainal hills, broad lacustrine basins, and extensive sandy outwash plains.

The MNDNR further classifies the site between the border of two subsections; Hardwood Hills and Pine Moraines and Outwash Plains. Hardwood Hills is characterized by steep slopes, high hills and lakes formed in glacial end moraines and outwash plains. Agriculture is the major land use. Wetlands and lakes in poorly-drained potholes provide opportunities for recreation or wildlife habitat (MNDNR 2010). Pine Moraines and Outwash Plains is a mix of end moraines, outwash plains, till plains, and drumlin fields. White and red pine dominated the majority of forest communities on end moraines and till plains. Lakes are very common on the end moraines and some of the Outwash plains. Agriculture is common in the west, where center pivot irrigation of corn and potatoes is common (MNDNR 2010). The Naytahwaush site is located in the transition zone between the two subsections.

Currently, the project site consists of maintained grass fields between baseball fields and forested habitat (Figure 3.3-2; Appendix A – Photographs). The broader evaluation area surrounding the project site is a mixture of forested, shrub, and grass communities with interspersed waterbodies. The site is generally flat with some areas of gently rolling hills. Elevation at the site is approximately 1,500 feet (450 m) above MSL (Figure 3.3-3).

3.3.2 Land Cover

According to Minnesota GAP data, the 6.14-acre Naytahwaush site is composed primarily of cropland (70.4%) with grassland composing the remaining area (29.6%; Table 3.1-1, Figure 3.1-4). Since the GAP data was compiled in 1993, the site has been converted into a sports complex facility for baseball. Currently, the site is entirely maintained grass fields.

The broader evaluation area (¼ mile buffer surrounding the site boundary) includes a fairly diverse land cover mixture including cropland (28.9%), grassland (23.8%), aspen/white birch (16.9%), upland shrub (16.7%), oak (13.2%), and less than 1.0% of both black ash and marsh (Table 3.3-1; Figure 3.3-4).

Table 3.2-1
Land Cover Types – Naytahwaush Site

	Site		Evaluation Area	
Land cover Type	Acres	% Composition	Acres	% Composition
Aspen/White Birch	0	0	32.60	16.9%
Black Ash	0	0	0.27	<1.0%
Cropland	4.32	70.4%	55.70	28.9%
Grassland	1.82	29.6%	45.76	23.8%
Marsh	0	0	0.56	<1.0%
Oak	0	0	25.33	13.2%
Upland Shrub	0	0	32.23	16.7%
Total	**6.14**	**100.0%**	**192.45**	**100.0%**

3.3.3 Waterbodies and Wetlands

Based on NWI mapping, there are no waterbodies or wetlands within the Naytahwaush site itself; similarly, these features are found minimally in the larger evaluation area, totaling 1.80 acres of emergent wetlands in the northeastern portion of the evaluation area (Table 3.3-2; Figure 3.3-5). Beyond the evaluation area, North Twin Lake is located approximately 1.25 mile to the southwest of the site and Badboy Creek, which flows from east of the site into the lake, is within one mile of the project site (Figure 3.3-1).

Table 3.3-2
Wetlands - Naytahwaush Site

	Project Area		Evaluation Area	
Wetland Type	**Acres**	**% Comp.**	**Acres**	**% Comp.**
Emergent Wetland	0	0	1.80	100%
Total	**0**	**0**	**1.80**	**100%**

3.3.4 Cultural Resources

A review of the National Registrar of Historic Places online database did not show any registered sites within the Naytahwaush site or evaluation area. Further cultural resource searches will be completed at a later date by a White Earth representative.

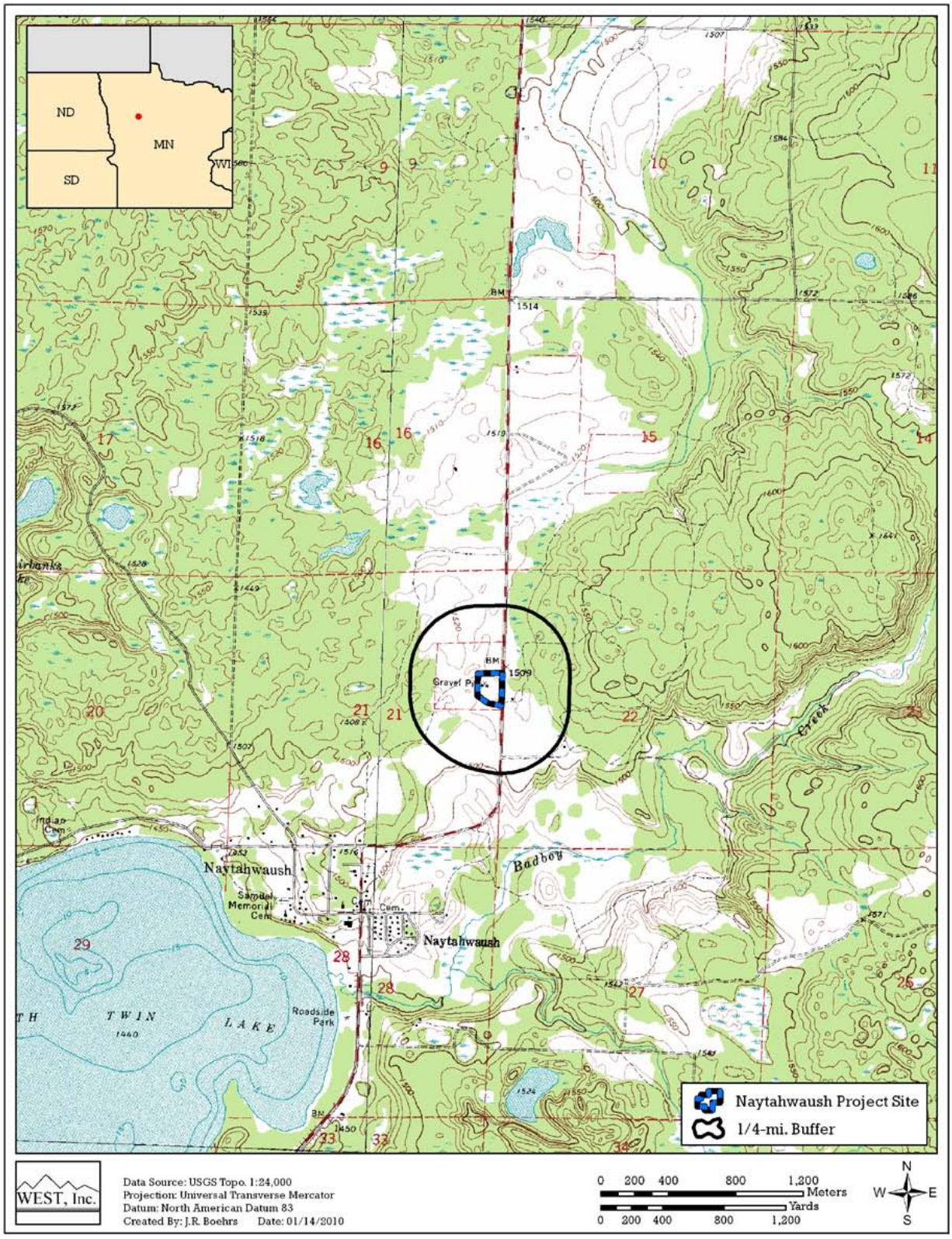


Figure 3.3-1 Naytahwaush Topography

Figure 3.3-2 Naytahwaush Aerial

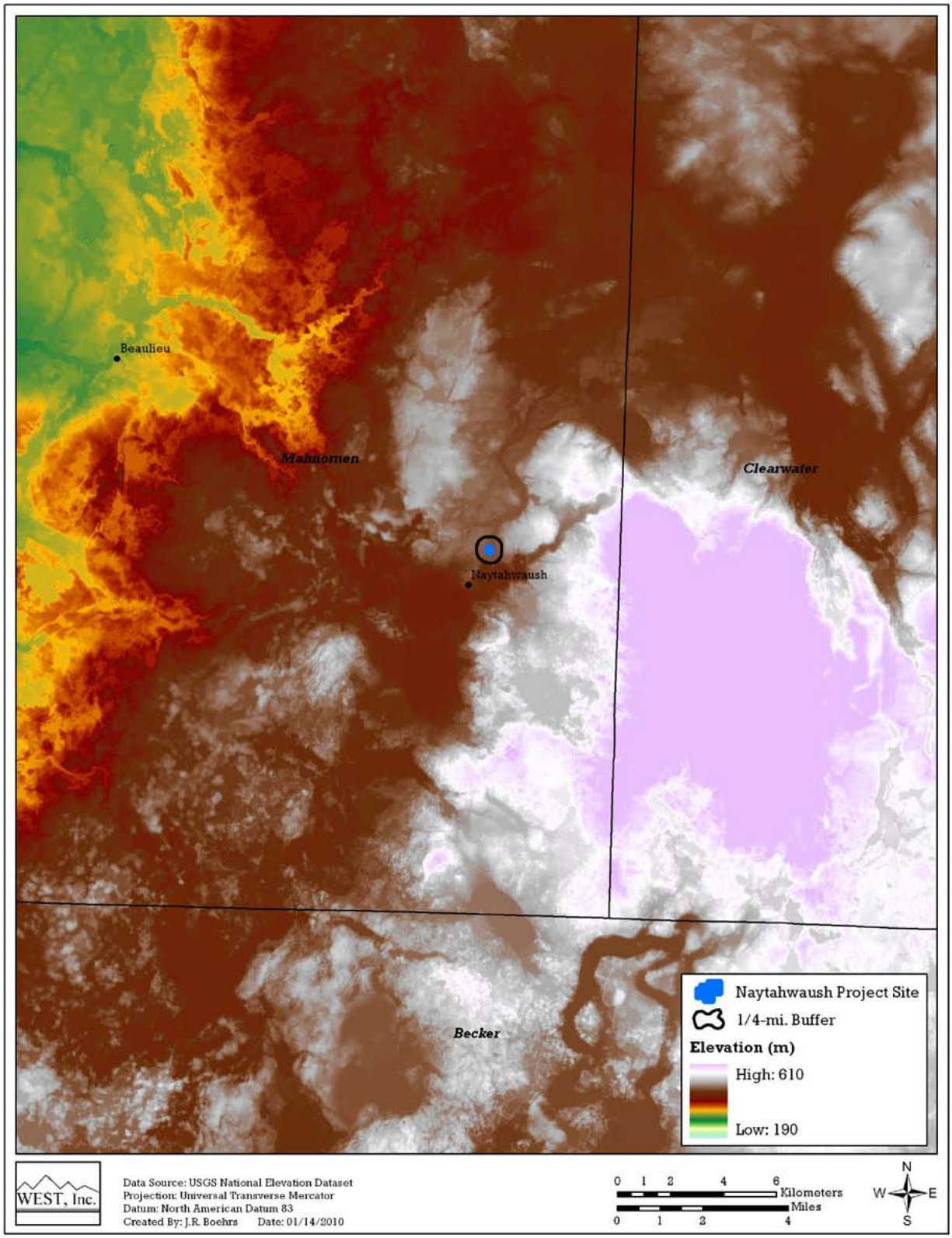


Figure 3.3-3 Naytahwaush Elevation

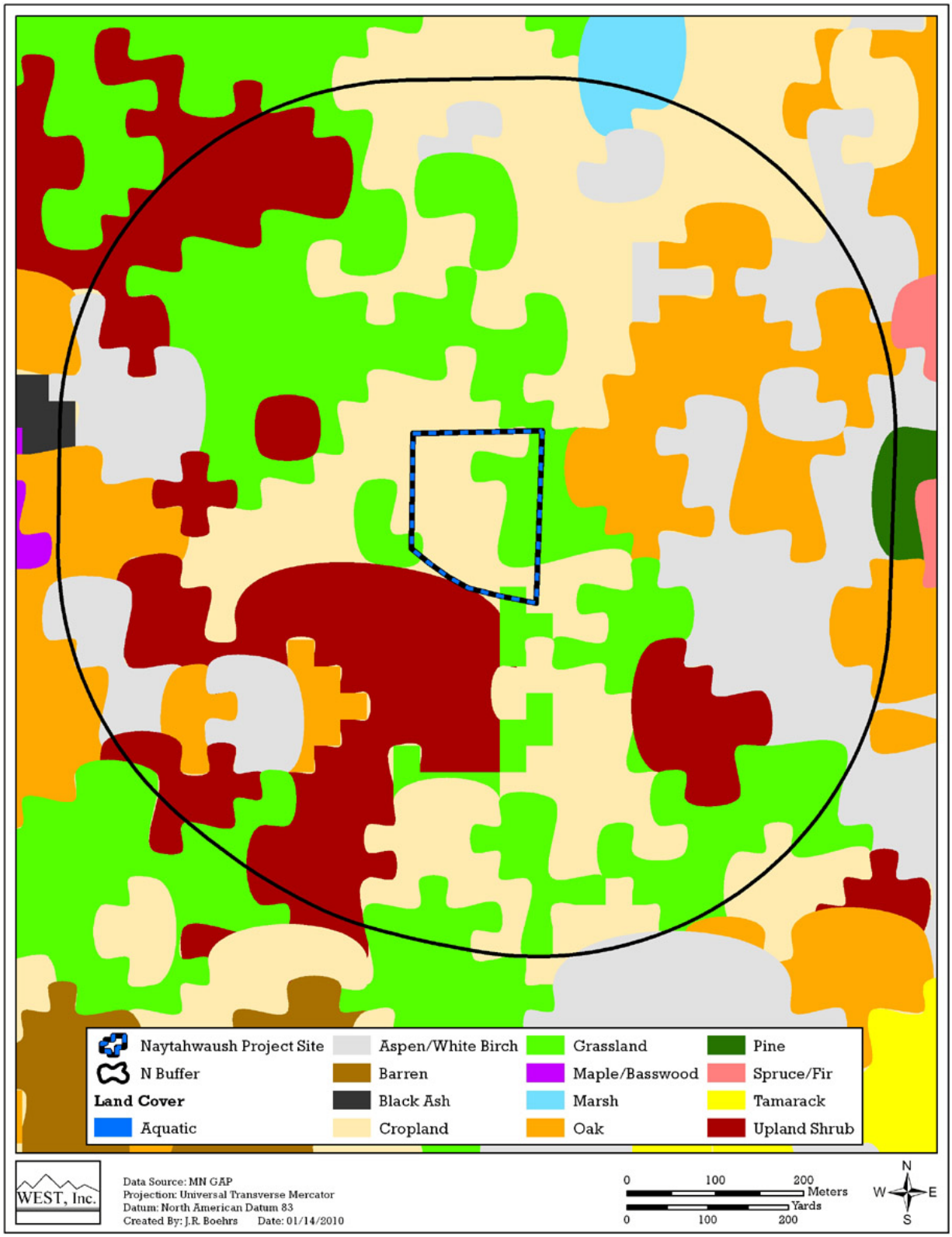


Figure 3.3-4 Naytahwaush Land Cover

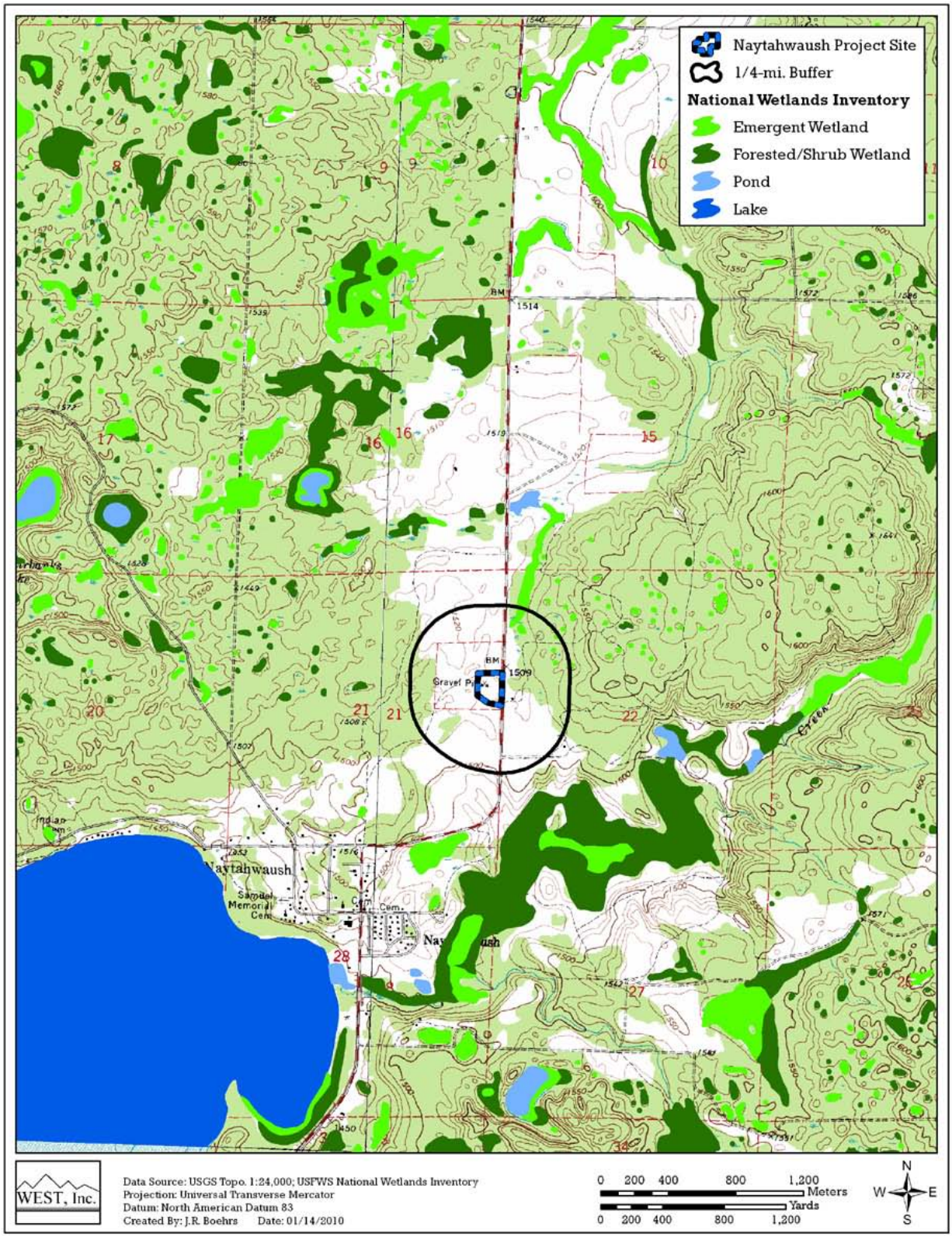


Figure 3.3-5 Naytahwaush Wetlands

3.4 Pine Point Site

3.4.1 Setting

The Pine Point site encompasses approximately 50 acres of tribal lands on the White Earth Reservation in Becker County, Minnesota, on the eastern limits of the town of Pine Point (Figure 3.4-1).

The Pine Point Site is located in the Northern Lakes and Forests ecoregion (USEPA 2007), characterized as a region of nutrient poor glacial soils, coniferous and northern hardwood forests, undulating till plains, morainal hills, broad lacustrine basins, and extensive sandy outwash plains.

The MNDNR further classifies the site as within the Pine Moraines and Outwash Plains. Pine Moraines and Outwash Plains is a mix of end moraines, outwash plains, till plains, and drumlin fields. White and red pine dominated the majority of forest communities on end moraines and till plains. Lakes are very common on the end moraines and some of the Outwash plains. Agriculture is common in the west, where center pivot irrigation of corn and potatoes is common (MDNR 2010).

The proposed project site is located between a school facility and water tower (Figure 3.4-2; Appendix A – Photographs). The Pine Point community is directly adjacent to the east of the project site. Areas surrounding the project/evaluation site consist of extensive forested and wetland communities. The site is generally flat. Elevation at the site is approximately 1,540 feet (470 m) above mean sea level (MSL; Figure 3.4-3).

3.4.2 Land Cover

According to Minnesota GAP data, the 48.93-acre Pine Point site is composed primarily of cropland (46.7%) and grassland (25.7%) with the remaining area composed of upland shrub (16.7%), oak (8.1%), barren (1.6%), and aspen/white birch (1.2%; Table 3.4-1, Figure 3.4-4). Field investigations showed the majority of the site as a weedy/brome covered field.

The broader evaluation area (¼ mile buffer surrounding the site boundary) includes a fairly diverse land cover mixture including cropland (27.0%), aspen/white birch (18.6%), marsh (15.2%), grassland (13.1%), oak (11.4%), and with all other land cover types accounting for less than 5.0% of the total cover (Table 3.4-1; Figure 3.4-4).

Table 3.4-1
Land Cover Types – Pine Point Site

	Site		Evaluation Area	
Land cover Type	Acres	% Composition	Acres	% Composition
Aspen/White Birch	0.58	1.2%	64.23	18.6%
Barren	0.80	1.6%	12.01	3.5%
Cropland	22.83	46.7%	93.46	27.0%
Grassland	12.57	25.7%	45.31	13.1%
Lowland Shrub	0	0	15.11	4.4%
Maple/Basswood	0	0	4.23	1.2%
Marsh	0	0	52.46	15.2%
Oak	3.98	8.1%	39.26	11.4%
Tamarack	0	0	4.20	1.2%
Upland Shrub	8.17	16.7%	15.53	4.5%
Total	**48.93**	**100.0%**	**345.80**	**100.0%**

3.4.3 Waterbodies and Wetlands

Based on NWI mapping, there are no waterbodies or wetlands within the Pine Point site itself; however, these features are found in the larger evaluation area, including 68.32 acres of emergent wetlands in the northern portion of the evaluation area, 4.39 acres of forested/shrub wetlands, and 1.49 acres of pond (Table 3.3-2; Figure 3.3-5).

It appears that sewer lagoons have been constructed within the project site after the NWI mapping was updated (Figure 3.4-2). These features would normally be designated as pond wetlands. A feature designated as Mission Lake (Figure 3.4-1) is located within the evaluation area; however, based on aerial imagery review, the feature appears to be without standing water (Figure 3.4-2). It is likely this area is a marsh wetland. Three lakes (Shell Lake, Big Rush Lake, and Aspinwall Lake) are located within two miles of the project site (Figure 3.4-1).

Table 3.4-2
Wetlands - Pine Point Site

	Project Area		Evaluation Area	
Wetland Type	**Acres**	**% Comp.**	**Acres**	**% Comp.**
Emergent Wetland	0	0	68.32	92.1%
Forested/Shrub Wetland	0	0	4.39	5.9%
Pond	0	0	1.49	2.0%
Total	**0**	**0**	**74.20**	**100%**

3.4.4 Cultural Resources

A review of the National Registrar of Historic Places online database did not show any registered sites within the Pine Point site or evaluation area. Further cultural resource searches will be completed at a later date by a White Earth representative.

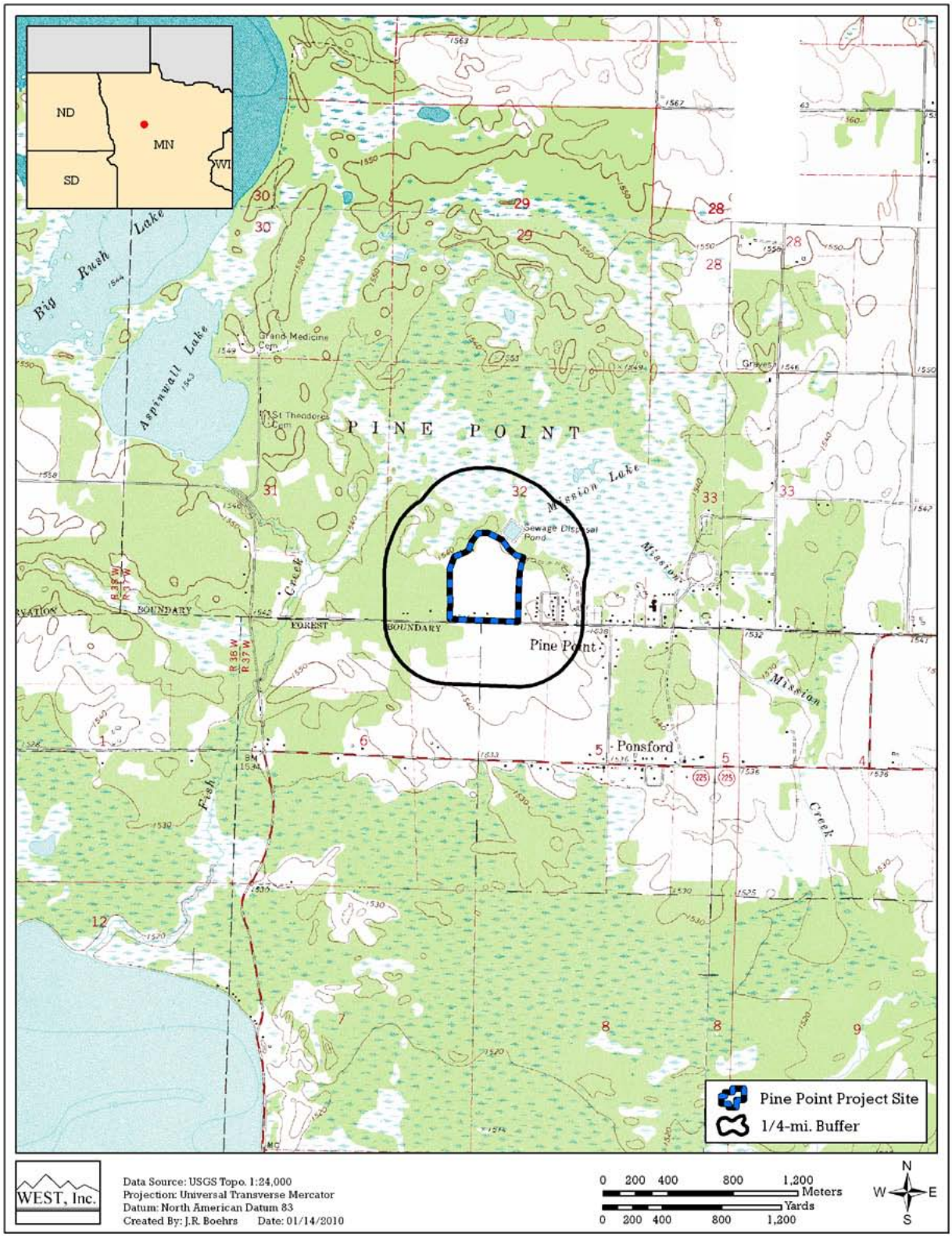


Figure 3.4-1 Pine Point Topography

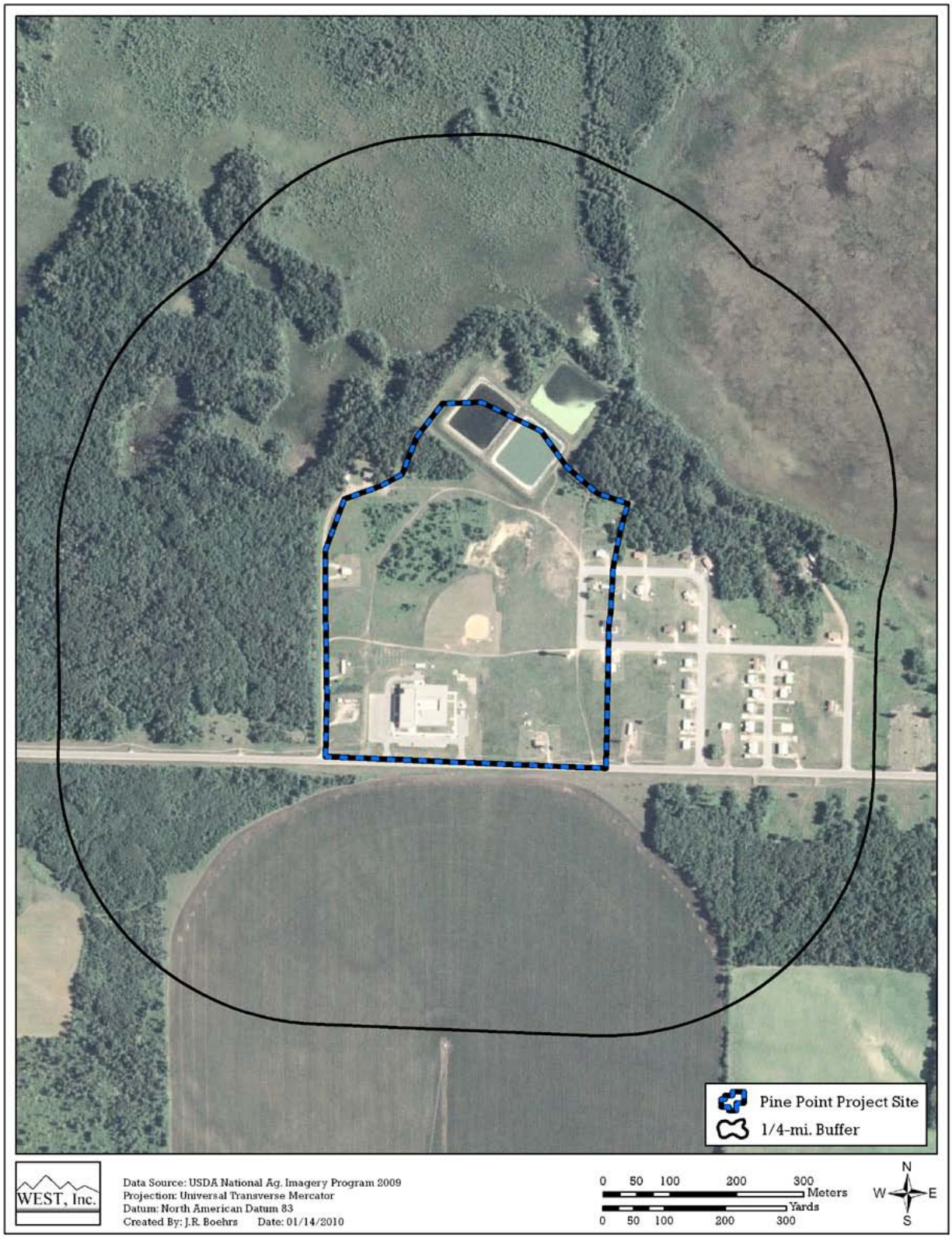


Figure 3.4-2 Pine Point Aerial

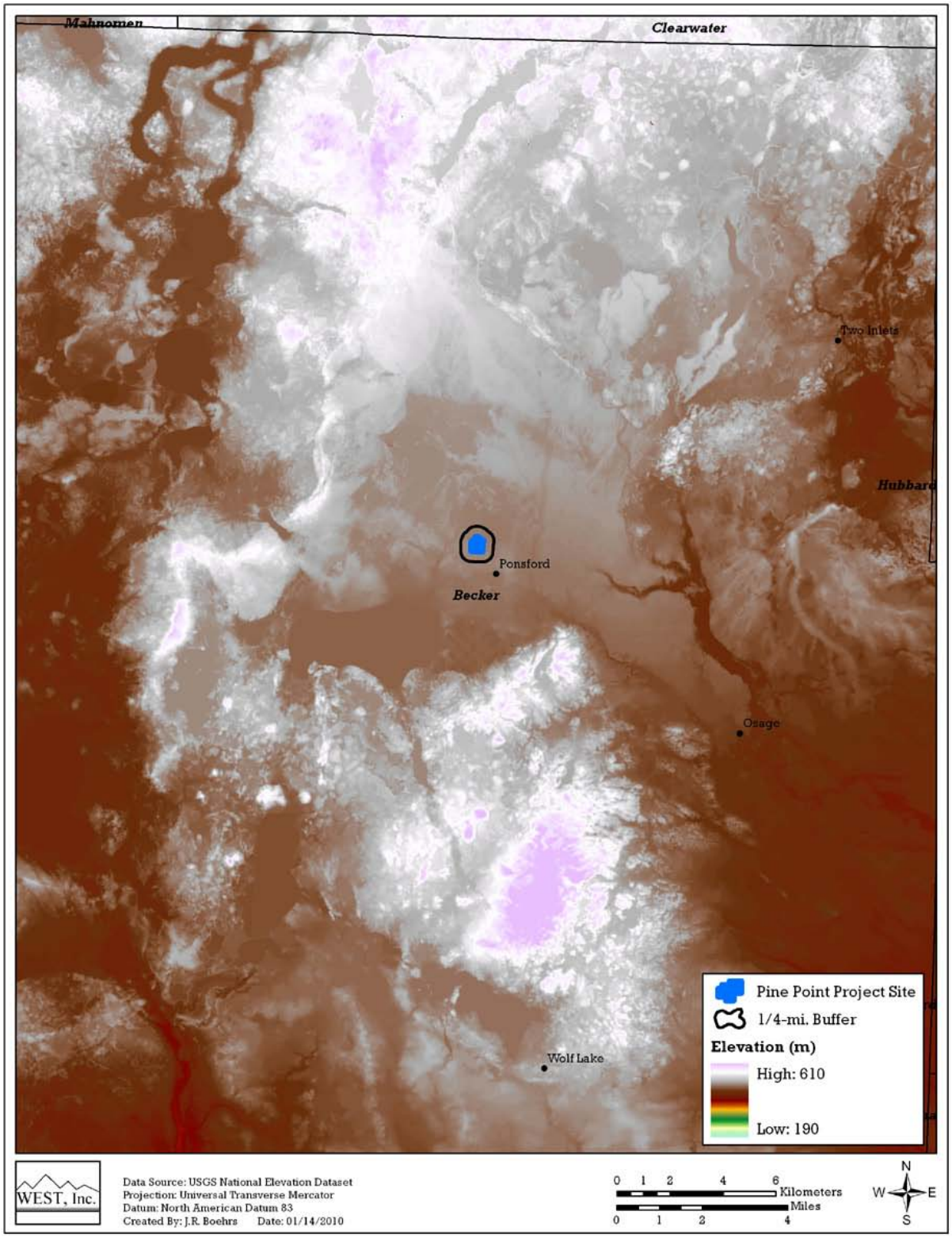


Figure 3.4-3 Pine Point Elevation

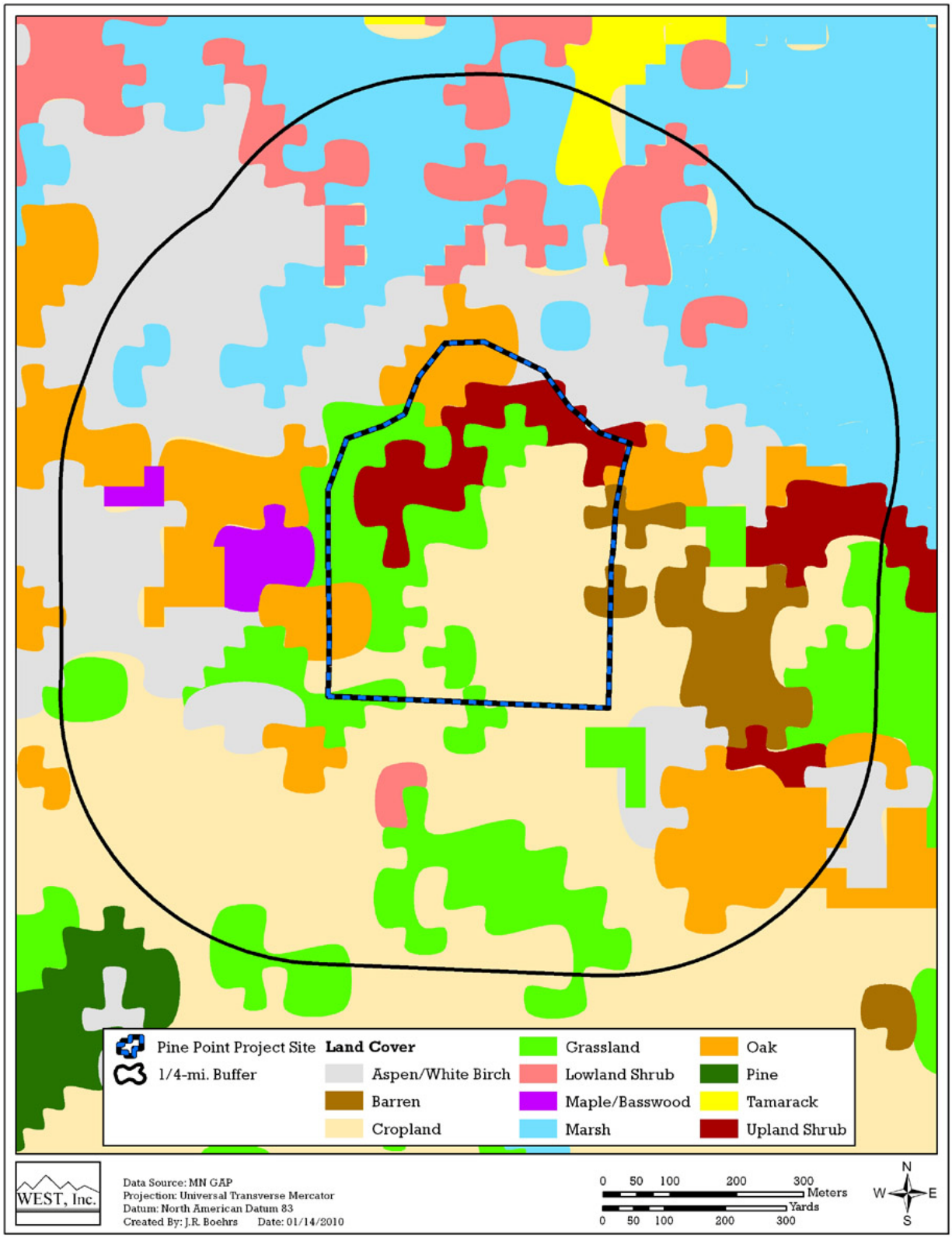


Figure 3.4-4 Pine Point Land Cover

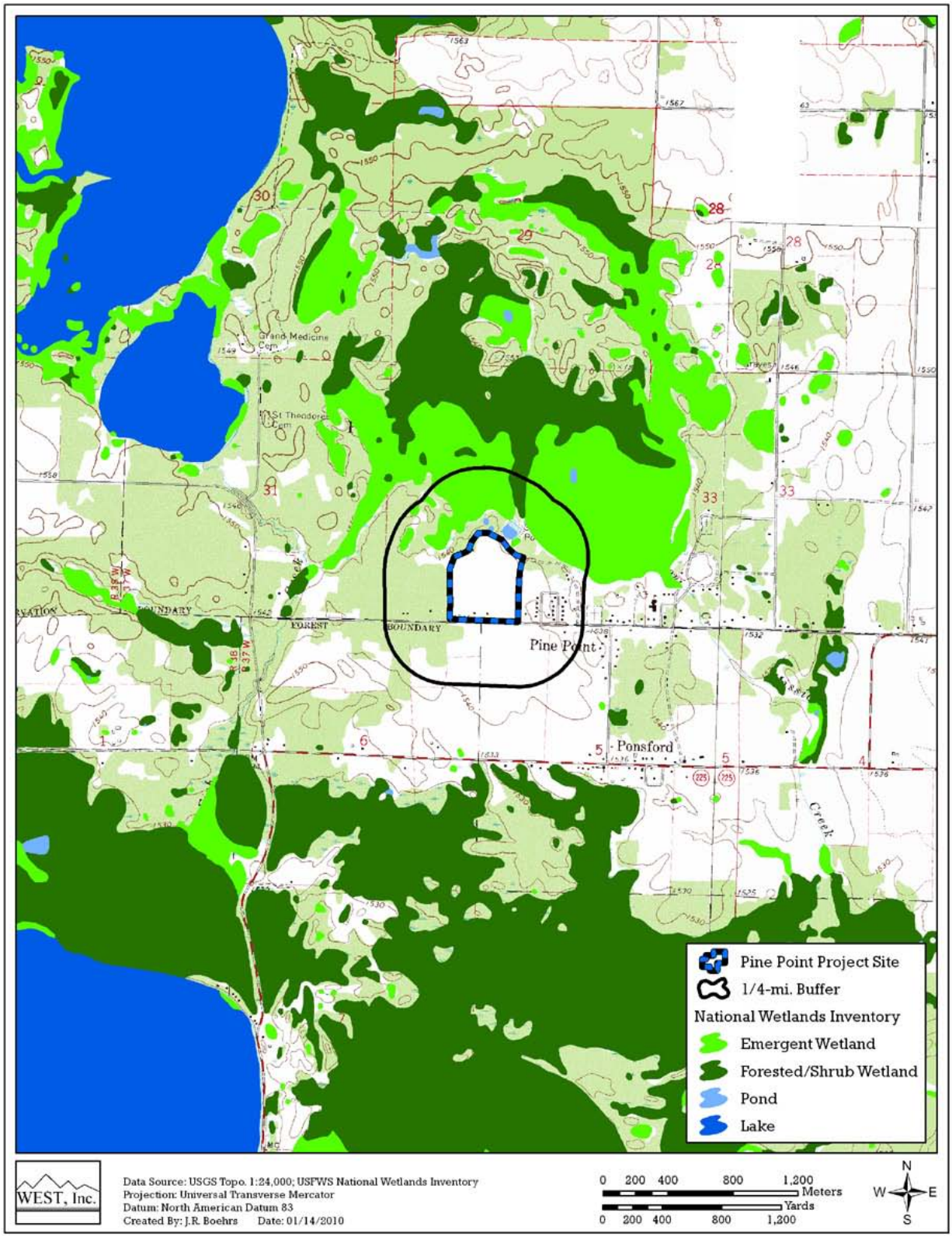


Figure 3.4-5 Pine Point Wetlands

4.0 Wildlife and Plants

This section characterizes the wildlife at each site, in the surrounding evaluation area, and in the broader regional area encompassing all four sites. The focus of this section is on birds and bats since these are the species that would be most affected by the project.

4.1 Wildlife Observations

During the field visit in November 2009, few wildlife or their sign were observed. No observations were made at Mahnomen or Waubun sites. One species (bald eagle) was observed approximately one mile from the Naytahwaush site, but none were observed onsite. Other observations from Pine Point or the general project area are listed below (Table 4.1-1)

Table 4.1-1
Wildlife Observations from Field Visit

Birds		
Common Name	**Scientific Name**	**Site Observed**
American Crow	*Corvus brachyrhynchos*	Pine Point; general project area
Blue Jay	*Cyanocitta cristata*	Pine Point; general project area
Bald Eagle	*Haliaeetus leucocephalus*	Pine Point; near Naytahwaush; general project area
Canada Goose	*Branta candensis*	
Ruffed Grouse	*Bonasa umbellus*	Pine Point – tracks only
White-tailed deer	*Odocoileus virginianus*	General project area

4.2 Raptors

4.2.1 Raptor Species Likely to Occur in the Evaluation Area

Twenty-four raptor species may occur in or near each of the sites (Table 4.2-1). Of these, species that could potentially breed in the area include American kestrel, bald eagle, broad-winged hawk, Cooper's hawk, northern harrier, red-tailed hawk, Swainson's hawk, red-shouldered hawk, osprey, sharp-shinned hawk, and turkey vulture. Owl species likely to breed in or near the sites include burrowing owl, eastern screech owl, great horned owl, long-eared owl, barred owl, northern saw-whet owl, and short-eared owl.

Raptor species that may also occur in the area outside of the breeding season (migration, winter, or post-breeding dispersal) include golden eagle, gyrfalcon, northern goshawk, merlin, rough-legged hawk, and snowy owl. During the field visit, bald eagle was the only raptor observed

(Table 4.1-1); a bald eagle was observed at the Pine Point site and second bald eagle was observed near Twin Lakes southwest of the Naytahwaush site.

Table 4.2-1
Raptor Species Likely to Occur in General Project Area

Species	Habitat	Likelihood of Occurrence (Site[s])*
Turkey vulture *Cathartes aura*	Nest in woodlands or in remote areas, using snags, old hawk nests, thickets etc. This species has no particular affinity for any one habitat type.	Likely summer resident (All).
Osprey *Pandion haliaetus*	Inhabits open farmland country in the vicinity of lakes, ponds, rivers and creeks where they catch fish in open water. Nests in large trees at the edge of forests near water.	Likely summer resident (Pine Point/Naytahwaush). Likely migrant (All)
Bald eagle *Haliaeetus leucocephalus*	Prefers coasts, lakes and rivers and is seen along mountain ridges in migration. Nests almost exclusively in live trees in wooded areas adjacent to marshes or bodies of water. Use similar areas for roost sites in winter.	Likely summer resident (Pine Point/Naytahwaush). Likely winter (All).
Swainson's hawk *Buteo swainsonii*	Found in open country such as grassland, shrubland, and agricultural areas.	Likely summer resident (Waubun/Mahnomen).
Northern harrier *Circus cyaneus*	Inhabits non-forested land for nesting and foraging, including marshes, prairies and grasslands.	Likely summer resident (All).
Gyrfalcon *Falco rusticolus*	Breeds in tundra, often near rivers or coasts. Winter habitat similar; at lower latitudes, open country, especially near water.	Likely winter resident (All).
Sharp-shinned hawk *Accipiter striatus*	At high elevations, frequently found in deciduous trees and are usually found in mature stands of mixed and pure forests. Nests preferentially in conifers located in the densest parts of forests. Found in open woodland and edges	Likely summer resident (All).
Cooper's hawk *Accipiter cooperii*	Forages in areas of mixed forest and openings. Nests in a wide variety of forest types and winters mostly in mixed forest or pine woods.	Likely summer resident (All).
Northern goshawk *Accipiter gentilis*	Nests in heavily forested regions of Canada and northern U.S. at high elevations. Winters in extensive forest areas, upland forests and prefers coniferous and mixed forest over deciduous.	Likely winter resident (All). Potential year-round resident (Pine Point/Naytahwaush)
Red-shouldered hawk *Buteo lineatus*	Prefers low wetland habitat for nesting, using large trees in mature stands e.g. in wet deciduous woods. Has been known to use upland habitat if found within 1/8 mile of an aquatic/wetland complex.	Likely summer resident (All).
Broad-winged hawk *Buteo platypterus*	Prefers extensive second growth forest stands and is rarely found over open meadows. Mainly found in deciduous forests in hilly areas and prefers broadleaf evergreen woods over winter.	Likely summer resident (All).
Red-tailed hawk *Buteo jamaicensis*	Has widest ecological tolerance of any buteo. Prefers woodlands mixed with open fields and	Likely summer resident (All).

Table 4.2-1
Raptor Species Likely to Occur in General Project Area

Species	Habitat	Likelihood of Occurrence (Site[s])*
	brushy area scattered with suitable perch trees.	Potential year-round resident (All).
Rough-legged hawk *Buteo lagopus*	Avoids woodlands and prefers extensive open country. They use large areas of marsh and grassy fields. Wintering birds seek out pastures and wet meadows for hunting.	Likely winter resident (All).
Golden eagle *Aquila chrysaetos*	Grassland, deserts and other open country, usually in mountainous areas.	Likely winter resident (All).
American kestrel *Falco sparverius*	Found in open areas including farmland, grassy fields, roadside verges and woodland margins. Nests in natural cavities in trees, eaves of buildings and cliffs.	Likely summer resident (All).
Merlin *Falco columbarius*	Found in wide open spaces and open woods.	Likely migrant (All).
Long-eared owl *Asio otus*	**State-threatened**. Utilize a range of forest communities for nest and roost sites but most closely associated with conifers than deciduous trees.	Likely year-round resident (All).
Short-eared owl *Asio flammeus*	**State-endangered**. Require large open grassland or emergent wetland habitats such as prairie, or marshes for breeding. Winter in old fields, marshes, and hayfields.	Likely summer resident (All).
Eastern screech owl *Otus asio*	Found in a range of habitats below 5,000 ft, from developed to boreal forest. Generally found in wooded areas.	Likely year-round resident (All).
Burrowing Owl *Speotyto cunicularia*	Lives in dry, open areas with no trees and short grass. Found on golf courses, cemeteries, airports, vacant lots, university campuses, pastures, and prairie dog towns.	Potential summer resident (Waubun/Mahnomen).
Great horned owl *Bubo virginianus*	Found in a range of habitats including dense woodlands of hardwood or conifer, along cliffs and rocky canyons or in forest openings.	Likely year-round resident (All).
Snowy owl *Nyctea scandiaca*	Inhabits open tundra below 1,000 ft. Also lowland salt grass meadows and poorly drained freshwater wet meadows. Winter in habitat similar to breeding habitat.	Potential winter resident (All).
Barred owl *Strix varia*	Found in coniferous forest near water source and wooded swamp. Require large trees with cavities which makes them dependent on old growth forest.	Likely year-round resident (Pine Point/Naytahwaush); potential year-round resident (Waubun/Mahnomen).
Northern saw-whet owl *Aegolius acadicus*	Inhabits a range of woodland types throughout their range.	Likely year-round resident (All).

*Likelihood of Occurrence based on range maps from http://www.allaboutbirds.org/guide/search.aspx

4.2.2 Areas of High Nesting Density and Potential Nest Locations

Potential nest structures for above-ground nesting raptor species are present in the form of living and dead trees within forested areas, shelterbelts, transmission lines, and infrastructure. Grassland areas could provide nesting habitats for ground-nesting raptors, such as the northern harrier and burrowing owl. Potential raptor nest locations are present at or near each site.

4.2.3 Areas of Potentially High Prey Density

The availability of raptor prey can affect the likelihood raptors will occur near the project sites and potentially be affected by the turbines. Studies indicate that raptor mortality at wind-energy facilities may be in part due to behavioral differences between species, increasing the susceptibility of some for collision with turbines. Golden eagle (*Aquila chrysaetos*) mortality at Altamont Pass Wind Resource Area in California may be due in part to the apparently high densities of ground squirrels (*Spermophilus beecheyi*) in the area (Thelander and Smallwood 2007). Continued research at the site revealed that the degree of aggregation of pocket gopher (*Thomomy bottae*) burrows around the turbines was positively correlated to red-tailed hawk fatality rates (Smallwood et al. 2001, Thelander et al. 2003, Thelander and Smallwood 2007). In addition, features providing cover for cottontails (*Sylvilagus auduboni*) appeared to be associated with areas where golden eagles were killed.

No clear indicators of potential prey species (colonial or otherwise) were noted during the field visit; however, many species have suitable habitat and known ranges that are within the general project area. Prey species including rabbits, rodents, waterfowl, fish, and passerines are likely to exist within the different habitat types.

Overall, it is very difficult to assess potential prey densities during a single field visit as prey densities can fluctuate rapidly based on habitat and climatic factors. All of the sites, however, are likely to have some level of raptor prey present. The Mahnomen site could attract small birds and mammals because it is a restored grassland community surrounded by tilled fields. Both the Waubun and Pine Point sites are located near sewage lagoons that could attract waterfowl, and one of the Waubun subsites has a garbage transfer station that likely attracts small mammals. Both the Naytahwaush and Pine Point sites have forest/grassland transition ecotones. Research suggests that this type of habitat interface, known as the edge effect, may affect distribution and densities of small mammal populations (Martin and Wike 2000). Increase in opportunistic rodent species has been documented in multiples studies concerning roads and edge effect (Noss 1995).

Although prey species are likely to be present, densities are not expected to be significantly different from areas outside of the proposed sites. With roost sites and food available, it is likely that raptors will use the area, but not to a greater degree than the surrounding areas with similar habitat.

4.2.4 Topography Indicating Potential for Raptor Migratory Pathways

Several factors influence the migratory pathways of raptors, the most significant of which is geography. Two geographical features primarily used by raptors during migration are ridgelines

and the shorelines of large bodies of water. There are no prominent hills, ridges, or other topographical features at any of the sites that might cause updrafts where raptors might concentrate; however, an abrupt change in ecotone occurs in the general, where the eastern hardwood forest changes to prairie. This change in ecotone includes a mild rise in elevation from west to east (Figure 4.2-1). This elevational change is not likely to create updrafts that would attract raptors; however, the change in habitat (the edge effect described above) could attract both prey and raptors. Two of the project sites are in the prairie ecoregion (Mahnomen and Waubun) and two are in the forest ecoregion (Naytahwaush and Pine Point).

No major waterbodies occur in the general area of the project sites with shoreline that might attract raptors; however, the Naytahwaush and Pine Point sites are within an ecoregion that contains an extensive matrix of lakes. Moderate sized lakes (at least 1 sq mi) are present within one mile of the Naytahwaush and Pine Point sites (Figure 4.2-2), and these lakes are likely o attract raptors such as bald eagles, osprey, and red-shouldered hawk.

4.3 Avian Migration

Avian migration is of concern at wind turbine sites because of the possibility of migrating birds colliding with wind turbines, and since most species of birds are protected by the Migratory Bird Treaty Act (MBTA) loss of individual birds due to collisions with wind turbines would be a violation of the MBTA. Many species of songbird migrate at night and may collide with tall man-made structures. It is generally assumed that nocturnal migrating passerines move in broad fronts rather than along specific topographical features (Gauthreaux et al. 2003, NRC 2007). Large numbers of songbirds have collided with lighted communication towers and buildings when foggy conditions and spring or fall migration coincide. Birds appear to become confused by the lights during foggy or low ceiling conditions and fly in circles around lighted structures until they become exhausted or collide with the structure (Erickson et al. 2001). No large mortality events on the same scale as those seen at communication towers have been documented at wind-energy facilities in North America (NWCC 2004). Most collisions at communication towers are attributed to the guy wires on these structures, which wind turbines do not have. Additionally, the large mortality events observed at communication towers occurred at structures greater than 500 feet (150 m) in height (Erickson et al. 2001), likely because most birds migrate at elevations of 900 feet (270 m) or higher (Young et al. 2004). Modern wind turbines are well below 900 feet (270 m) in height, and although the turbine size for this project has not yet been selected it is anticipated that a smaller turbine model (<150 ft) will be utilized.

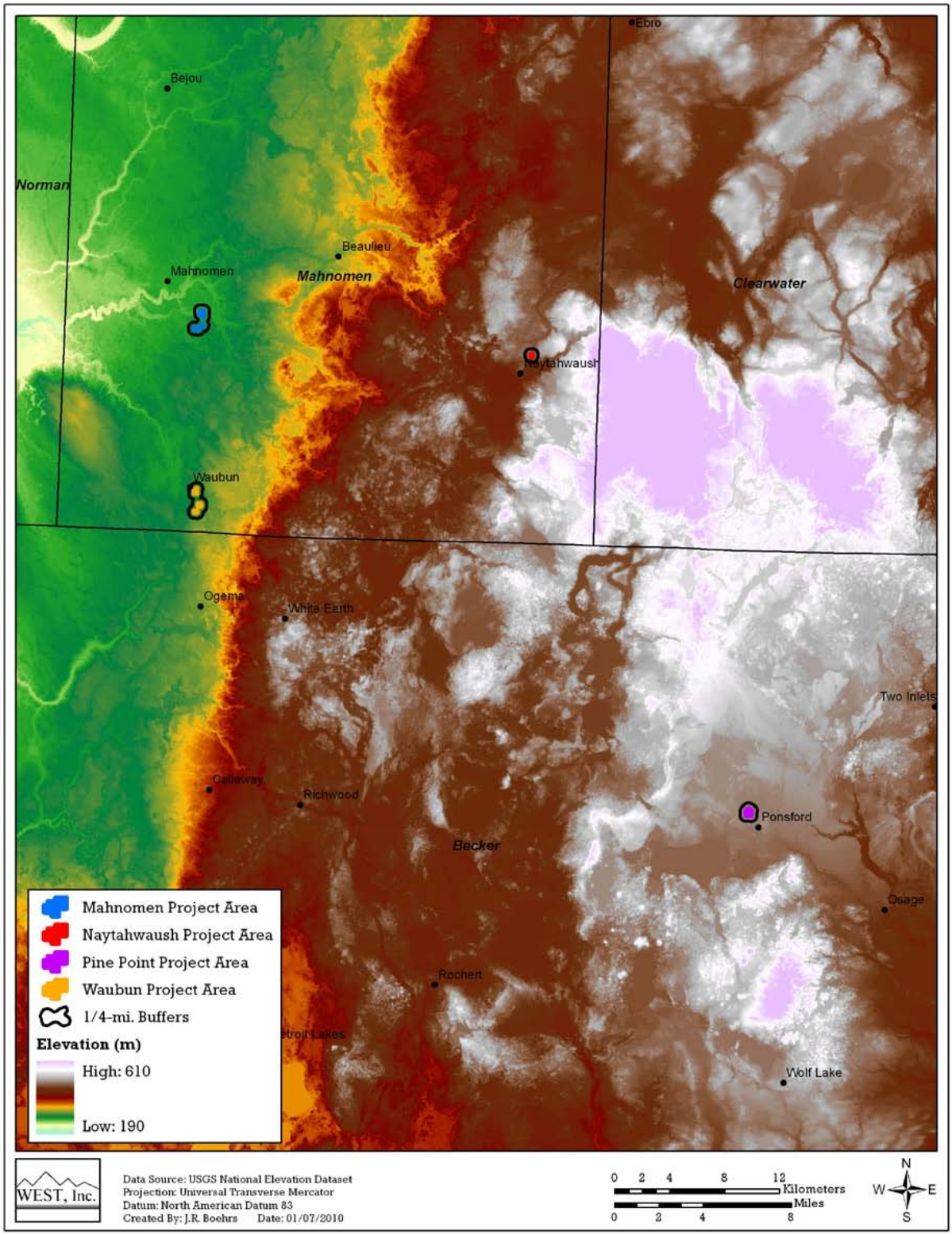


Figure 4.2-1 Elevation Map of the General Project Area

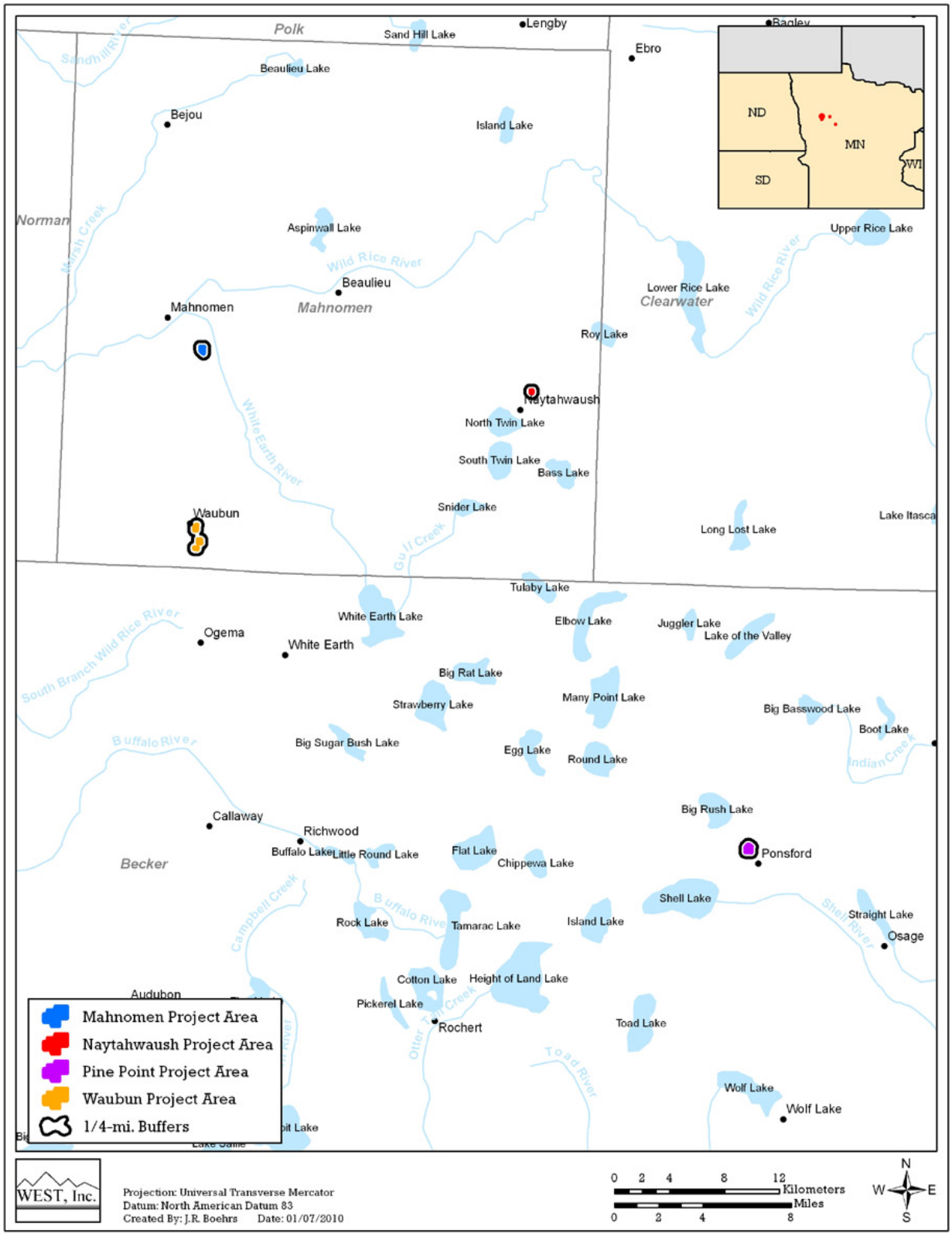


Figure 4.2-2 Lakes and Other Waterbodies in the General Project Area

Migrating songbirds and other species may be more at risk of turbine collision when ascending and descending from stopover habitats. It is likely that birds migrate through the general project area, including passerines, raptors, and waterfowl. Wooded areas, lakes, ponds, grasslands, agricultural fields, and wetlands found in and near each of the four project sites provide stopover habitat for migrants or individuals during migration. These types of habitats are found extensively throughout the region and therefore their presence at and near each site are not likely to concentrate bird use in any one area as compared to adjacent areas. Furthermore, each of the sites is located within or near urban communities in previously altered land. This may lead to a greater propensity for migrating birds to avoid the sites and therefore, fewer potential impacts.

The presence of large numbers of lakes, ponds, sewage lagoons, and wetlands intermingled among harvested grain crops at or near the four sites and in the general area could attract migrating waterfowl. Wind energy facilities with year-round use by water-dependent species have shown the high mortality levels, although the overall level of waterfowl/waterbird/shorebird mortality is relatively small compared to other avian species. For example, of 1,033 bird carcasses collected at U.S. wind-energy facilities, waterbirds comprised about two percent, waterfowl comprised about three percent, and shorebirds comprised less than one percent (Erickson et al. 2002). At the Klondike wind energy project in Oregon, only two Canada goose fatalities were documented (Johnson et al. 2003c) even though 43 flocks, totaling 4,845 individuals, were observed during pre-construction surveys (Johnson et al. 2002b). The Top of Iowa wind energy facility is located in cropland between three Wildlife Management Areas (WMAs) with historically high bird use, including migrant and resident waterfowl. Approximately one-million goose-use days and 120,000 duck-use days were recorded in the WMAs during the fall and early winter, and no waterfowl fatalities were documented during concurrent and standardized wind-energy facility fatality studies (Koford et al. 2005). Similar findings were observed at the Buffalo Ridge wind energy project in southwestern Minnesota, which is located in an area with relatively high waterfowl/waterbird use and some shorebird use (Johnson et al. 2000a). Snow geese (*Chen caerulescens*), Canada geese, and mallards (*Anas platyrhynchos*) were the most common waterfowl observed. Three of the 55 fatalities observed during fatality monitoring studies were waterfowl; two mallards and one blue-winged teal (*Anas discors*). In addition, three waterbirds (two American coots (*Fulica Americana*) and one grebe (*Podiceps* sp.)), and one shorebird fatality were also found (Johnson et al. 2000a). The available data indicate that although some waterbird, waterfowl, and shorebird mortality could occur at the sites over the life of the project, it would probably be relatively low, despite the presence of stopover habitat that could attract migrating birds.

4.4 Breeding Birds

In the U.S., the USGS conducts annual breeding bird surveys (BBS) along thousands of randomly established roadside routes. None of these routes cross through any of the sites; however, two routes have been selected that occur nearby with similar habitat. The Tamarac National Wildlife Refuge (NRW) route (50902) was selected as a representative for Pine Point and Naytahwaush, while the Beltrami route (50043) was selected as a representative for Waubun and Mahnomen (Sauer et al. 2008; Figure 4.4-1). Each BBS route is 24.5 miles (39.2 km) long, and all birds seen or heard are tallied for a three-minute period every half-mile along the route.

An average of 118 bird species was recorded from 1966 to 2007 during the summer BBS surveys along the Tamarac NWR route (Sauer et al. 2008). The most abundant birds were ovenbird (*Seiurus aurocapillus*), chestnut-sided warbler (*Dendroica pensylvanica*), American crow, veery (*Catharus fuscescens*), common yellow throat (*Geothlypis trichas*), and yellow warbler (*Dendroica petechi*a), all of which average more than 20 individuals observed on this route. Raptor species recorded include osprey, bald eagle, sharp-shinned hawk, Cooper's hawk, red-shouldered hawk, broad-winged hawk, red-tailed hawk, American kestrel, great horned owl, and barred owl.

An average of 116 bird species was recorded from 1966 to 2007 during the summer BBS surveys along the Beltrami route (Sauer et al. 2008). The most abundant birds were cliff swallow (*Petrochelidon pyrrhonota*) and red-winged blackbird (*Agelaius phoeniceus*), each with over an average of 100 observations. Mourning dove (*Zenaida macrour*a), vespers sparrow (*Pooecetes gramineus*), western meadowlark (*Sturnella neglecta*), European starling (*Sturnus vulgaris*), bank swallow (*Riparia riparia*), common grackle (*Quiscalus quiscula*), bobolink (*Dolichonyx oryzivorus*), American robin (*Turdus migratorius*), and horned lark (*Eremophila alpestris*) were also common, all of which had an average of more than 20 observations on this route. Seven raptors were observed including northern harrier, Cooper's hawk, Swainson's hawk, red-tailed hawk, American kestrel, great horned owl, and short-eared owl.

Recent research has begun to focus on the potential displacement of grassland passerines at wind energy facilities. Wind energy facility construction appears to cause small-scale local displacement of grassland passerines, likely due to bird avoidance of turbine noise and maintenance activities. Construction also reduces habitat effectiveness because of the presence of access roads and large gravel pads surrounding turbines (Johnson et al. 2000a; Leddy 1996). Leddy et al. (1999) surveyed bird densities in CRP grasslands at the Buffalo Ridge wind energy facility and found that mean densities of ten grassland bird species were four times higher at areas located 591 feet (180 m) from turbines than they were at grasslands nearer turbines. Johnson et al. (2000a) found reduced use of habitat within 330 feet (100 m) of turbines by seven of 22 grassland-breeding birds following construction of the Buffalo Ridge facility, but changes in density at broader scales were not detectable. Results from the Stateline wind energy facility in Oregon and Washington (Erickson et al. 2004), and the Combine Hills wind energy facility in Oregon (Young et al. 2005), suggest a relatively small impact of the facilities on grassland nesting passerines. Transect surveys conducted prior to and after construction of the wind energy facilities found that grassland passerine use was significantly reduced within approximately 164 feet (50 m) of turbine strings, but areas further from turbine strings did not exhibit reduced bird use. Piorkowski (2006) conducted a displacement study at a wind energy facility in Oklahoma where, of the grassland species present on the site, only the western meadowlark (*Sternella neglecta*) showed significantly lower densities near turbines. Piorkowski (2006) suggested that habitat characteristics were more important to determining breeding passerine densities than the presence of wind turbines. Shaffer and Johnson (2007) documented avoidance by grasshopper sparrows (*Ammodramus savannarum*) out to 492 feet (150 m) from turbines at a wind-energy facility in northern South Dakota.

Two of the sites, Mahnomen and Waubun, contain sections of prairie or restored grasslands. Some grassland passerines that have been shown to be displaced at other wind energy facilities, such as the western meadowlark, bobolink, common yellowthroat, and red-winged blackbird, are likely to be present at these sites based on the BBS, so some displacement could occur. Displacement of grassland passerines may be reduced by siting turbines away from grasslands or natural habitats. Turbines sited within agricultural land, similar to the surrounding area, should minimize displacement impacts. As more research is published, the potential impacts of wind turbines on breeding passerines can be better defined.

In addition to breeding passerines, other groups of birds may also be displaced by wind energy development. The only published report of avoidance of wind turbines by nesting raptors occurred at the Buffalo Ridge wind energy facility, where raptor nest density on 101 square miles (261.6 km^2) of land surrounding a wind project was 5.94 nests/39 mi^2 (5.94 nests/101.0 km^2), yet no nests were present in the 12 square miles of the (31.1 km^2) wind-energy facility itself, even though habitat was similar (Usgaard et al. 1997). However, this analysis assumes that raptor nests are uniformly distributed across the landscape, an unlikely event, and even though no nests were found, only two would be expected for an area 12 square miles in size if the nests were distributed uniformly. Other studies have not shown any avoidance of wind energy facilities by nesting raptors (Erickson et al. 2004, Johnson et al. 2000b, Johnson et al. 2003c). Another study at Buffalo Ridge found evidence of northern harriers avoiding turbines on both a small scale (less than 328 feet [100 m] from turbines) and a larger scale (344 to 17,598 feet [105–5,364 m] from the nearest turbine) in the year following construction (Johnson et al. 2000a). Two years following construction, however, no large-scale displacement of northern harriers was detected. Since no raptor nests were observed within or near any of the project sites during the field investigation, displacement is unlikely.

Displacement effects of wind-energy facilities on waterfowl, waterbirds, and shorebirds appear to be mixed. Studies from the Netherlands and Denmark suggest that densities of these types of species near turbines were lower compared to densities in similar habitats away from turbines (Pedersen and Poulsen 1991; Winkelman 1990). However, a study from a facility in England found no effect of wind turbines on populations of cormorants (*Phalacrocorax xarbo*), purple sandpipers (*Calidris maritima*), eiders (*Somateria mollissima*), or gulls, although the cormorants were temporarily displaced during construction (Lawrence et al. 2007). At the Buffalo Ridge wind energy facility, the abundance of several bird types, including shorebirds and waterfowl, was found to be significantly lower at survey plots with turbines than at reference plots without turbines (Johnson et al. 2000a). The report concluded that the area of reduced use was limited primarily to those areas within 328 feet (100 m) of the turbines. Migrating birds may also experience disturbance in their feeding and resting areas (Crockford 1992; NRC 2007). The presence of similar wetland and open water habitats in or near each site means that displacement of these species is possible for a few affected individuals, but population impacts are unlikely. High quality and more abundant wetland systems, however, are found outside of the project sites and these areas are more likely to attract waterfowl, waterbirds, and shorebirds.

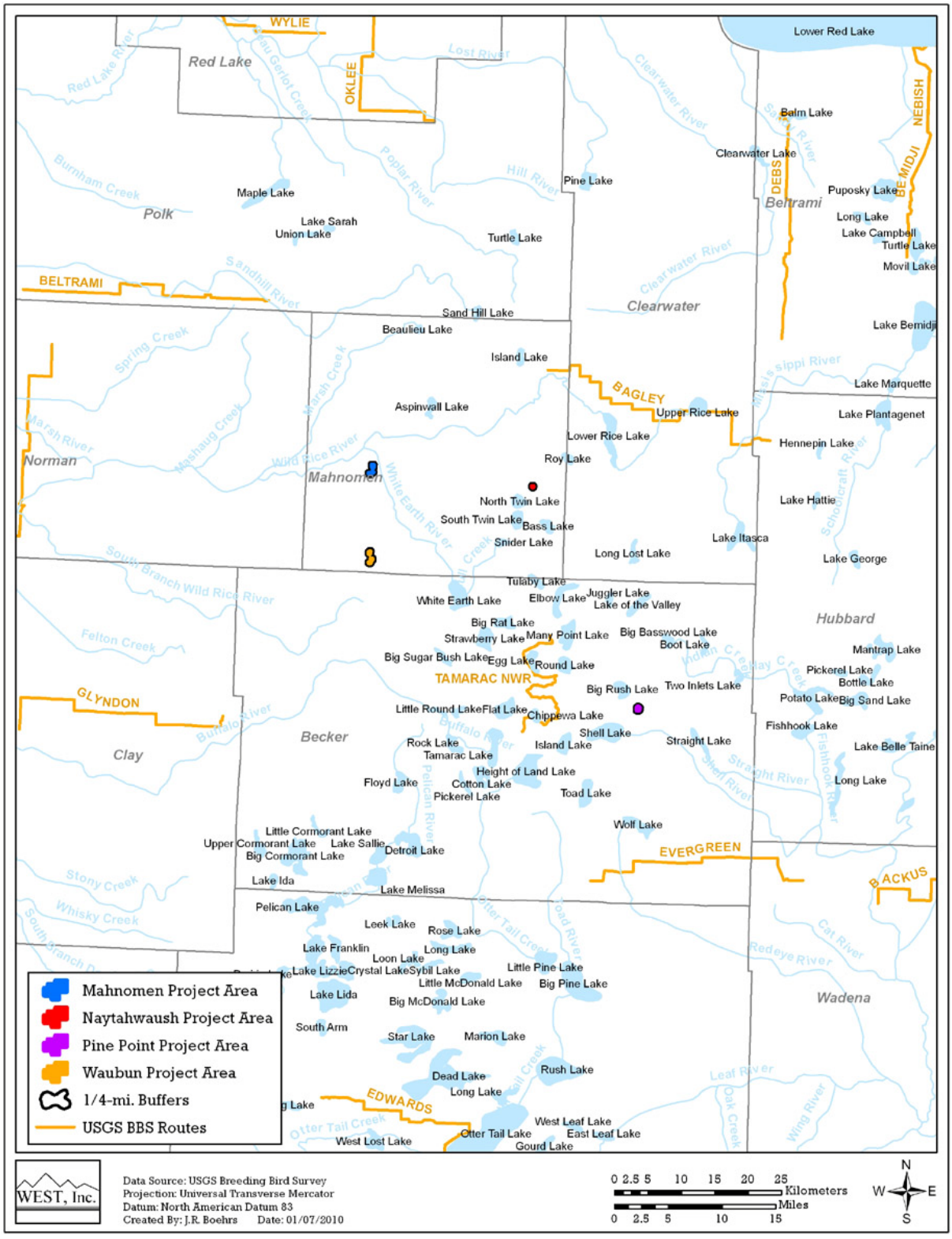


Figure 4.4-1 Breeding Bird Survey Routes in the General Project Area

4.5 Bats

Several species of bats could occur in Mahnomen and Becker Counties, Minnesota, including the big brown bat (*Eptesicus fuscus*), eastern pipistrelle (*Perimyotis subflavus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), little brown myotis (*Myotis lucifugus*), northern long-eared myotis (*Myotis septentrionalis*), and silver-haired bat (*Lasionycteris noctivagans* (BCI 2009; Table 4.5-1). The northern myotis and eastern pipistrelle are both listed as a species of special concern in Minnesota (MDNR 2009). The northern myotis is found roosting in caves, mines, buildings, and trees, often in groups of bats. The eastern pipistrelle, an uncommon and solitary species, can be found in the same types of habitats (MDNR 2009).

Table 4.5-1
Bat Species of Minnesota and Likelihood of their Occurrence at the Site

Species	Habitat	Occurrence
Eastern pipistrelle *Pipistrellus subflavus (subflavus)*	Roosts in tree foliage or high in tree crevices. Prefer edge habitats adjacent to agricultural settings in the vicinity of watercourses. Hibernates in caves or mines. In summer, roosts in foliage, cliff crevices or manmade structures.	Likely summer resident and migrant (All).
Eastern red bat *Lasiurus borealis*	Solitary tree bat. Roosts in the foliage of deciduous or evergreen trees and prefers trees bordered by open fields. Forage along forest edge, flood plain timber and fence rows. Uses woodland habitats.	Likely summer resident and migrant (All).
Hoary bat *Lasiurus cinereus (cinereus)*	Solitary tree bat. Roost in trees along forest borders and edges of forest clearings. Forage above water and forest openings such as grassy meadows.	Likely summer resident and migrant (All).
Little brown myotis *Myotis lucifugus (lucifugus)*	Forms nursery colonies in buildings, attics, and other man-made structures. Uses a variety of habitats. Hibernates in caves or mines. Forages around trees and in open areas around water.	Likely summer resident and migrant (All).
Northern long-eared myotis *Myotis septentrionalis*	Summer roosts are in variety of places from trees to manmade structures. Forage on forested hillsides and ridges. Hibernates in caves and mines.	Likely summer resident and migrant (All).
Silver-haired bat *asionycteris noctivagans*	Solitary tree-roosting bat. Forms maternity colonies in tree cavities and small hollows. Roosts and hibernates beneath lose bark, in snags and in manmade structures.	Likely summer resident and migrant (All).
Big brown bat *Eptesicus fuscus*	Forms maternity colonies beneath loose bark in forests and other trees, or in buildings, barns and bridges. Uses a variety of habitats including oak woodlands and dense tree canopy. May forage over cleared meadows and trees in pastures or along streams. May hibernate in caves.	Likely to occur year-round (All).

Potential roosting habitat at or near each site includes trees and buildings. Caves are common roosting sites for many bat species, however, no caves were observed during the field visit and the topology of the area suggests caves are uncommon in this part of Minnesota. Bats generally forage over water and open spaces such as grasslands, streams, and wetlands/ponds, preying on insects that concentrate over water in wetlands and streams. These habitats are typically the most likely areas to attract foraging bats. Bat habitat (i.e., areas of water, wetlands, and other open space) exist near each of the sites, but the extent of bat use within each specific site is not known.

Bat casualties have been reported from most wind energy facilities where post-construction fatality data are publicly available. Reported estimates of bat mortality at wind energy facilities have ranged from 0.01 – 47.5 fatalities per turbine per year (0.9 – 43.2 bats/MW/year) in the U.S., with an average of 3.4 fatalities per turbine or 4.6 fatalities per MW (NWCC 2004). Most of the bat casualties at wind-energy facilities are migratory species that conduct long migrations between summer roosts and winter areas. The species most commonly found as fatalities at wind power facilities include hoary bat, silver-haired bat, and eastern red bat. The highest numbers of bat fatalities found at wind energy facilities to date have occurred in eastern North America, on ridge-tops dominated by deciduous forest (NWCC 2004). However, Barclay et al. (2007) recently reported relatively high fatality rates at a facility in Canada, which was located in grassland and agricultural habitats.

The causes of the relatively high number of migratory bat deaths at wind-energy facilities are not well understood. Furthermore, quantitative predictions of migratory bat use based on strong field methods are lacking. At least 11 bat species have been recovered during carcass searches at wind-energy facilities throughout the U.S. (Table 4.5-2; Johnson 2005; Kunz et al. 2007; NRC 2007) and of these, seven species have the potential to occur at or near each of the sites.

Table 4.5-2
Species Composition of Bat Fatalities from Wind Power Facilities in the U.S

Common name	Scientific name	Total	
		Count	Percentage
Hoary bat*	*Lasiurus cinereus*	1,023	41
Eastern red bat*	*Lasiurus borealis*	580	23
Eastern pipistrelle*	*Pipistrellus subflavus*	261	11
Silver-haired bat*	*Lasionycteris noctivagans*	209	8.4
Little brown myotis*	*Myotis lucifugus*	145	5.8
Brazilian (or Mexican) free-tailed bat	*Tadarida brasiliensis*	143	5.7
Big brown bat*	*Eptesicus fuscus*	59	2.4
Northern long-eared myotis*	*Myotis septentrionalis*	8	0.4
Western red bat	*Lasiurus blossivilli*	4	0.2
Seminole bat	*Lasiurus seminolus*	1	0.1
Unknown		53	2.1
Total		**2,486**	**100**

Adapted from NRC, 2007, p.65
* Potential Occurrence in the Site

4.6 Sensitive Habitats and Species

4.6.1 Federally-Listed Species

Only one federally listed wildlife species is known to occur in Mahnomen and Becker counties; the gray wolf (*Canis lupus*). The USFWS has been contacted for input concerning potential impacts to wildlife species. This section will be updated as appropriate based on information provided in the response.

The gray wolf is a federally threatened species and state Species of Special Concern. The wide range of habitats in which wolves can thrive reflects their adaptability as a species and includes temperate forests, mountains, tundra, taiga, and grasslands. Their territory may range in size from 50 to 1,000 sq miles. In Minnesota, the gray wolf is believed to occur through the northeast Great Lakes regions, as well as, within specific wildlife management areas. No areas designated as critical habitat for the gray wolf are designated within the proposed project locations. Three areas of critical habitat for gray wolves have been designated within the great lakes region (north and northeast MN; USFWS 2009). Due to the relatively small areas required for the project, location near other infrastructure, and similar suitable habitat adjacent to the project sites, it is unlikely that impacts to the wolf will result from the project construction at any of the proposed sites.

4.6.2 State-Listed Species

Minnesota has an extensive list of state endangered, threatened, and special concern wildlife species (181 species) that includes: 28 birds; 15 mammals; 14 reptiles and amphibians; 21 fish; 47 arthropods; 26 mosses, lichens and fungi; and 30 mollusks (MDNR 2009). Minnesota statutes prohibit “take” of endangered or threatened species, while species of special concern are not protected by Minnesota's Endangered Species statute. For wind energy facilities, birds and bats are generally the species of primary concern.

Based on a review of the MDNR rare species guide, 12 state-listed bird species have been identified as present in Mahnomen County (Table 4.6-1), while 13 state listed species have been identified in Becker County (Table 4.6-2). Additionally, the northern myotis and eastern pipistrelle are both on the State’s list as a species of special concern and even though no records of observation exist within either county, their projected range does cover the entire state of Minnesota; therefore, each species could potentially be found in each Site. The MDNR has been contacted for additional information pertaining to potential impacts to natural resources within the specific project Sites. This section will be updated as appropriate based on the MDNR response.

Construction of each Site could potentially impact some of the remaining species of concern, including 13 other mammals, 14 reptiles and amphibians, 21 fish, 47 arthropods, 26 mosses, lichens and fungi, and 30 mollusks listed by the MDNR as endangered, threatened, or of special concern. It is likely that only a small fraction of these species would occur in any of the Sites based on habitat and ranges. Furthermore, many of the species are mobile and would likely

evacuate the project areas during construction operations and return to the Sites during the operational period.

Table 4.6-1
State-Listed Bird Species – Mahnomen County, Minnesota

Species	Habitat	Likelihood of Occurrence	State Status
Bald Eagle *Haliaeetus leucocephalus*	Prefers coasts, lakes and rivers and is seen along mountain ridges in migration. Nests almost exclusively in live trees in wooded areas adjacent to marshes or bodies of water. Use similar areas for roost sites in winter.	Likely summer resident. Potential migrant.	special concern
Burrowing Owl *Speotyto cunicularia*	Lives in dry, open areas with no trees and short grass. Found on golf courses, cemeteries, airports, vacant lots, university campuses, pastures, and prairie dog towns.	Potential summer resident.	endangered
Cerulean Warbler *Dendroica cerulea*	During breeding season inhabits mature deciduous forest preferring mesic to wet stands. Bottomlands are preferred over uplands	Potential summer resident.	special concern
Greater Prairie-chicken *Tympanuchus cupido*	Open prairie and oak savannah.	Potential resident.	special concern
Horned Grebe *Podiceps auritus*	Breeds on small to moderate-sized, shallow freshwater ponds and marshes. Winters along coasts and on large bodies of water.	Likely migrant.	threatened
Marbled Godwit *Limosa fedoa*	Breeds in marshes and flooded plains, in migration and winter also on mudflats and beaches.	Likely summer resident.	special concern
Nelson's Sharp-tailed Sparrow *Ammodramus nelsoni*	Freshwater marshes and wet meadows in interior and brackish marshes along coast; in winter in salt and brackish marshes.	Likely summer resident. Potential migrant.	special concern
Red-shouldered Hawk *Buteo lineatus*	Nests in large (> 300 acres) mature deciduous or mixed forest. Forages in wetlands including wet meadows, lowland forests, or upland areas.	Likely summer resident.	special concern
Short-eared Owl *Buteo lineatus*	Require large open grassland or emergent wetland habitats such as prairie, or marshes for breeding. Winter in old fields, marshes, and hayfields.	Likely summer resident. Potential year-round resident.	special concern
Trumpeter Swan *Cygnus buccinator*	Breeds in freshwater marshes and along ponds and lakes. Winters in lakes, streams, springs, rivers, and reservoirs.	Likely summer resident.	threatened
Wilson's Phalarope *Phalaropus tricolor*	Breed in shallow, prairie wetlands in the northern US and southern Canada. During migration, inhabit	Potential summer resident (Waubun/Mahno	threatened

Table 4.6-1
State-Listed Bird Species – Mahnomen County, Minnesota

Species	Habitat	Likelihood of Occurrence	State Status
	shallow ponds, flooded fields, and sometimes mudflats.	men). Potential migrant (Waubun/Mahnomen).	
Yellow Rail *Coturnicops noveboracensis*	Shallow marshes, and wet meadows; in winter, drier fresh-water and brackish marshes, as well as dense, deep grass, and rice fields.	Likely summer resident.	special concern

Table 4.6-2
State-Listed Bird Species – Becker County, MN

Common Name	Habitat	Likelihood of Occurrence	State Status
Bald Eagle *Haliaeetus leucocephalus*	Prefers coasts, lakes and rivers and is seen along mountain ridges in migration. Nests almost exclusively in live trees in wooded areas adjacent to marshes or bodies of water. Use similar areas for roost sites in winter.	Likely summer resident. Potential migrant.	special concern
Cerulean Warbler *Dendroica cerulea*	During breeding season inhabits mature deciduous forest preferring mesic to wet stands. Bottomlands are preferred over uplands	Potential summer resident.	special concern
Common Tern *Sterna hirundo*	Nests on islands, marshes, and sometimes beaches of lakes and ocean.	Likely migrant.	threatened
Forster's Tern *Sterna forsteri*	Breeds in marshes, generally with lots of open water and large stands of island-like vegetation.	Likely summer resident. Potential migrant.	special concern
Greater Prairie-chicken *Tympanuchus cupido*	Open prairie and oak savannah.	Potential resident.	special concern
Horned Grebe *Podiceps auritus*	Breeds on small to moderate-sized, shallow freshwater ponds and marshes. Winters along coasts and on large bodies of water.	Likely migrant .	threatened
Marbled Godwit *Limosa fedoa*	Breeds in marshes and flooded plains, in migration and winter also on mudflats and beaches.	Likely summer resident.	special concern
Nelson's Sharp-tailed Sparrow *Ammodramus nelsoni*	Freshwater marshes and wet meadows in interior and brackish marshes along coast; in winter in salt and brackish marshes.	Likely summer resident. Potential migrant.	special concern

Table 4.6-2
State-Listed Bird Species – Becker County, MN

Common Name	Habitat	Likelihood of Occurrence	State Status
Red-shouldered Hawk *Buteo lineatus*	Nests in large (> 300 acres) mature deciduous or mixed forest. Forages in wetlands including wet meadows, lowland forests, or upland areas.	Likely summer resident.	special concern
Short-eared Owl *Asio flammeus*	Require large open grassland or emergent wetland habitats such as prairie, or marshes for breeding. Winter in old fields, marshes, and hayfields.	Likely summer resident. Potential year-round resident.	special concern
Trumpeter Swan *Cygnus buccinator*	Breeds in freshwater marshes and along ponds and lakes. Winters in lakes, streams, springs, rivers, and reservoirs.	Likely summer resident.	threatened
Wilson's Phalarope *Phalaropus tricolor*	Breed in shallow, prairie wetlands in the northern US and southern Canada. During migration, inhabit shallow ponds, flooded fields, and sometimes mudflats.	Potential summer resident. Potential migrant.	threatened
Yellow Rail *Coturnicops noveboracensis*	Shallow marshes, and wet meadows; in winter, drier fresh-water and brackish marshes, as well as dense, deep grass, and rice fields.	Likely summer resident.	special concern

4.6.3 Plant Communities

Four federally-listed threatened plant species occur in Minnesota: prairie bush-clover (*Lespedeza leptostachya*), western prairie fringed orchid (*Platanthera praeclara*), Minnesota dwarf trout lily (*Erythronium propullans*), and Leedy's roseroot (*Sedum integrifolium* ssp. *leedyi*). None of these species have been recorded in either Mahnomen or Becker Counties (USFWS 2009).

A total of 256 plant species are either state-listed as endangered (57), threatened (66) or special concern (133) in Minnesota. Most of the listed plant species occur in native habitats such as grasslands, wetlands, or woodlands, and will not likely be affected by the project since the sites have some level of past or current disturbance. However, surveys for state listed plant species may be required depending on final turbine placement within each site.

5.0 Communication, Radar, and Aviation Issues

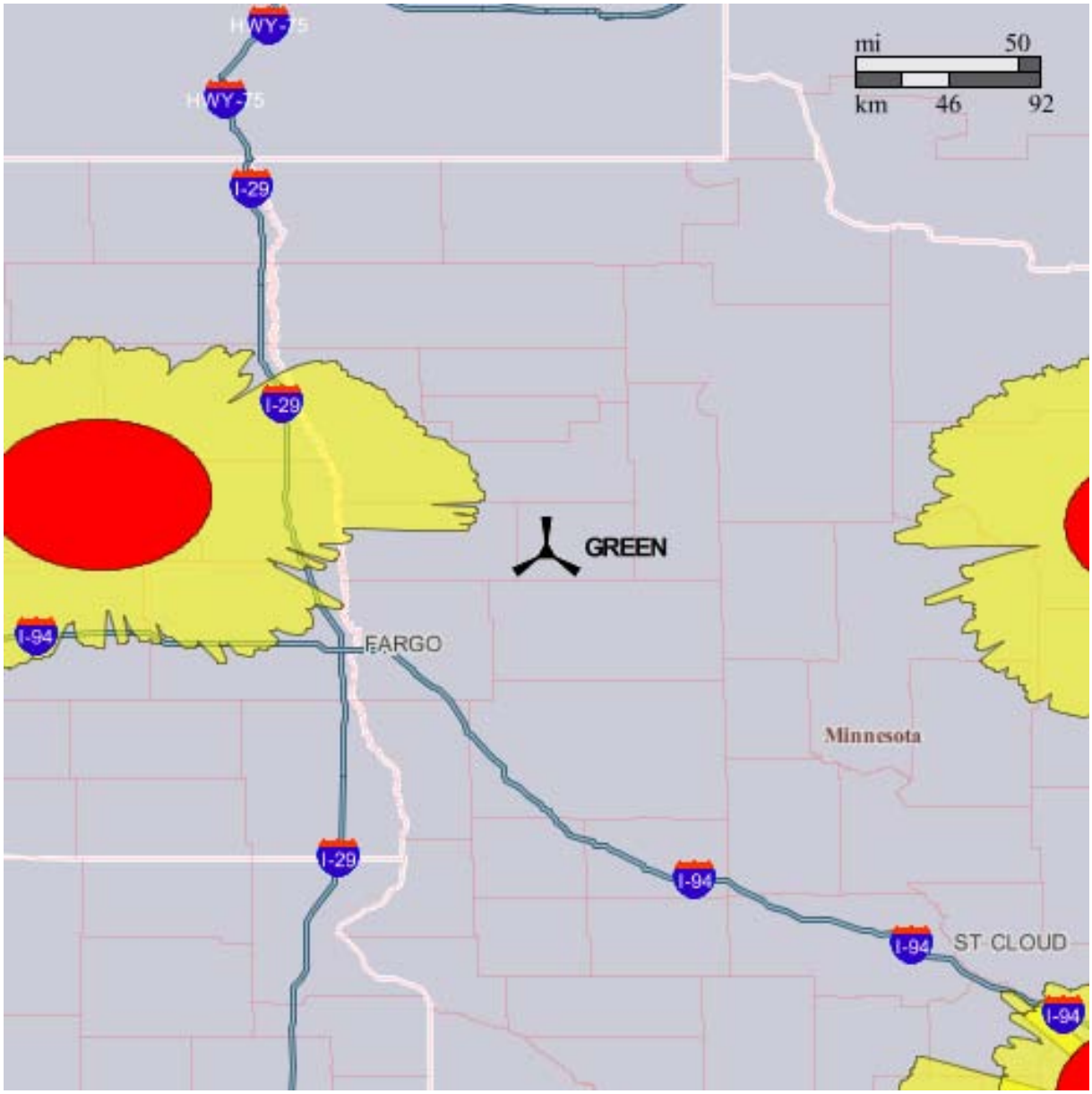
5.1 Airports

Mahnomen County Airport is located approximately 2.5 miles south of the Mahnomen Site. Due to the planned height of constructed turbines (<150ft) it is unlikely that turbine(s) will affect air traffic. Coordination with the airport or FAA representatives should be completed to ensure all appropriate conditions are met.

5.2 FAA - Radar Pre-Screen Tool

The FAA has developed an online tool (the "Radar Pre-Screening Tool") for initial evaluation of the potential impacts of elevated structure obstructions on Air Defense and Homeland Security radars, Weather Surveillance Radars-1988 Doppler (WSR-88D) radars, and Military Operations radars. This tool is intended to serve as a pre-screening tool, in order to identify potential issues with obstructions to Air Defense and Homeland Security, WSR-88D, and Military Operations radars. The tool outputs a color coded map, indicating whether areas require additional detailed studies to further qualify potential impacts. This tool has been applied for all three radar types for the Study Areas (Note: Only Mahnomen Site coordinates were inputted into the tool as output was clearly visible for all four proposed Sites). The results for long range and WSR-88D are illustrated in Figures 5.0-1 and 5.0-2. No military radars output was provided due to no known effects.

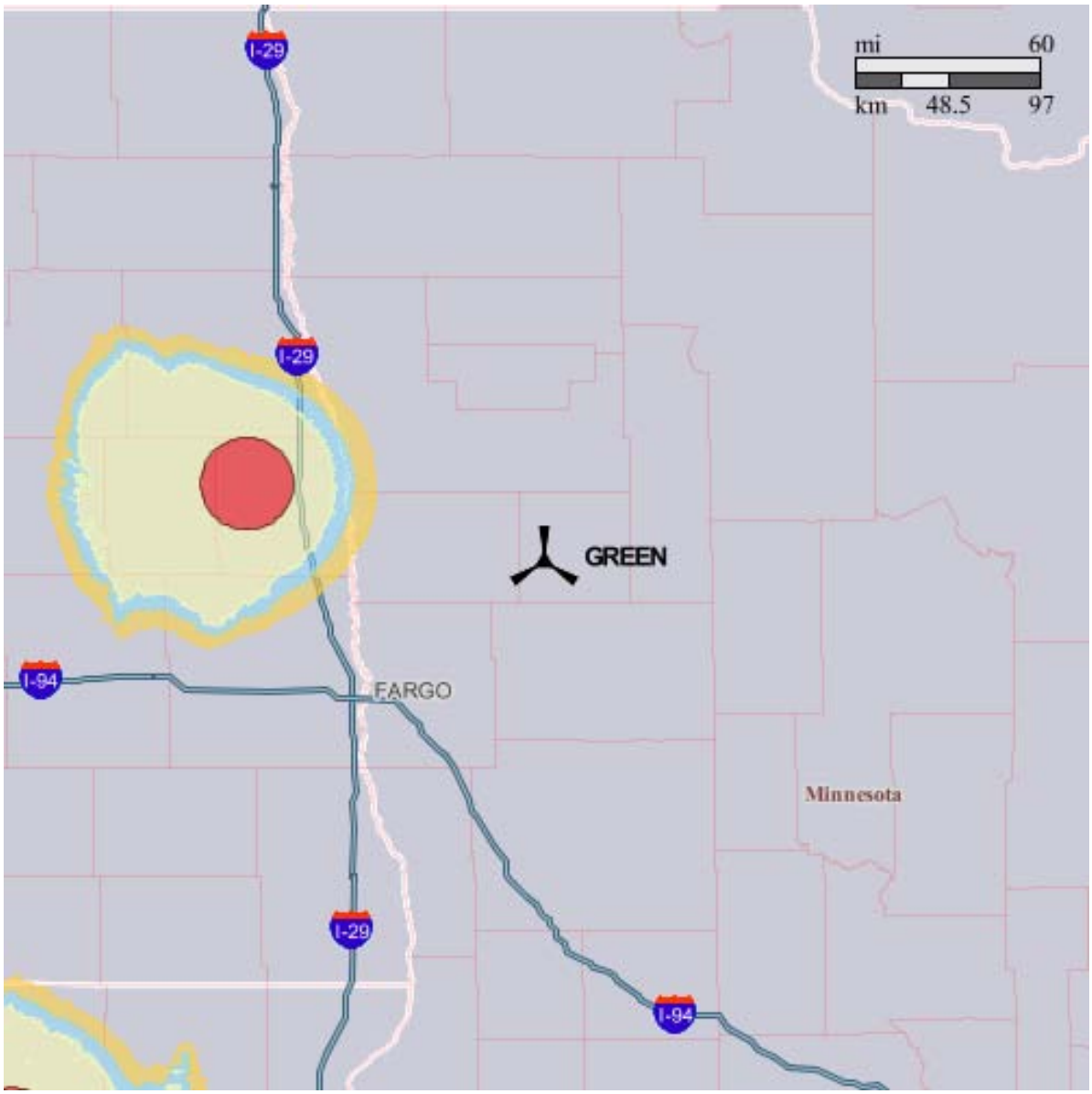
Based on the results of the radar tool application, turbine construction at all four locations are "not anticipated" to impact Air Defense and Homeland Security or WSR-88D weather radar operations.



Map Legend:

Green – No anticipated impact to Air Defense and Homeland Security radars. Aeronautical study required.
Yellow – Impact likely to Air Defense and Homeland Security radars. Aeronautical study required.
Red – Impact highly likely to Air Defense and Homeland Security radars. Aeronautical study required

Figure 5.0-1 FAA Long Range Radar Tool Resultant Map



Map Legend:

Green – Minimal to no impact to Weather Surveillance Radar-1988 Doppler (WSR-88D) weather radar operations. Aeronautical study required. National Telecommunications & Information Administration (NTIA) notification advised.
Yellow – Impact likely to WSR-88D weather radar operations. Turbine likely in radar line of sight. Aeronautical study required. NTIA notification strongly advised.
Red –Impact highly likely to WSR-88D weather radar operations. Turbine likely in radar line of sight. Aeronautical study required. NTIA notification strongly advised.

Figure 5.0-2 FAA Weather Surveillance Radar Tool Resultant Map

6.0 Conclusions

6.1 Land Cover

The four proposed wind turbine sites are located in Mahnomen and Becker Counties, Minnesota. Each site is relatively small ranging from approximately five to 150 acres. The existing land cover at each of the sites (previously described) is not incompatible with wind turbine development. At Mahnomen, a small amount (typically about 0.25 acre) of the restored grassland enrolled in the EQIP program would be used for the wind turbine foundation and associated equipment. Depending on which of the Waubun sub-sites is selected for the turbine, a small amount of land could be taken out of agriculture production, but crop production could continue around the base of the wind turbine.

In general, native habitats, including wetlands, forests, and grasslands, were found in negligible amount at all of the sites. Mahnomen and Waubun sites are located in areas designated as prairie; however, based on a review of MNDNR mapping the sites are not in a location designated as "natural prairie" (MNDNR 2009).

6.2 Wildlife and Plants

The primary wildlife concerns for the proposed project are birds and bats. Sensitive wildlife and plant species are also of concern. The following Tables 6.2-1 through 6.2-4 summarize wildlife and plant concerns by site and assesses their potential level of concern.

Table 6.2-1
Summary of Wildlife Considerations for the Mahnomen Site

Issue	*VH*	*H*	*M*	*L*	*Notes*
Potential for raptor nest sites				✓	Ground nesting prairie raptors most likely species, due to lack of trees
Raptor flight potential			✓		The general lack of stark topography over the majority of the site decreases the potential for concentrated raptor use; however, forage for prey may occur.
Potential for migratory pathway				✓	The site does not have major topographic relief or other prominent features likely to concentrate birds during migration.
Potential for raptor prey species			✓		Waterfowl and shorebirds may concentrate in area ponds and wetlands; some suitable habitat for small mammals exists but rodent populations should not be higher at the site than elsewhere in the region.
Potential for Federally protected species to occur				✓	Only on federal species is listed in the county (gray wolf) and presence is unlikely.
Potential for State issues		✓			Establishment of restored grasslands and enrollment in EQIP program potentially of concern.
Uniqueness of habitat at proposed Site		✓			Overall, habitat at the site is somewhat unique compared to the surrounding landscape, because it is an area of restored grassland surrounded by agricultural fields.
Potential for rare plants to occur				✓	No federally listed plants known to occur in Mahnomen County.
Potential for use by bats			✓		The site has scattered trees, buildings, and wetlands as well as small forested tracts that could be used by bats.

VH = Very High, H = High, M = Medium, and L = Low.

Table 6.2-2
Summary of Wildlife Considerations for the Waubun Site

Issue	*VH*	*H*	*M*	*L*	*Notes*
Potential for raptor nest sites				✓	Ground nesting prairie raptors most likely species, due to lack of trees.
Raptor flight potential			✓		The general lack of stark topography over the majority of the site decreases the potential for concentrated raptor use; however, forage for prey may occur.
Potential for migratory pathway				✓	The sites does not have major topographic relief or other prominent features likely to concentrate birds during migration.
Potential for raptor prey species			✓		Waterfowl and shorebirds may concentrate in area ponds and wetlands; some suitable habitat for small mammals exists but rodent populations should not be higher at the site than elsewhere in the region.
Potential for Federally protected species to occur				✓	Only on federal species is listed in the county (gray wolf) and presence is unlikely.
Potential for State issues		✓			Presence of CRP lands, WMA, IPA within close proximity of concern.
Uniqueness of habitat at proposed Site			✓		Overall, habitat in the site is not unique compared to the surrounding landscape, due to previous agricultural use and/or plot clearing. Potential for wetlands does exist.
Potential for rare plants to occur				✓	No federally listed plants known to occur in Mahnomen County.
Potential for use by bats			✓		The Site has scattered trees, buildings, and wetlands as well as small forested tracts that could be used by bats.

VH = Very High, H = High, M = Medium, and L = Low.

Table 6.2-3
Summary of Wildlife Considerations for the Naytahwaush Site

Issue	*VH*	*H*	*M*	*L*	*Notes*
Potential for raptor nest sites			✓		Area void of forested vegetation; however, surrounding area is heavily forested.
Raptor flight potential		✓			Raptors observed flying near site, high concentration of forested habitat adjacent makes raptor flight through project area likely.
Potential for migratory pathway			✓		The site does not have major topographic relief or other prominent features likely to concentrate birds during migration.
Potential for raptor prey species				✓	Site is maintained grass field for sports complex so foraging likely low.
Potential for Federally protected species to occur				✓	Only on federal species is listed in the county (gray wolf) and presence is unlikely.
Potential for State issues				✓	No protected or designated lands within or immediately adjacent to site.
Uniqueness of habitat at proposed Site				✓	Site is maintained grass field for sports complex. Adjacent areas are mixed land use.
Potential for rare plants to occur				✓	No federally listed plants known to occur in Mahnomen County.
Potential for use by bats			✓		Potential bat use is unknown, but due to lack of trees and structures within site use estimates are medium to low.

VH = Very High, H = High, M = Medium, and L = Low.

Table 6.2-4
Summary of Wildlife Considerations for the Pine Point Site

Issue	*VH*	*H*	*M*	*L*	*Notes*
Potential for raptor nest sites			✓		Site is void forested vegetation; however, adjacent area native forests. Structures exist with potential for nesting.
Raptor flight potential		✓			Due to surrounding habitat types and observation of raptors during field visit, raptor flight through site likely.
Potential for migratory pathway			✓		The site does not have major topographic relief or other prominent features likely to concentrate birds during migration.
Potential for raptor prey species			✓		Site is grass field adjacent wetland and forested habitat. Potential for prey species exist, but no more than surrounding regional.
Potential for Federally protected species to occur				✓	Only one federal species is listed in the county (gray wolf) and presence is unlikely.
Potential for State issues				✓	No areas of protected or managed lands exist within site.
Uniqueness of habitat at proposed Site				✓	Site is grass field with man-made ponds. Areas adjacent significantly more unique.
Potential for rare plants to occur				✓	No federally listed plants known to occur in Mahnomen or Becker Counties.
Potential for use by bats			✓		Site is void of forest habitat; however, structures do exist onsite and wetland adjacent.

VH = Very High, H = High, M = Medium, and L = Low.

6.3 Wetland and Waterbodies

Due to the small size of the proposed project footprint, turbines can be sited to avoid wetland impacts at each of the sites. Direct wetland impacts are not expected, unless access roads or other project features might affect wetlands. A permit from the U.S. Army Corps of Engineers would be required if access roads are to be constructed across jurisdictional wetlands.

6.4 Cultural Resources

There are no NRHP-listed historic properties recorded as being present within any of the sites. Significant historic tribal populations existed in, and may have an interest in development in, the subject counties. All proposed sites exist on tribal lands, and will be further reviewed by White Earth representatives.

6.5 Communication, Radar, and Aviation Related Issues

Mahnomen County Airport is located approximately 2.5 miles south of the Mahnomen site. Due to the planned height of constructed turbines (<150ft) it is unlikely that turbine will affect air traffic. Coordination with the airport or FAA representatives should be completed to ensure all appropriate conditions are met.

References

All About Birds. 2009 The Cornell Lab of Ornithology. Cornell University. Bird Guide. http://www.allaboutbirds.org/guide/search.aspx

Barclay, R.M.R., E.F. Baerwald, and J.C. Gruver. 2007. Variation in Bat and Bird Fatalities at Wind Energy Facilities: Assessing the Effects of Rotor Size and Tower Height. Canadian Journal of Zoology 85: 381-387. http://www.bio.ucalgary.ca/contact/faculty/pdf/Barclay07Tur.pdf

Bat Conservation International (BCI). 2008. Bat Species: US Bats. BCI, Inc., Austin, Texas. Accessed 2009. Homepage: http://www.batcon.org Species Profiles: http://www.batcon.org/SPprofiles/index.asp

Crockford, N.J. 1992. A Review of the Possible Impacts of Wind Farms on Birds and Other Wildlife. JNCC Report No. 27. Joint Nature Conservancy Committee. Peterborough, UK. 60 pp.

Erickson, W.P., 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. Technical report prepared for Bonneville Power Administration, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. December 2002. http://www.bpa.gov/Power/pgc/wind/Avian_and_Bat_Study_12-2002.pdf

Erickson, W.P., G.D. Johnson, M.D. Strickland, K.J. Sernka, and R.E. Good. 2001. Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States. Prepared for the National Wind Coordinating Committee (NWCC). http://www.west-inc.com and http://www.nationalwind.org

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report: July 2001 - December 2003. Technical report for and peer-reviewed by FPL Energy, Stateline Technical Advisory Committee, and the Oregon Energy Facility Siting Council, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Walla Walla, Washington, and Northwest Wildlife Consultants (NWC), Pendelton, Oregon. December 2004.

Johnson, G.D. 2005. A Review of Bat Mortality at Wind-Energy Developments in the United States. Bat Research News 46(2): 45-49.

Johnson, G.D., W.P. Erickson, and K. Bay. 2002b. Baseline Ecological Studies for the Klondike Wind Project, Sherman County, Oregon. Final report prepared for Northwest Wind Power, Goldendale, Washington.

Johnson, G.D., W.P. Erickson, J. White, and R. McKinney. 2003c. Avian and Bat Mortality during the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon. Technical report prepared for Northwestern Wind Power, Goldendale, Washington, by WEST, Inc., Cheyenne, Wyoming. March 2003. http://www.west-inc.com

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000a. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-Year Study. Final report prepared for Northern States Power Company, Minneapolis, Minnesota, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 22, 2000. 212 pp. http://www.west-inc.com

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000a. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-Year Study. Final report prepared for Northern States Power Company, Minneapolis, Minnesota, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 22, 2000. 212 pp. http://www.west-inc.com

Koford, R., A. Jain, G. Zenner, and A. Hancock. 2005. Avian Mortality Associated with the Top of Iowa Wind Farm. Progress Report, Calendar Year 2004. February 2005. Iowa Cooperative Fish and Wildlife Research Unit, Iowa State University. Ames, Iowa. 12 pp. http://www.horizonwind.com/images_projects/what_were_doing/TOI_Avian_Annual_Interim_Report_2004_020205.pdf

Kunz, T.H., E.B. Arnett, B.M. Cooper, 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. Frontiers in Ecology and the Environment 5(6): 315-324.

Lawrence, E.S., S. Painter, and B. Little. 2007. Responses of Birds to the Windfarm at Blyth Harbour, Northumberland, UK. In: Birds and Windfarms: Risk Assessment and Mitigation. M. J. de Lucas, G. F. E. Janss, and M. Ferrer, eds. Quercus, Madrid, Spain. Pp. 47-69.

Leddy, K.L. 1996. Effects of Wind Turbines on Nongame Birds in Conservation Reserve Program Grasslands in Southwestern Minnesota. M.S. Thesis. South Dakota State University, Brookings. 61 pp.

Leddy, K.L., K.F. Higgins, and D.E. Naugle. 1999. Effects of Wind Turbines on Upland Nesting Birds in Conservation Reserve Program Grasslands. Wilson Bulletin 111(1): 100-104.

Martin F.D. and Wike L.D. 2000. Role of Edge Effect on Small Mammal Populations in a Forest Fragment. Westinghouse Savannah River Company. Technical Report: DOI.

Migratory Bird Treaty Act (MBTA). 1918. 16 United States Code § 703-712. July 13, 1918

Minnesota Department of Natural Resources (MNDNR). 2009. Endangered, Threatened and Special Concern Species (Online). December 2010. http://www.dnr.state.mn.us/ets/index.html and http://www.dnr.state.mn.us/mammals/bats/index.html

Minnesota Department of Natural Resources (MNDNR). 2010. The Minnesota Department of Natural Resources Web Site (online). Accessed 2010 at http://www.dnr.state.mn.us/sitetools/copyright.html

National Research Council (NRC). 2007. Environmental Impacts of Wind-Energy Projects. National Academies Press. Washington, D.C.

National Wind Coordinating Committee (NWCC). 2004. Wind Turbine Interactions with Birds and Bats: A Summary of Research Results and Remaining Questions. Fact Sheet, Second Edition. November 2004. http://www.nationalwind.org/publications/default.htm

Natural Resources Conservation Service (NRCS). 2009. Environmental Quality Incentives Program (EQIP). http://www.nrcs.usda.gov/PROGRAMS/EQIP/

Noss R. 1995. The Ecological Effects of Roads. Wildlands CRP – Reviving Wild Places. http://www.wildlandscpr.org/ecological-effects-roads

Pedersen, M.B. and E. Poulsen. 1991. Impact of a 90m/2mw Wind Turbine on Birds - Avian Responses to the Implementation of the Tjaereborg Wind Turbine at the Danish Wadden Sea. Dansek Vildundersogelser 47: 1-44. Miljoministeriet & Danmarks Miljoundersogelser.

Piorkowski, M.D. 2006. Breeding Bird Habitat Use and Turbine Collisions of Birds and Bats Located at a Wind Farm in Oklahoma Mixed-Grass Prairie. M.S. Thesis. Oklahoma State University, Stillwater, Oklahoma. 112 pp.

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD

Shaffer, J.A. and D.H. Johnson. 2007. Effects of Wind Developments on Grassland Birds in Native Habitats in the Northern Great Plains. Presented at the 2007 International Meeting of The

Wildlife Society, Tucson, Arizona.

US Environmental Protection Agency (USEPA). 2007. Ecoregions. USEPA, Corvallis, Oregon. Available online at: http://www.epa.gov/wed/pages/ecoregions.htm. Ecoregion data available at: http://www.epa.gov/wed/pages/ecoregions/level_ii.htm and http://www.epa.gov/wed/pages/ecoregions/level_iii.htm

US Fish and Wildlife Service (USFWS). 2009. Minnesota County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species. http://www.fws.gov/midwest/endangered/lists/minnesot-spp.html

Usgaard, R.E., D.E. Naugle, R.G. Osborn, and K.F. Higgins. 1997. Effects of Wind Turbines on Nesting Raptors at Buffalo Ridge in Southwestern Minnesota. Proceedings of the South Dakota Academy of Science 76: 113-117.

Winkelman, E. 1990. Impact of the Wind Park near Urk, Netherlands, on Birds: Bird Collision Victims and Disturbance of Wintering Fowl. International Ornithological Congress 20: 402-403.

Young, D.P., Jr., W.P. Erickson, J.D. Jeffrey, K. Bay, and M. Bourassa. 2005. Eurus Combine Hills Turbine Ranch. Phase 1 Post Construction Wildlife Monitoring Final Report February 2004 February 2005. Technical report for Eurus Energy America Corporation and the Combine Hills Technical Advisory Committee, Umatilla County, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon.