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## List of Abbreviations

| Abbreviation | Definition |
|---|---|
| AADT | Average Annual Daily Traffic |
| AC | alternating current |
| ACGIH | American Council of Governmental Industrial Hygienists |
| ACSR | Aluminum conductor steel reinforced |
| ACSS | Aluminum conductor steel supported |
| Act | North Dakota Energy Conversion and Transmission Facility Siting Act |
| AES | Alternatives Evaluation Study |
| APLIC | Avian Power Line Interaction Committee |
| ATV | all-terrain vehicle |
| BMP | Best Management Practice |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| Commission | North Dakota Public Service Commission |
| Corridor Certificate Application | Certificate of Corridor Compatibility Application |
| CPI | center pivot irrigation |
| CREP | Conservation Reserve Enhancement Program |
| CRP | Conservation Reserve Program |
| dB | Decibel |
| dBA | A-weighted decibel |
| DC | direct current |
| DOT | North Dakota Department of Transportation |
| EHS | extra-high-strength |
| EMF | electric and magnetic fields |
| EMI | electromagnetic interference |
| EPA | Environmental Protection Agency |
| EPRI | Electric Power Research Institute |
| ESA | Endangered Species Act of 1973, as amended |
| FAA | Federal Aviation Administration |
| FAR | Federal Aviation Regulations |
| FEMA | Federal Emergency Management Agency |
| FHWA | Federal Highway Administration |
| FPPA | Farmland Protection Policy Act |
| GAP | Gap Analysis Program |
| GIS | Geographic Information System |
| Guidelines | Commission's Guidelines for Energy Conversion and Transmission Facility Siting |
| HVDC | high voltage direct-current |
| Hz | Hertz |

| Abbreviation | Definition |
|---|---|
| ICNIRP | International Commission on Non-Ionizing Radiation Protection |
| IEEE | Institute of Electrical and Electronics Engineers |
| kcmil | Thousand circular mils |
| kV | Kilovolt |
| LOI | Letter of Intent |
| MBTA | Migratory Bird and Treaty Act |
| MCS | Macro-Corridor Study |
| Minnkota | Minnkota Power Cooperative, Inc. |
| MW | Megawatt |
| NAC | Noise Area Classifications |
| NDAC | North Dakota Administrative Code |
| NDCC | North Dakota Century Code |
| NDGF | North Dakota Game and Fish Department |
| NDDTL | North Dakota Department of Trust Lands |
| NDPR | North Dakota Parks and Recreation Department |
| NEPA | National Environmental Policy Act |
| NERC | North American Electric Reliability Corporation |
| NESC | National Electricity Safety Code |
| NHI | Natural Heritage Inventory |
| NHPA | National Historic Preservation Act |
| NIEHS | National Institute of Environmental Health Sciences |
| NOI | Notice of Intent |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRCS | Natural Resource Conservation Service |
| NRHP | National Register of Historic Places |
| NMPA | Northern Municipal Power Agency |
| NWI | National Wetland Inventory |
| NWR | National Wildlife Refuge |
| OPGW | Fiber optical ground wire |
| OSHA | Occupational Safety and Health Administration |
| PA | Programmatic Agreement |
| PLOTS | Private Lands Open to Sportsmen |
| PLSS | Public Land Survey System |
| PPA | power purchase agreement |
| PPM | parts per million |
| Project | Center to Grand Forks Transmission Line Project |
| Project Route | Transmission line facilities locations |
| ROW | right-of-way |

| Abbreviation | Definition |
|---|---|
| Rules | NDAC Energy Conversion and Transmission Facility Siting |
| RUS | Rural Utilities Service |
| SHPO | State Historic Preservation Office |
| Square Butte | Square Butte Electric Cooperative |
| SSURGO | Soil Survey Geographic soils data |
| STATSGO | General State Soil Geographic |
| SVC | Static VAR Compensator |
| SWPPP | Storm Water Pollution Prevention Plan |
| TNC | The Nature Conservancy |
| TW | trapezoidal wire |
| USACE | U.S. Army Corps of Engineers |
| USDA | U.S. Department of Agriculture |
| USBOR | U.S. Bureau of Reclamation |
| USFWS | U.S. Fish and Wildlife Service |
| WDA | Wildlife Development Area |
| Western | Western Area Power Administration |
| WHO | World Health Organization |
| WMA | Wildlife Management Area |
| WPA | Waterfowl Production Area |
| Young 2 | Milton R Young Station Unit 2 |

# 1.0 Introduction

Minnkota Power Cooperative, Inc. (Minnkota), proposes to construct, operate, and maintain a 345 kilovolt (kV) transmission line and substation modifications from Center, North Dakota to Grand Forks, North Dakota called the Center to Grand Forks 345 kV Transmission Line Project (Project) (Case No. PU-09-670). Minnkota submits this application for a Transmission Facility Route Permit and respectfully requests that the North Dakota Public Service Commission (Commission) approve the Route developed for the Project (Project Route). The Project Route is approximately 250-miles-long and begins at the Center 345 kV Substation located near Center, North Dakota, and continues east to the Prairie Substation located adjacent to Grand Forks, North Dakota.

On February 18, 2011, Minnkota submitted an Application for a Certificate of Corridor Compatibility (Corridor Certificate Application) to the Commission. The Corridor Certificate Application requested approval of a 1,000-foot-wide Project Corridor. Public hearings for the Corridor Certificate Application were held June 16, 17, and 24, 2011. The Certificate of Corridor Compatibility was issued on September 7, 2011.

Minnkota is a wholesale electric generation and transmission cooperative headquartered in Grand Forks, North Dakota. Incorporated on March 28, 1940, Minnkota provides, on a nonprofit basis, wholesale electric service to 11 retail/member-owner distribution cooperatives, which are the members and owners of Minnkota. The member systems' service areas encompass 34,500 square miles in the eastern third of North Dakota and northwestern Minnesota that contains an aggregate population of approximately 300,000 people. These cooperatives serve more than 120,000 retail customers including many of the region's schools, farms, homes, and businesses.

The primary source of base load generation for the rural cooperatives is the Milton R. Young Generation Station located approximately 24 miles northwest of Bismarck, North Dakota, near the community of Center, North Dakota. Minnkota also serves as the operating agent for the Northern Municipal Power Agency (NMPA) members with respect to their 30 percent share of the output from the Coyote Station near Beulah, North Dakota, and associated transmission facilities. NMPA is the energy supplier for 12 municipal utilities located within the Minnkota service area. In addition, Minnkota has acquired, through power purchase agreements (PPAs) with large wind developers, significant North Dakota-based wind energy resources, totaling about 357 megawatts (MW) of nameplate capacity.

## *1.1 Compliance with the Energy Conversion and Transmission Facility Siting Act Chapter 49-22*

The North Dakota Energy Conversion and Transmission Facility Siting Act (Act) requires an application for a Route Permit to meet the criteria set forth in North Dakota Century Code (NDCC) Chapter 49-22. The routing of a transmission facility is to be made in an orderly manner compatible with environmental preservation and the efficient use of resources (NDCC Section 49-22-02). Consistent with this requirement, Minnkota's policy is to locate and design the Project to minimize environmental impacts and utilize existing corridors and section lines to the extent practical.

Within this application, Minnkota presents the information required by the Act. In addition, Minnkota discusses in this application its consideration of the exclusion areas, the avoidance areas, the selection criteria, and the policy criteria set forth in North Dakota Administrative

Code (NDAC) Section 69-06-08-02 when selecting the Project Route. Also, detailed transmission line design and technical information has been provided to allow a thorough evaluation of the Project Route (see **Appendix A** for the Design Data Report).

### 1.1.1 Rural Utilities Service Planning Documents

Minnkota requested financing assistance from the U.S. Department of Agriculture (USDA) Rural Utilities Service (RUS) to construct the Project. RUS administers the USDA's Rural Development Utilities Program and is required to complete an environmental analysis under the National Environmental Policy Act (NEPA) (7 Code of Federal Regulations (CFR) Part 1794) prior to approving financing assistance. The RUS requires preparation of four documents, i.e., an Alternative Evaluation Study (AES), a Macro-Corridor Study (MCS), a Scoping Report, and an Environmental Assessment (EA).

Beginning in March 2009 and on-going, Minnkota initiated a public involvement process for the Project. This is an effort to inform and gather data from the public, agencies, and tribal governments on the Project. Minnkota held five public open house meetings in May 2009, presented the Project at thirteen county commissioner meetings, met with a variety of state and federal agencies at a North Dakota Inter-Agency meeting, sent letters to tribal representatives, and held an additional open house meeting in August 2009.

The objectives of the outreach efforts were to educate interested stakeholders on the Project need and description, and gather information to develop potential corridors. To achieve these objectives, Minnkota publicized the Project and public meetings through press releases, local advertisements, informational postcards to the public, and letters to county commissioners, agencies, townships, and tribes. In addition, a toll free Project information hotline and website were established to offer resources and to collect input.

Following RUS guidance, Minnkota prepared an AES to identify the Project's purpose and need and system alternatives for meeting capacity requirements utilizing the alternating current (AC) transmission system. Appendix A of the Corridor Certificate Application provides a copy of the AES. The AES was approved by the RUS in October 2009. Refer to Section 2.2 of this application for a brief overview on the Alternatives that were studied.

In October 2009, Minnkota completed a MCS to begin the process of identifying corridors for potential routes. Refer to Appendix B of the Corridor Certificate Application for a copy of the MCS. Development of the MCS was a tiered process that narrowed a large study area into preliminary study corridors and then into macro-corridors. The MCS provided information about environmental, land use, social, cultural, and permitting factors for the macro-corridors. The macro-corridors evaluated for the Project were typically 6-miles-wide, while some portions of the macro-corridors were 8-miles-wide, such as near the Milton R Young Unit 2 Generation Station (Young 2) and the Prairie Substation. Study corridors were developed by considering the following criteria:

- Parallel existing rights-of-way (transmission lines, pipelines, railway, or roads), survey lines, section/field lines, and natural division lines;
- Avoid populated areas;
- Avoid major environmental natural features (Lake Ashtabula, Jamestown Reservoir, National Wildlife Refuges, Wildlife Management Areas, Wildlife Development Areas);
- Cross major rivers at areas in the vicinity of existing transmission line crossing;
- Avoid public airports;

- Maximize transmission system reliability (e.g., maintain maximum distance from existing system transmission lines);
- Minimize length; and
- Follow the Commission's Exclusion and Avoidance Area Criteria set forth in NDAC Section 69-06-08-02.

The purpose of the MCS was to identify potential constraints (natural or human resources that conflict with the location of new transmission line facilities) and opportunities (locations or areas well suited for the location of new transmission line facilities) that were considered when developing the macro-corridors. Generally, constraint areas were avoided, or at least minimized during the macro-corridor development process, and opportunities were used, to the extent practicable, to develop corridors between the two substations. Within the backdrop of constraints and opportunities, practical considerations such as total project length and potential cost issues were also considered.

In November 2009, the RUS held public and agency scoping meetings across the macro-corridors to gain input on opportunities and constraints within the macro-corridors. The goals of the public and agency meetings were to answer questions, provide information regarding the Project description, location, and need, and identify concerns regarding the potential environmental impacts. The agency meetings discussed compliance and permitting requirements and covered the range of issues to be addressed in the EA. In March 2010, the RUS released a Scoping Report for the Project. The Scoping Report summarized the public scoping process and inter-agency consultation regarding the macro-corridors and potential Project alternatives. Refer to Appendix C of the Corridor Certificate Application for a copy of the Scoping Report.

Following the release of the Scoping Report, the EA process began for the Project. Comments from the Scoping Report and state and federal agencies, Native American tribes, governmental representatives, and the public were used by Minnkota to identify potential Project impacts and refine the macro-corridors to develop EA "route" alternatives. Throughout the EA process, three 1,000-foot-wide "route" alternatives and 38 1,000-foot-wide segment alternatives were developed within the macro-corridors. Through the NEPA process and EA analysis of "route" and segment alternatives, Minnkota selected a preferred 1,000-foot-wide "route" alternative. Appendix D of the Corridor Certificate Application provided a copy of the EA.

In November 2010, the RUS released the EA for public and agency review during a 30-day-long EA comment period. The EA Comment Report was being prepared at the time this Route Permit application was prepared. Comments on the EA were used in developing the Corridor application and this Route Permit application. The preferred "route" alternative within the EA was further refined based on landowner discussions and was presented as the proposed Project Corridor within the Corridor Certificate Application. The RUS Finding of No Significant Impact (FONSI) is expected to be finalized and published in the first quarter of 2012.

### 1.1.2 Letter of Intent and Waiver of One-Year Notice

The Corridor Certificate Application included a discussion of Minnkota's Letter of Intent (LOI) to submit an application for a combined Certificate of Corridor Compatibility and Route Permit and a request for a waiver of the one-year notice period between filing the LOI and Certificate of Corridor Compatibility and Route Permit application. Refer to the Corridor Certificate Application Section 1.1.2 for details concerning the LOI.

### 1.1.3 Request for Commission Guidance Regarding a Route Proposal

The Corridor Certificate Application included discussion of Minnkota's request for Commission guidance on routing issues, including a Minnkota-specific routing proposal that addressed unique Project challenges. Refer to the Corridor Certificate Application Section 1.1.3 for details concerning the guidance request.

### 1.1.4 Certificate of Corridor Compatibility

On February 18, 2011, Minnkota submitted an application to the Commission for a Certificate of Corridor Compatibility. Consistent with the response letter to Minnkota from Commission Staff, dated May 13, 2010, the Corridor Certificate Application sought approval of a 1,000-foot-wide corridor for the Project. Public hearings on the Corridor Certificate Application were held June 16, 17, and 24, 2011. A Certificate of Corridor Compatibility approving a corridor for the Project (Project Corridor) was issued on September 7, 2011.

### 1.1.5 Proposed Corridor Modifications

Following issuance of the Certificate of Corridor Compatibility, Minnkota worked with landowners, agencies and others to identify a proposed Project Route within the Project Corridor that satisfies the siting criteria set forth in the Siting Act and Siting Rules and addresses various concerns raised both during and outside of the Corridor Certificate Application public hearings. The proposed Project Route identified falls slightly outside of the Project Corridor in five locations. For this reason, in addition to seeking a Route Permit for the proposed Project Route, Minnkota also requests that the Commission approve the five corridor modifications required to accommodate the proposed Project Route (proposed Modified Project Corridor). More specific information regarding the corridor modifications requested is set forth in Minnkota's Request for Modification of the Project Corridor and for Waiver of Procedures and Time Schedules (Corridor Modification and Waiver Request), which accompanies this Route Permit Application.

### 1.1.6 Route Permit

**Table 1.1-1** outlines the information required to fulfill the requirements to obtain a Route Permit from the Commission using the Commission's Guidelines for Energy Conversion and Transmission Facility Siting (November 1979) and identifying where these requirements are addressed in this application. This Route Permit Application sets forth Minnkota's proposed Project Route within the proposed Modified Project Corridor.

**Table 1.1-1. Route Permit Completion Checklist**

| State Authority | Description | Section |
|---|---|---|
| Chapter 49-22 | Commission Guidelines: Energy Conversion and Transmission Facility Siting | 1.1 |
| Section A | Description | 1.2, 4.2 |
| 1. | Type: Describe the type of transmission facility proposed. | 1.0, 1.2, 4.2 |
| 2. | Product: Describe the product or products to be transmitted. | 1.2.2 |
| 3. | Size and Design: Provide a general description of the proposed size and design, and any alternate size or design, which was considered. Provide one (1) copy of the design data report, separate from the application, for the proposed facility and any associated facilities. | 4.0, Appendix A |

| State Authority | Description | Section |
|---|---|---|
| 4. | Time Schedule: Provide the anticipated time schedule for the accomplishment of major events including, at a minimum, the following: | 1.3 |
| a. | Route Permit; | 1.3 |
| b. | Right-of-way acquisition complete; | 1.3 |
| c. | Construction start date; | 1.3 |
| d. | Construction complete; | 1.3 |
| e. | Test operations; and | 1.3 |
| f. | In-service date. | 1.3 |
| Section B | Location | Figure 3.1, Preliminary Plan and Profile, Appendix B |
| 1. | Discuss the utility's policies and commitments to limit the environmental impact of its facilities, including copies of board resolutions and management directives. | 3.4 |
| 2. | Discuss the factors listed in Section 49-22-09, NDCC to aid the Commission's evaluation of the proposed route. | 7.0 |
| a. | Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment. | 7.1 |
| b. | The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects. | 7.2 |
| c. | The potential for beneficial uses of waste energy from a proposed energy conversion facility | 7.3 |
| d. | Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designated. | 7.4 |
| e. | Alternatives to the proposed site, corridor, or route which are developed during the hearing process and which minimize adverse effects. | 7.5 |
| f. | Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated. | 7.6 |
| g. | The direct and indirect economic impacts of the proposed facility | 7.7 |
| h. | Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route. | 7.8 |
| i. | The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites. | 7.9 |
| j. | The effect of the proposed site or route on areas which are unique because of biological wealth or because they are habitats for rare and endangered species | 7.10 |
| k. | Problems raised by federal agencies, other state agencies, and local entities | 7.11 |

| State Authority | Description | Section |
|---|---|---|
| 3. | Identify and map the criteria that led to the proposed route location within the designated corridor. | Figures, 1.2.1, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6 |
| 4. | Discuss in detail the relative value of each criteria and how the location, construction, and operation of the facility will affect each criteria. | 1.2.1, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6 |
| 5. | The criteria to be evaluated shall include at a minimum all of the following which are within the designated corridor: | 3.0 |
| a. | Exclusion areas; | 3.1 |
| b. | Avoidance areas; | 3.2 |
| c. | Selection criteria; | 3.3 |
| d. | Policy criteria; | 3.4 |
| e. | Design and construction limitations; and | 3.5 |
| f. | Economic considerations. | 3.6 |
| 6. | Discuss the mitigative measures that will be taken to minimize adverse impacts which result from the location, construction, and operation of the facility. | 5.1.3, 5.2.3, 5.3.3, 5.4.3, 5.5.3, 5.6.3, 5.7.3, 5.8.3, 5.9.3, 5.10.3, 5.11.3, 5.12.3, 5.13.3, 5.14.3, 5.15.3, 5.16.3, 5.17 |
| 7. | List the qualifications of the people in the various disciplines that contributed to the facility route location study | 7.0 |
| 8. | Maps | Figures |
| a. | Map the criteria within the designated corridor showing the proposed route and location of any new associated facilities. Several different criteria may be shown on each map, depending on the map scale and the density and nature of the criteria. Minimum map scale shall be ½ inch = 1 mile. All maps shall be at the same scale unless otherwise specified. | Figures |
| b. | Furnish one (1) set of Mylar maps, separate from the application, of the same scale as the criteria maps and showing the same basic features as the criteria maps, including the designated corridor, but not the proposed route or location of any new associated facilities. | Figures. GIS-based maps are included with this Application in lieu of Mylar maps |
| c. | Furnish one (1) set of uncontrolled 9x9 inch stereo-pair aerial photographs, separate from the application, with acceptable resolution showing the designated corridor, proposed route and location of any new associated faculties, and Section, Township and Range numbers, at a scale of 1 inch = 2000 feet, together with a flight map at a scale of ½ inch = 1 mile showing each flight line and the beginning and ending photo number of each flight line. Photo mosaic strip maps will also be acceptable. If the applicant can demonstrate that because of the limited size and scope of the project, aerial photographs would not be practical, this requirement may be waived. | Figures. GIS-based maps are included with this Application. |

## *1.2 Project Summary*

The Project consists of approximately 250 miles of new, high voltage AC transmission line from the existing Center 345 kV Substation at the Milton R. Young Generation Station located about 4.5 miles southeast of the town of Center, North Dakota in Oliver County, to the existing Prairie Substation located on the western boundary of the city of Grand Forks, North Dakota in Grand Forks County (**Figure 1**). The Project will deliver energy from existing base load generation to Minnkota's cooperative members. While final engineering and design have not been completed, the majority of the line will be constructed with self-supported mono-pole tubular steel structures. Typical structures will be approximately 140-feet-high and placed approximately 1,000-feet apart. The typical right-of-way (ROW) is 150-feet-wide. In some limited instances, where specialty structures are required for long spans, additional ROW may be needed for the transmission line and this will be stated within the easement agreement. A preliminary plan and profile is attached. Final structure locations and design information will be provided to the Commission prior to construction.

### 1.2.1 Study Area, Project Corridor, and Route Development Summary

The Project's NEPA-compliance requirement changed corridor and route development from the traditional two-step process (i.e., Certificate of Corridor Compatibility and Route Permit), to a four-step process (i.e., MCS, EA, Certificate of Corridor Compatibility, and Route Permit). Section 1.1.1 describes in more detail the NEPA-compliance documents. Minnkota identified a need for additional power generation in northeast North Dakota and northwest Minnesota. Transmission constraints in this area were also threatening the stability of the regional transmission system. Minnkota defined a Study Area, rectangular in shape, that encompassed an area from Young 2 near Center, North Dakota (in the west), to Grand Forks and Fargo, North Dakota (in the east). The Study Area was narrowed into preliminary study corridors, based upon the criteria discussed in Section 1.1.1. Preliminary study corridors were developed to terminate in Grand Forks and Fargo. System impact studies indicate that a termination in Grand Forks supports a higher North Dakota load serving limit for the regionally limiting contingency. Voltage stability limits for prior-outage contingencies were also shown to be higher for the Grand Forks alternative. Fargo was not recommended as an end point due to the increased benefits shown from terminating in Grand Forks (refer to the AES provided in Appendix A of the Corridor Certificate Application).

Minnkota began the route development process by preparing the AES to identify alternatives for meeting capacity requirements and also prepared a MCS to begin the process of identifying a corridor for potential routes. The MCS was developed for the RUS and provided information about environmental, land use, social, cultural, and permitting factors for the macro-corridors within the Study Area (refer to the MCS provided in Appendix B of the Corridor Certificate Application). The RUS conducted a series of public meetings and an agency meeting to gain input on opportunities and constraints within the macro-corridors. The Scoping Report summarizes the comments collected during the meetings and a 30-day comment period (refer to the Scoping Report provided in Appendix C of the Corridor Certificate Application). Based on comments from the Scoping Report, public and agency input, and Minnkota's review of the macro-corridors, an EA was developed and a preferred 1,000-foot-wide Project Route was selected (refer to the EA provided in Appendix D of the Corridor Certificate Application). The preferred 1,000-foot-wide "route" alternative selected in the EA was further refined based on

landowner input and environmental studies and was presented to the Commission as the proposed Project Corridor in the Corridor Certificate Application.

The factors addressed in NDCC Section 49-22-09 were considered in identifying the Project Route for a 345 kV transmission line within the proposed Modified Project Corridor. The factors are discussed in Section 5.0. All exclusion and avoidance area criteria were considered in selecting the Project Route within the proposed Modified Project Corridor. Minnkota sought to avoid residential areas, irrigated land, recreational areas, wildlife, and conservation areas and to minimize impacts to agricultural fields to the extent practicable. Minnkota also considered utilizing existing rights-of-way and Public Land Survey System (PLSS) lines when crossing agricultural fields and interconnecting with existing infrastructure where possible, such as with the existing substations at both ends of the Project. This is consistent with the Commission's Policy Criteria for transmission corridors and routes (see NDAC Sections 69-06-08-02(2)(e), 69-06-08-02(4)(i), and 69-06-08-02(4)(g)), which encourage applicants to avoid residences and to maximize benefits by coordinating facilities and utilizing existing and proposed rights-of-way and corridors.

### 1.2.2 Product

The Project will transmit Young 2 output from the existing Center 345 kV Substation (located northeast of the Milton R. Young Generation Station, near Center, North Dakota) to the existing Prairie Substation in Grand Forks, North Dakota. The line is intended to be energized at 345 kV AC. Much of the energy transmitted on the new transmission line will be used to serve Minnkota customers in North Dakota and Minnesota.

## *1.3 Project Schedule*

Minnkota's construction schedule will be set by satisfactorily reaching a number of milestone agreements and obtaining required approvals. The in-service date is dependent upon permitting and development activities. Minnkota is targeting construction to begin in spring/summer 2012, provided that Minnkota can secure all preconstruction permits and approvals. No future Project expansions or additions are anticipated at this time.

1. **Certificate of Corridor Compatibility:** Minnkota submitted a Corridor Certificate Application in February 2011. The Commission issued a Findings of Fact, Conclusions of Law and Order for a Certificate of Corridor Compatibility on September, 7, 2011. Minnkota anticipates that the proposed Modified Project Corridor will be approved at the same time the Route Permit is issued in the first quarter of 2012.
2. **Route Permit:** Minnkota submits this Route Permit application for the Project. Minnkota anticipates the Route Permit will be issued in the first quarter of 2012. It is critical for Minnkota to receive the Route Permit as soon as possible, as completing this step will allow Minnkota to move forward with other commitments associated with the Project, including ordering long-lead-time equipment and securing other permits and approvals.
3. **Right-of-Way Acquisition Complete:** Minnkota is responsible for all right-of-way acquisition and is in the process of obtaining the necessary easement options from landowners. The voluntary land acquisition process is anticipated to be substantially complete by winter 2011.

4. **Equipment Procurement, Manufacture, and Delivery:** Minnkota will order the transmission and substation components as soon as practicable. Once the components have been ordered, delivery is anticipated to occur so as to allow construction to be completed by the 4th quarter 2013.
5. **Construction:** Project construction is expected to begin in spring/summer 2012, subject to obtaining applicable permits. Construction will take approximately twenty months to complete.
6. **Test and Operations:** Minnkota expects system commissioning will occur in 4th quarter 2013.
7. **In-Service Date:** The expected in-service date is 4th quarter 2013.

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# 2.0 Need for Facility

## *2.1 Needs Analysis*

Over the past ten years, Minnkota's load has grown at a rate of 2.9 percent annually (refer to the AES provided in Appendix A of the Corridor Certificate Application). In addition, Minnkota's 2009 Load Forecast Study showed that load will continue to grow at a rate of approximately 1.9 percent annually over the next 25 years (Minnkota 2010a). In order to adequately serve this future load growth, Minnkota must increase its base load generation resources. In particular, additional base load generation is needed by the winter of 2013 to address an increased need for electricity to serve new residences, commercial accounts, and pipeline pumping projects (Minnkota 2010a).

To address the need for additional base load generation resources, Minnkota will acquire additional generation from Young 2 in early 2013 and eventually acquire all of the Young 2 output. A more detailed needs analysis is included in Section 2.0 of the Corridor Certificate Application.

## *2.2 Alternatives*

Minnkota conducted an AES on the Project for the RUS, which discussed system alternatives for addressing Minnkota's Young 2 output transmission requirements utilizing the AC transmission system. The AES was included as Appendix A to the Corridor Certificate Application. As discussed in the AES, regional transmission studies and Minnkota-specific system studies have shown that the best solution for addressing Minnkota's transmission requirements, as well as for meeting the voltage stability and load-serving capability needs of the Red River Valley region, is to construct a new transmission facility. The Project is needed to transmit the baseload generation to meet anticipated customer demand from Young 2 to the Red River Valley and to improve regional electrical system reliability. The AES analyzed specific alternatives to the Project (i.e., No Action, 230 kV Line, and 345 kV Line from Center to Fargo). These alternatives are discussed in detail in Section 2.2 of the Corridor Certificate Application.

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# 3.0 Transmission Facility Route Criteria

The Project Route selection included an inventory and suitability analysis of criteria listed in NDAC Section 69-06-08-02, including exclusion and avoidance area criteria; selection criteria that relate to minimizing potential land use and environmental impacts; policy criteria that relate to maximizing public benefits; and design and construction limitations. Minnkota also included economic considerations.

The ROW is the 150-foot-wide area in which the transmission line facility will be constructed and the Route refers to the specific locations of the transmission line facilities. **Figure 2** displays Project Route siting criteria used to determine the location of the Project Route.

## *3.1 Exclusion Areas*

Per Section 69-06-08-02(1), the geographical areas listed in **Table 3.1-1** shall be excluded in the consideration of a route for a transmission facility, and shall include a buffer zone of reasonable width to protect the integrity of the area. Exclusion areas are mapped for the Project Route in **Figure 3**.

**Table 3.1-1. Exclusion Areas**

| Geographic Area | Present within Project ROW | Proposed Buffer | Section Addressed |
|---|---|---|---|
| Designated or registered national: parks; memorial parks; historic sites and landmarks; natural landmarks; monuments; and wilderness areas | Not present within Project ROW. | No impacts are anticipated and no buffer is proposed. | 5.2; 5.7; 5.8 |
| Designated or registered state: parks; historic sites; monuments; historical markers; archaeological sites; and nature preserves | Not present within Project ROW. | No impacts are anticipated and no buffer is proposed. | 5.2; 5.7; 5.8 |
| County parks and recreational areas; municipal parks; and parks owned or administered by other governmental subdivisions | Not present within Project ROW. | No impacts are anticipated and no buffer is proposed. | 5.2, 5.8 |

| Geographic Area | Present within Project ROW | Proposed Buffer | Section Addressed |
|---|---|---|---|
| Areas critical to the life stages of threatened or endangered species | Missouri River is designated critical habitat for federally threatened piping plover. River will be spanned by the transmission line. Minnkota is working with the U.S. Fish and Wildlife Service (USFWS) on the Missouri River crossing for the Project Route. | The RUS has engaged the USFWS in the Section 7 consultation process to ensure that the Project will not jeopardize the continued existence of any listed species or adversely modify critical habitats.<br>No direct impacts within critical habitat expected; transmission line will span Missouri River, with structures being placed approximately 150-feet-away (back) from river's edge.<br>Minnkota will not construct the Missouri River crossing during the typical breeding season for the piping plover. During construction, no equipment will be located within the Missouri River. | 5.2, 5.8, 5.14; 5.15, 5.16 |
| Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged | No. Areas containing unique or rare plant or animal species are present within the Project ROW, but these areas and unique or rare species will not be irreversibly damaged by the Project Route. | See Section 5.16.3 for a list of mitigation and minimization measures Minnkota has identified. The Project is not expected to result in the listing of or jeopardizing of continued existence of any wildlife species, and will not violate any wildlife protection laws. Some examples of mitigation and minimization measures include shield wire marking, spanning the Missouri River, constructing the Missouri River crossing between November and the following March, pre-construction piping plover surveys, and designing the transmission line following Avian Powerline Interaction Committee (APLIC) standards. | 5.2, 5.8, 5.15, 5.16 |

## *3.2 Avoidance Areas*

Per Section 69-06-08-02(2), the geographical areas listed in **Table 3.2-1** shall not be considered in the routing of a transmission facility unless the applicant shows that under the circumstances there is no reasonable alternative. In determining whether an avoidance area should be designated for a facility, the Commission may consider, among other things, proposed management of adverse impacts; orderly siting of facilities; system reliability and integrity; efficient use of resources; and alternative routes. Avoidance areas are mapped for the Project Route in **Figure 3.**

**Table 3.2-1. Avoidance Areas**

| Avoidance Area | Present within Project ROW | Proposed Buffer | Section Addressed |
|---|---|---|---|
| Designated or registered national: historic districts; wildlife areas; wild, scenic or recreational rivers; wildlife refuges; and grasslands | Not present within Project ROW. | No impacts are anticipated and no buffer is proposed. Access will be maintained and recreational activity may continue. | 5.2; 5.7; 5.8; 5.12; 5.15 |
| Designated or registered state: wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands | 1 Wildlife Management Area (WMA) (Wilbur Boldt). | The Project Route avoids the WMA (no structures or conductors will be placed within the WMA). However, the Project ROW will overhang the WMA. Minnkota has submitted an application for an overhang easement to the North Dakota Game and Fish Department (NDGF) for the Wilbur Boldt WMA. Access will be maintained and recreational activity may continue. | 5.8; 5.12; 5.14 |
| Historical resources which are not specifically designated as exclusion or avoidance areas | - 21 archaeological resource sites have been identified within the Project ROW.<br>- 36 architectural resources have been identified within the Architectural APE - 26 historic structures from SHPO database and 10 eligible structures from the architectural inventory. The Architectural APE extends 0.5 mile on either side of the Project ROW centerline and 1 mile on either side of the Project ROW centerline at the Missouri River crossing | 9 structures will be located in four archaeological resource areas – 3 structures within two sites and 6 structures within two site lead boundaries, no impacts anticipated since additional testing will occur at the two site and the two site lead boundaries were surveyed and found archaeological material. Minnkota will seek SHPO concurrence prior to construction.<br>One architectural resource will be visually impacted by the Project Route, but the impact will be mitigated through screening.<br>No architectural resources are located within the Project ROW.<br>Minnkota is in the process of conducting cultural resource field surveys of high probability areas to avoid impacting cultural resource sites identified in the ROW. In addition, Minnkota will monitor auger locations in areas that have a high potential for deeply buried sites. The Programmatic Agreement, as executed by the SHPO, outlines the procedures for the identification and treatment of sites. | 5.7 |

| Avoidance Area | Present within Project ROW | Proposed Buffer | Section Addressed |
|---|---|---|---|
| Areas that are geologically unstable | Not present within Project ROW. | No impacts are anticipated and no buffer is proposed. | 5.11 |
| Within 500 feet of a residence, school, or place of business | - 10 occupied or vacant, but occupiable homes within 500-feet feet of the Transmission Facility.<br>- 1 vacant, not habitable home is located within the Project Route and will be removed. | Minnkota developed a route to avoid occupied homes by maximizing setbacks to the extent practicable. In some instances, it was preferable for the Project Route to pass within 500 feet of an occupied residence due to other routing factors. Minnkota has obtained waivers of the 500-foot setback requirement for 9 occupied homes and the 1 vacant, not habitable home. | 5.2; 5.3; 5.9 |
| Reservoirs and municipal water supplies | Not present within Project ROW. | Minnkota does not anticipate direct or indirect effects to reservoirs and municipal water supplies. | 5.3; 5.11; 5.12 |
| Water sources for organized rural water districts | The McClusky Canal will be crossed by the Project Route at two locations. At both locations, two structures will be placed on uplands of the canal.<br>Rural water pipelines may potentially be present. | The McClusky Canal will be crossed by the Project Route, but no direct impacts to the canal are anticipated. A Special Use Permit will be obtained from the U.S. Bureau of Reclamation (USBOR) for installation of two structures on USBOR property.<br>Minnkota will conduct a survey for underground utilities and does not anticipate direct or indirect effects to rural water districts. | 5.3; 5.11 |
| Irrigated land. This criterion shall not apply to an underground transmission facility. | Not present within Project ROW. | No impacts are anticipated and no buffer is proposed. | 5.2; 5.9 |
| Areas of recreational significance which are not designated as exclusion areas | - North Country National Scenic Trail.<br>- Lewis and Clark National Historic Trail.<br>- Chain of Lakes Recreation Area (McClusky Canal).<br><br>No reasonable alternative exists to crossing these trails and canal. | Minnkota will span trails.<br>One structure will be located within the Chain of Lakes Recreation Area (McClusky Canal) totaling about 78.5 sq ft of permanent impact. Minnkota is applying for a Special Use Permit from the USBOR.<br>Visual impacts will be minimized by placement of structures away from these features to the extent practicable. Access will be maintained and recreational activity may continue. | 5.8 |

## *3.3 Selection Criteria*

Per Section 69-06-08-02(3), a route shall be designated only when it is demonstrated to the Commission by the applicant that any significant adverse effects resulting from the location, construction, and maintenance of the facility, as they relate to the following, will be at an acceptable minimum or that those effects will be managed and maintained at an acceptable minimum (**Table 3.3-1**). **Figures 2**, **3,** and **4** identify the selection criteria for the Project

**Table 3.3-1. Selection Criteria**

| Selection Criteria | Potential Adverse Effects | Section Addressed |
|---|---|---|
| Agricultural production | Permanent impacts will occur as a result of structure placement in tillable soil, expansion of the Center 345 kV Substation, installation of the fiber optic stations, and fiber optic station access road development; impacts are approximately 78.5 square feet per structure or a total of about 6.5 acres for the Project (includes about 4.2 acres of Restricted Tillage Area as described in section 5.9). Temporary construction impacts such as soil compaction and crop damage will likely occur; approximately 2,827 square feet per structure or a total of about 715.4 acres for the Project.<br>Minnkota will work with landowners to minimize impacts to their land. | 5.2; 5.9 |
| Family farms and ranches | Eleven homes (10 occupied and 1 vacant, not habitable) are present within 500-feet of the transmission facility. The closest home to the Project Route (about 49 feet) is Minnkota owned. Minnkota will work with landowners to minimize impacts to their land and farming and/or ranching operations. | 5.2; 5.9 |
| Land which the owner demonstrates has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation | No CPI systems are present within the Project ROW. It is likely land economically suitable for irrigation is present within the Route; however, Minnkota will work with landowners to minimize impacts to their land. | 5.2, 5.9 |

| Selection Criteria | Potential Adverse Effects | Section Addressed |
|---|---|---|
| Surface drainage patterns and ground water flow patterns | No impacts are anticipated to rivers, streams, and drainage ways resources. Minnkota will span all rivers and streams to the extent practicable. A Sheyenne River hydrology study has been completed for the Project.<br>The removal of soil and groundwater at each structure location is not anticipated to impact local groundwater flow patterns due to the temporary and small-scale nature of the removal.<br>Structures will be placed in floodplains on the Missouri River, Sheyenne River, Goose River, Little Goose River, and English Coulee. Structures will be designed to withstand flood conditions, as necessary. The Missouri River floodplain crossing requires three transmission structures, totaling approximately 4,078 square feet of permanent impacts. For the Sheyenne River, three transmission structures are necessary within the floodplain totaling approximately 236 square feet of permanent impacts. Three crossings of the English Coulee floodplain are required; the flood retention area requires five transmission structures, totaling 393 square feet of permanent impacts, 3 structures are required at the second location with 231 square feet of impact, and no impacts would occur at the third crossing. Two structures are necessary to cross the Goose River resulting in 157 square feet of floodplain impact, and one structure would affect the Little Goose River floodplain with 78.5 square feet of permanent impacts.<br>To minimize impacts during construction, a National Pollutant Discharge Elimination System (NPDES) permit and a Storm Water Pollution Prevention Plan (SWPPP) will be prepared and a Notice of Intent (NOI) will be submitted to the North Dakota Department of Health. | 5.11, 5.12 |
| Noise sensitive land uses | Ten occupied homes and one vacant, not habitable home are within 500-feet of the Project Route. These homes may experience short-term effects during construction such as elevated noise levels and increased vehicle traffic. However, no noise impacts are anticipated during Project operation.<br>Closest occupied structure from the Center 345 kV Substation is about 5,380 feet and from Prairie Substation is about 2,880 feet. No impacts to noise sensitive land uses are anticipated due to substation upgrades. | 5.5 |
| The visual effect on the adjacent area | The transmission line will be visible to individuals traveling on adjacent roads and to residences and landowners that live close to the transmission line and substations. The Project Route selected minimizes the number of residences potentially impacted by the line. Minnkota sited the Route along field lines away from residences to the extent practicable. | 5.6 |
| Extractive and storage resources | 2 gravel pits are located within the Project ROW. These landowners have not indicated future extraction plans. Minnkota has addressed a future extraction strategy with the landowners within their option agreements. No adverse effects are anticipated. | 5.2; 5.9 |
| Wetlands, woodlands, and wooded areas | Wetland surveys will be completed prior to construction to avoid or minimize the placement of transmission structures within wetlands.<br>The most common wooded areas are shelterbelts in fields and around residences and buildings. Some rivers and streams crossed by the Route may have a wooded, riparian fringe.<br>If impacts to wetlands and woodlands cannot be avoided, options to minimize impacts will be considered and mitigation will be proposed consistent with regulatory requirements. | 5.9; 5.13; 5.14 |

| Selection Criteria | Potential Adverse Effects | Section Addressed |
|---|---|---|
| Radio and television reception and other communication or electronic control facilities | No communication towers are located in the Project ROW. The communication tower located within the Project Corridor will limit where adjacent structures are placed in relation to the tower, but will not impact operation of the Project or the communication tower. | 5.3; 5.9 |
| Human health and safety | Once construction is complete, the transmission line will span all roads and therefore will not impede emergency services.<br>Minnkota conducted an electric and magnetic field (EMF) effect estimate for the Project (as shown in Table 5.4-4). Results of the estimate show that calculated EMF levels for maximum operating conditions and normal operating conditions are below published guidelines.<br>Minnkota will design the Project to meet National Electric Safety Code (NESC) standards. Safety concerns related to electric fields are sufficiently addressed by adherence to the NESC. No additional mitigation is required or anticipated. | 5.3; 5.4 |
| Animal health and safety | No impacts to livestock are anticipated.<br>Impacts to wildlife populations are expected to be minimal. Minnkota has committed to marking the shield wires in select areas and designing the line and structures per APLIC guidelines. | 5.4; 5.9; 5.15; 5.16 |
| Plant life | The project area is primarily agricultural in nature. The most common type of rare plant communities in the Project ROW is western wheatgrass prairie, needle and thread mixed grass prairie, and cottonwood-green ash floodplain forests near the Missouri and Sheyenne Rivers. Permanent impacts to plant life will occur at structure and fiber optic station locations and areas of tree clearing. Areas of temporary construction impacts will be restored. Construction impacts to wooded areas will be limited to the 150-foot-wide right-of way in compliance with NERC standards for transmission facilities; low growing woody vegetation within the right-of-way may be allowed if it does not interfere with the safe operation and maintenance of the line. Impacts to individual trees would be replaced at a ratio of 2:1. | 5.14 |

## *3.4 Policy Criteria*

Per Section 69-06-08-02(4), the Commission may give preference to an applicant that will maximize benefits that result from the adoption of the following policies and practices, and in a proper case may require the adoption of such policies and practices (**Table 3.4-1**).

**Table 3.4-1. Policy Criteria**

| Policy Criteria | Suitable Policy or Practice of Applicant | Section Addressed |
|---|---|---|
| Location and design | Minnkota's policy is to locate and design to minimize environmental impacts and utilize existing corridors. | 1.1; 1.2.1 |
| Training and utilization of available labor in this state for the general and specialized skills required | Minnkota has discussed with construction contractors the use of local labor and will compile a listing of available local labor for use during construction. | 5.1 |

| Policy Criteria | Suitable Policy or Practice of Applicant | Section Addressed |
|---|---|---|
| Economies of construction and operation | Minnkota will utilize specialty contractors with proven experience in large transmission projects. Economy is obtained by originating and terminating into existing jointly owned substation facilities. | 5.1 |
| Use of citizen coordinating committees | Minnkota will work with landowners of properties crossed by the Project to site the transmission facility, and it is not anticipated that citizen coordinating committees will be necessary. | See Section 6.0 in the Corridor Certificate Application |
| A commitment of a portion of the transmitted product for use in this state | Energy transmitted by the Project will be used in Minnkota's service territory, which includes North Dakota. | 1.0; 1.2; |
| Labor relations | No labor relations will be affected. | 5.1 |
| Coordination of facilities | Minnkota has coordinated and will continue to coordinate with area utilities regarding the location of the facilities to maximize benefits and minimize duplication of efforts. | 1.2.1; 1.2.2 |
| Monitoring of impacts | Minnkota will utilize BMPs during construction to minimize environmental impacts and will monitor construction compliance with the commitments made in this application and applicable permit conditions, including the Commission's Order. | 5.10.3; 5.14.3; 5.15.3 |
| Utilization of existing and proposed rights-of-way and corridors | One of the primary goals in locating the Project Route was to maximize use of existing rights-of-way, corridors, and field breaks, to the extent practical. Paralleling opportunities are shown in Table 5.2-3. | 1.2.1; 5.2 |
| Other existing or proposed transmission facilities | Paralleling opportunities will be utilized to the extent practical. Project will utilize the existing Center 345 kV Substation and Prairie Substation. | 1.2; 4.2.4; 5.2 |

Minnkota's policy #5-LA-1 clarifies its position relative to environmental laws and regulations, and states that:

*It is a policy of Minnkota Power Cooperative to obey all laws and comply with all regulations promulgated pursuant to those laws affecting and governing the operation of Minnkota.*

*This is especially emphasized in the area of environmental laws and regulations. Each employee must be aware that there may be environmental responsibilities and requirements relating to their job at Minnkota. Each employee must follow rules they are instructed to observe relating to compliance with these legal responsibilities and requirements.*

Minnkota's environmental policies are consistent with Commission policy criteria outlined in NDAC Section 69-06-08-02(4).

## *3.5 Design and Construction Limitations*

Design and construction limitations for a transmission line within the Project ROW are primarily associated with the location of the transmission line. The Project Route is the most direct route that also minimizes impacts to the criteria identified in Section 69-06-08-02.

Most wetland impacts will be avoided through careful routing of the transmission line and associated facilities. Where impacts occur, they will be minimized by matting. Since new easements may be secured by the USFWS and USDA Natural Resource Conservation Service (NRCS), Minnkota continues to work with the agencies and landowners to obtain the exact locations of USFWS grassland and wetland easements and NRCS – Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP) parcels. In April 2011, locations of USFWS easements current through October 2010 were obtained in order to assess impacts and begin permitting conversations. In September 2011, a field review of the easement locations was conducted with the USFWS.

Following geotechnical exploration, it may become necessary to utilize special structures to avoid sensitive environmental features or different construction methodology may be required such as a specific footing design to accommodate soil features or other design limitations. The Missouri River crossing will require a special structure, i.e., a three pole structure with each phase supported by a separate pole (**Table 4.2-2**).

## *3.6 Economic Considerations*

There are several economic considerations in deciding where the Project should be routed. Overall, minimizing the length decreases the cost to construct the transmission line due to less material and ROW needed and less potential affects upon the land use. Minimized length also reduces line loss, as electricity travels from the generation source to the end user. As described in Section 2.2, this line design is the most economical and efficient alternative to deliver the electricity.

The single-pole, self-supporting design will have a smaller footprint on the land than other structure types (H-frame or three-pole) thereby minimizing environmental impacts. Another consideration in decreasing cost is in minimizing the number of corner structures required for the transmission line. Corner structures increase project costs, since special structures and engineering are typically required. They also slightly increase environmental impact as they have a larger construction footprint. Minnkota attempted to minimize the overall Project costs while simultaneously considering exclusion areas, avoidance areas, selection criteria, policy criteria, and landowner concerns.

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# 4.0 Engineering and Operational Design

Engineering design data is presented in **Appendix A**. Minnkota submits a preliminary plan and profile (attached). A legal description for the Project Route is provided in **Appendix B**. Reference **Figure 2** for the Project Route.

## *4.1 General Route Description*

The following is a description of the Project Route from west to east starting at the Center 345 kV Substation and ending at the Prairie Substation (**Figure 1**). The Project Route is approximately 250-miles-long. The Project Route proceeds diagonally northeast out of the Center 345 kV Substation for about 0.9 miles to the section line, then proceeds due east along the section line for about 3.25 miles. The Project Route then turns diagonally southeast on a cross-country path for about 0.5 miles, then proceeds east for approximately 0.75 miles, then northeast for about 0.5 miles to the section line. The Project Route travels east along the section line for about 3 miles, then diagonals to the northeast for about 1 mile, then turns to travel east for almost 3 miles to the Missouri River. It crosses the Missouri River about 0.16 miles north of the existing HVDC transmission line on the west side of the river and about 0.5 miles north of the existing HVDC transmission line on the east side of the river. From the west side of the Missouri River, the Project Route proceeds diagonally northeast for almost 2 miles, crossing State Highway 1804, then the Project Route proceeds east along 279th Ave NE for about 2.25 miles. The Project Route then proceeds north for about 0.75 miles before turning diagonally northwest for about 2 miles. The Project Route then proceeds north for 3.75 miles along a section line, and then east for about 5.5 miles along a quarter-section line to within 0.5 miles west of State Highway 41.

The Project Route proceeds north for about 8.5 miles along the quarter-section line about 0.5 miles west of State Highway 41, turns east for approximately 2 miles along State Highway 41, and follows State Highway 41 to the north for about 9 miles; within this segment, the Project Route spans the McClusky Canal and Chain of Lakes Recreation Area. The Project Route turns east for about 2 miles along 3rd St NW to the McLean/Sheridan County line. The Project Route proceeds diagonally, cross-country for about 2.4 miles to 5th St NW; then turns east along 5th St NW for about 0.75 miles. The Project Route travels diagonally, cross-country for about 7 miles, then diagonally northeast for 0.75 miles to the west side of 1st Ave NE in Sheridan County. At that point the Project Route proceeds east (about 0.25 miles north of 10th St NE) for about 20.5 miles; within this segment, the Project Route crosses the McClusky Canal and State Highway 14. The Project Route turns south for about 0.25 miles to 10th St NE/the section line; then turns east along the section line for about 4 miles, before turning north for about 0.25 miles to the quarter-section line. The Project Route goes east for about 1 mile approximately 0.25 miles north of 10th St NE. The Project Route turns south for about 0.25 miles to the section line, then travels east for about 2.25 miles along the section line to within 0.25 miles west of State Highway 3, and then proceeds north for about 1 mile to 11th St NE. The Project Route turns east along 11th St NE for about 6.75 miles, crossing State Highway 3, then turns north for about 1 mile on a quarter-section line to 12th St NE. The Project Route turns east along 12th St NE for about 9 miles, crossing U.S. Highway 52; then turns north for about 1.5 miles on a quarter-section line between 44th Ave NE and 45th Ave NE. The Project Route turns east along a quarter-section line for about 17.5 miles to 62nd Ave NE, crossing State Highway 30. The Project Route turns north along 62nd Ave NE for about 0.25 miles, then turns east for about 2 miles, before turning south for about 0.25 miles to the quarter-section line. The Project Route turns east along a quarter-

section line for about 7.5 miles to a quarter-section line between 71st Ave NE and 72nd Ave NE, crossing U.S. Highway 281, where it turns south for about 1 mile to just north of the quarter-section line, and continues east for about 4 miles just north of the quarter-section line to where it turns south for about 0.5 miles to just north of the section line along 12th St NE (Foster/Eddy County line) where it travels approximately 12 miles to the east.

To bypass the towns of McHenry and Binford, the Project Route goes south for approximately 3.25 miles, then east for about 12.5 miles along 3rd St NE/9th St NE (crossing State Highway 20), and north for about 3 miles to 12th St NE. Along 12th St NE, the Project Route heads east for about 20.5 miles, across State Highway 1, Sheyenne River, and State Highway 45, to about 0.5 miles east of 120th Ave NE in Steele County where the Project Route travels north for about 6 miles on the quarter-section to 18th St NE near Aneta. At Aneta, the Project Route goes northeast, diagonally, cross-country for about 7.5 miles to 6th Ave NE in Grand Forks County. The Project Route travels east along 6th Ave NE for about 7.75 miles, then north for about 0.2 miles along 41st St NE. The Project Route then proceeds east for about 9.5 miles, crossing State Highway 18, and turns north for about 2 miles along the quarter-section line (about 0.5 miles west of 31st St NE). Then the Project Route travels east about 200 feet north of 8th Ave NE for about 4.5 miles to 27th St NE. At 27th St NE, the Project Route travels north for about 0.5 miles and then travels east for about 4.25 miles to the existing Western (Western Area Power Administration) 230 kV transmission line. Then, the Project Route proceeds northeast, diagonally, cross-country for about 4 miles adjacent to the Western line ROW, then north for about 2.5 miles along the quarter-section line, approximately 0.5 miles west of 19th St NE, where it turns to go east along the 14th Ave NE section line for about 0.5 miles to 19th St NE. The Project Route goes north for about 1.5 miles along 19th St NE to the quarter-section line between 15th Ave NE and 16th Ave NE. The Project Route turns to go east along the quarter-section line for almost 4.5 miles. At 0.5 miles west of 14th St NE, the Project Route heads north along the quarter-section line for about 0.75 miles to the south side of the existing 230 kV transmission line and then proceeds east along the south side of the existing transmission line for about 1.5 miles into the Prairie Substation.

## *4.2 Description of Proposed Facilities*

The transmission line will be designed to meet all relevant state codes, National Electric Safety Code (NESC), RUS standards, and other standards that Minnkota has adopted. Appropriate standards will be met for construction and installation and all applicable safety procedures will be followed during and after installation. The standards have been established to identify minimum conductor distances to ground, conductor spacing, and other parameters. The following summarizes applicable standards as they relate to this Project.

In general, a high-voltage transmission line consists of three phases, each at the end of a separate insulator string (or v-string configuration), all physically supported by structures. Each phase consists of one or more conductors. When more than one conductor is used to make up a phase, the term "bundled" conductors is used. Conductors are metal cables consisting of multiple strands of steel and aluminum wire wound together. There are also two shield wires strung above the electrical phases to prevent, to the extent possible, lighting from striking the phases. Shield wires are typically less than 1 inch in diameter. One of the shield wires will also include fiber optic cable that allows a path for substation protection and control equipment to communicate to equipment at other terminals on the transmission line. Transmission lines are constructed on a ROW, in which the width is primarily dependent on structure design, span length, and the electrical safety requirements associated with the transmission line voltage.

### 4.2.1 Transmission Facility and Right-of-Way Design

**Transmission Structure**

Single pole, self-weathering tubular steel single circuit structures are proposed for the majority of the Project. The self-weathering steel oxidizes or rusts to form a dark reddish brown surface coating to protect the structure from further weathering. The steel single poles are placed on large concrete foundations, which are wider than the pole base. **Table 4.2-1** outlines typical characteristics of the 345 kV transmission line structures.

**Table 4.2-1. Typical Characteristics of Single Pole 345 kV Transmission Line Structures**

| Characteristics | Details |
|---|---|
| Voltage (kV) | 345 kV |
| ROW width (feet) | 150 |
| Approximate span length (feet) | 1,000 |
| Range of structure heights for most common structures (feet) | 125 - 140 |
| Number of structures per mile | 5 - 7 |
| Minimum ground clearance beneath conductor (feet) | 35 - 40 |
| Depth of concrete footings for the poles (feet) | 30 - 40 |
| Diameter of concrete footings for the poles (feet) | 7 - 10 |
| Average area of permanent disturbance per structure (square feet) | 78.5 |

The Missouri River crossing requires a specialty structure design due to the large span distance. A steel three pole structure design will be utilized. The structure would have three poles adjacent to each other or a pole for each phase wire. The three pole structure will be shorter than a single pole structure normally utilized for a span of this length.

**Table 4.2-2** summarizes the structure designs and foundations for the Project, the Missouri River structures, and the H-frame structures to be used near the Grand Forks International Airport. **Diagram 1** shows the Project tangent structure. **Diagram 2** shows the Project dead end structure. **Diagram 3** shows the H-frame structure to be used near the Grand Forks airport. **Diagram 4** illustrates the specialty structure that will be used to span the Missouri River.

**Table 4.2-2. Structure Design Summary**

| Structure Location | Structure Type | Structure Material | ROW Width (feet) | Structure Height (feet) | Foundation Diameter (feet) | Approx Span Between Structures (feet) |
|---|---|---|---|---|---|---|
| Project - Tangent | Single Pole Davit Arm | Self-Weathering Tubular Steel | 150 | 95-180 | 7-10 | 1,000 |
| Project – Dead End | Single Pole Davit Arm | Self-Weathering Tubular Steel | 150 | 95-180 | 11-15 | 1,000 |
| H-Frame near Grand Forks Airport | Two Pole H-Frame | Wood or Steel | 150 | 62-80 | 5-7 | 600-800 |
| Missouri River Span | Three Pole | Self-Weathering Tubular Steel | 250 | 205 | 10-12 | 2,400-3,000 |

**Diagram 1. Project Tangent Structure**

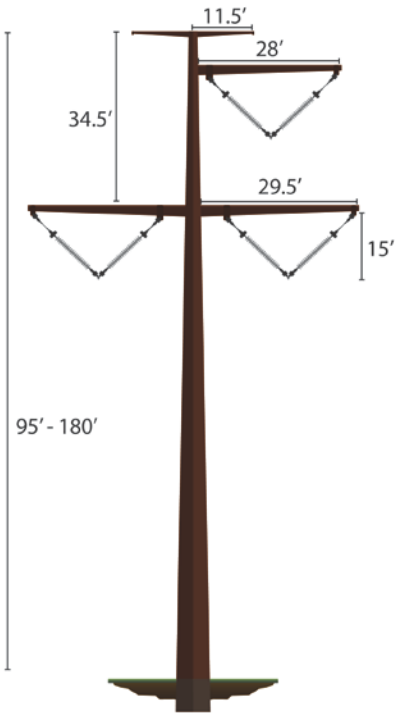



**Diagram 2. Project Dead End Structure**

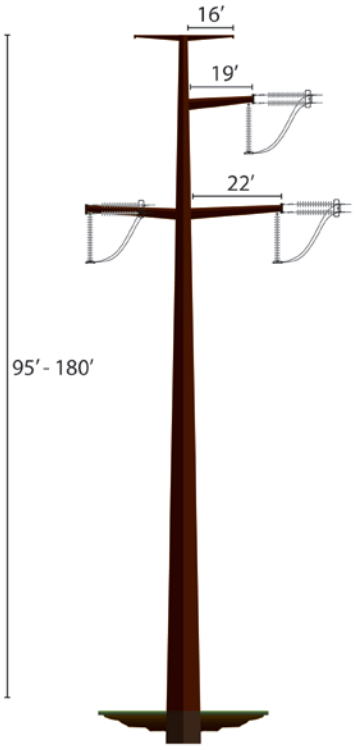


**Diagram 3. H-Frame Structure**

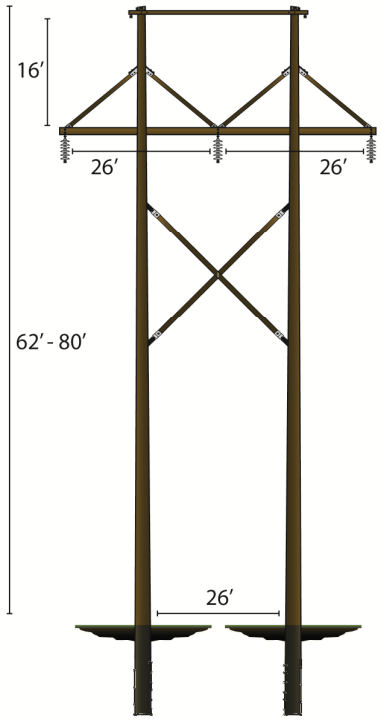
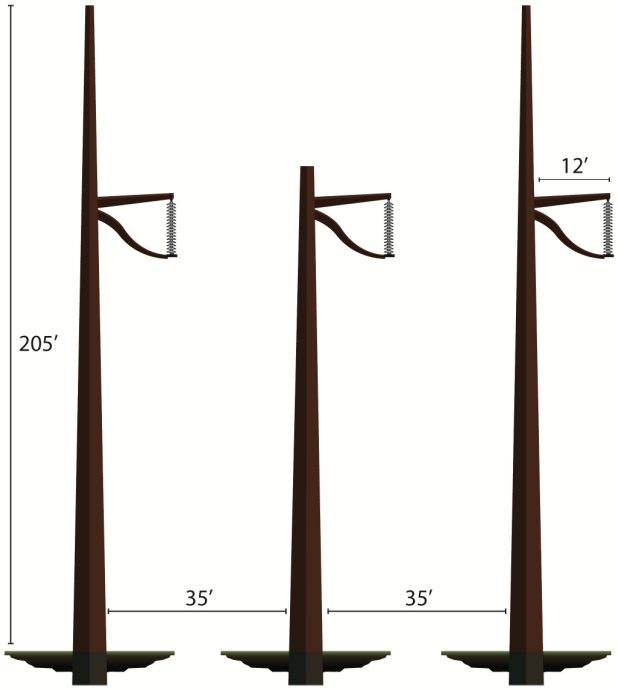



**Diagram 4. Missouri River Span Structure**



**Conductors and Shield Wires**

It is anticipated that each phase wire will consist of bundled conductors composed of two 959.6 kcmil (thousand circular mils) Suwannee trapezoidal wire (TW) type aluminum conductor steel reinforced (ACSR) cables. Each conductor has an outside diameter of 1.1 inches. The trapezoidal configuration of the aluminum strands allows more capacity than in an equal diameter conductor of standard ACSR design. Suwannee TW type ACSR consists of seven steel wires at the center surrounded by 22 trapezoidal shaped aluminum strands. The trapezoidal configuration of the aluminum strands reduces air gaps between strands. Two shield wires, also known as lightning protection wires, are planned. On one side, the shield wire will be fiber optical ground wire (OPGW), and, on the other side, the shield wire will be 0.5-inch Extra High Strength (EHS) steel cable. OPGW consists of 24 strands of single mode fiber optics conductors in a steel tube wrapped with ten strands of steel wire around the fiber optic tube.

**Span**

Span represents the distance between structures (regardless of structure type or service design). The average span distance would be about 1,000 feet. Spans used throughout the proposed Project would be adjusted to account for topography, specific physical resources along the transmission line route, and land uses.

**Right-of-Way Design**

The majority of the new 345 kV transmission line facilities will be built with single pole structures, which typically require a 150-foot-wide ROW for the length of the transmission line. The Missouri River crossing will require a 250-feet-wide ROW due to the long span. The additional ROW will be identified in the easement agreement with the landowner. If the transmission line is placed on property division lines across private land, the easement width to be acquired from each of the adjacent landowner(s) will vary.

It is intended that the Project will not share ROW with existing features; rather, it will parallel ROWs of existing features. Throughout the route development process, Minnkota sought to identify areas to parallel existing linear features including roads. Identification of opportunities to parallel existing linear features minimizes the proliferation of new corridors.

Given the terrain in the area, construction of access roads outside of the ROW will generally not be needed. If obstructions exist that are completely blocking ingress and/or egress along the ROW, such as flowing creeks, Minnkota will arrange with landowners to use existing field roads or create temporary access from state and county highways to access the structure locations.

Minnkota land agents will work individually with property owners to purchase easements for the Project. Under the easement agreements, property owners will not be allowed to place any structures or other objects within the 150-foot ROW that will restrict access to the ROW, inhibit maintenance of the transmission line, or jeopardize safe operations of the transmission line, without Minnkota's prior written approval.

The fiber optic regeneration sites and access roads required for the Project will be purchased in fee. These sites are located near road crossings to provide all-weather access to the sites.

### 4.2.2 Associated Facilities and Project Components

**Center 345 kV Substation Upgrades**

The Center 345 kV Substation is located about 4.5 miles southeast of the town of Center, North Dakota, and about 1 mile east of the Milton R. Young Generation Station in Oliver County. Most upgrades will occur within the existing substation's fenced boundary (ownership shared with Otter Tail Power Company). This will involve installing new 345 kV circuit breakers, 345 kV dead-end structures, one new and one replacement 345/230 kV transformer and associated bus work, new 345 kV switches and associated foundations, steel structures, and control panels. A line reactor for open line voltage control will also be required. The reactor will require a 22,500-square-foot (0.5 acre) expansion to the north end of the substation, beyond the existing fenced boundary but on Minnkota-owned property.

**New 230 kV Tie Line**

This approximately 1,500-foot-long 230 kV Tie Line will parallel the existing tie line on Minnkota-owned property. It will be needed to complete a second transmission-to-transmission interconnection between the Square Butte 230 kV Substation and the Center 345 kV Substation. The Square Butte 230 kV Substation is located approximately 0.2 miles south of the Center 345 kV Substation.

**Existing 230 kV Tie Line Upgrades**

The existing Square Butte 230 kV Substation to Center 345 kV Substation Tie Line modifications will include: terminating the existing line to a new transformer (T2) terminal at the Center 345 kV Substation, new 1272/Pheasant ACSR aluminum conductor, steel overhead ground wire and associated line hardware, installing 1 new deadend structure for the T2 terminal location, removal of an existing deadend structure at the T1 terminal location. All work will occur on Minnkota-owned property.

**Square Butte 230 kV Substation**

The Square Butte 230 kV Substation is located about 4.5 miles southeast of the town of Center, North Dakota, and about 1 mile east of the Milton R. Young Generation Station in Oliver County. Existing 230 kV circuit breakers and line terminal equipment will be re-allocated from the existing HVDC tie line to the new 345 kV interconnect as part of the agreement with Minnesota Power. This activity will be completed within the existing substation footprint.

**Prairie Substation Upgrades**

The Prairie Substation is located just west of the City of Grand Forks, North Dakota in Grand Forks County. All upgrades will occur within the fenced boundary of the existing Minnkota-operated substation. This will involve installing new 345 kV circuit breakers, 345 kV dead-end structures, one new and one relocated 345/230 kV transformer and associated bus work, new 345 kV switches and associated foundations, steel structures, and control panels. New 230 kV circuit breakers will be added to accommodate interconnecting with the existing 230 kV ring bus.

**Fiber Optic Regeneration Stations**

Four fiber optic regeneration stations will be required along the transmission line route to re-amplify the protection and control signals carried in the OPGW. The stations will be about 50 to 55 miles apart. Permanent access roads will be constructed for each fiber optic regeneration

station. Each station will require a permanent area of about 50-foot by 50-foot (2,500 sq ft total) that would be leveled, graveled, and have a perimeter fence. The station would have a small 10-foot by 15-foot (150 sq ft total) heated and air-conditioned control building to house the electronic equipment, a battery bank for backup power, and a 20-foot-wide permanent access road. These four stations will be placed in proximity to the base of a structure within the 150-foot-wide Route. **Figure 2** shows the location of each station. **Table 4.2-3** provides location and site information for each fiber optic regeneration station along the Project Route.

**Table 4.2-3: Fiber Optic Regeneration Stations for the Project**

| Fiber Optic Regeneration Station | County | PLSS | Civil Township | Length of Access Road |
|---|---|---|---|---|
| 1 | Sheridan | T146N, R78W, Section 7, NE | Pickard | 100 feet |
| 2 | Wells | T147N, R70W, Section 5, NE | South Cottonwood | 60 feet |
| 3 | Foster | T147N, R63W, Section 13, SE | Florance | 66 feet |
| 4 | Grand Forks | T150N, R56W, Section 35, SE | Logan Center | 65 feet |

**Laydown Areas**

There are eight laydown areas planned for the Project. Minnkota will have three laydown areas located on property currently owned and utilized by Minnkota for its operations. Laydown areas A1 and A2 will be located at the Center 345 kV Substation and laydown area G1 will be located near the Prairie Substation on property that is currently utilized by Minnkota as a laydown area and equipment yard (indicated in **Table 4.2-4)**.

Five additional temporary laydown areas may be established for the Project and each will temporarily impact approximately 10 acres. **Table 4.2-4** outlines the location of the laydown areas. **Figures 2** and **3** depict the laydown area locations. These areas were selected for their location, access, security, ability to efficiently and safely warehouse supplies and in an effort to minimize excavation and grading. Minnkota plans to secure the right to use the laydown areas by obtaining easement agreements from affected landowners.

The laydown areas will be leveled (if necessary), graveled, and may have a perimeter fence. Erosion and sediment control best management practices would be utilized for sites near wetlands. Construction office trailers may be located within the laydown areas. The laydown areas will accept delivery of and store equipment and materials necessary to construct the new transmission line facilities, and will be an area for pre-assembly work and to potentially locate portable concrete batch plant sites. Areas disturbed as a result of establishing the laydown area will be restored to pre-construction condition or per landowner agreement.

**Table 4.2-4. Laydown Areas for the Project**

| Laydown Area ID | Size of Laydown Area (Acres) | Public Land Survey | Comment |
|---|---|---|---|
| 1A<br>(Milton R. Young Station property) | 5 | T141N, R83W, Section 5 | Existing Minnkota laydown area |
| 1B<br>(Center 345 kV Substation) | 10 | T142N, R83W, Section 33 | Existing Minnkota-owned land |

| Laydown Area ID | Size of Laydown Area (Acres) | Public Land Survey | Comment |
|---|---|---|---|
| 2 | 10 | T148N, R73W, Section 36 | Temporary on private land |
| 3 | 10 | T147N, R66W, Section 7 | Temporary on private land |
| 4A, 4B, 4C, | 10, 2, 2 | T147N, R65W, Section 4 | Temporary on private land |
| 5 | 10 | T147N, R60W, Section 20 | Temporary on private land |
| 6 | 10 | T149N, R55W, Section 6 | Temporary on private land |
| 7 (Prairie Substation) | 15 | T151N, R51W, Section 12 | Existing Minnkota-owned land |

**Relocation of Transmission Line Structures at the Center 345 kV Substation**

Relocation of an existing Minnkota-owned transmission line section and addition of new structures will facilitate the addition of a second tie line between the Center 345 kV Substation and the Square Butte 230 kV substation. All relocated structures will occur on Minnkota-owned property. Currently, Minnkota is in negotiation regarding the work details with the other utilities that use this substation. This work may involve:

- Terminating the existing 230 kV Tie Line in a new bay within the substation. The new bay is approximately one span length south of the existing termination point.
    - Remove one structure. Add a new structure and terminate at the new bay.
    - Replace conductor between structures.

**Highway Crossing and Construction Access Locations**

The Project Route will cross U.S. and state highways at 16 locations. Section 5.3.2 discusses the highway crossings and access locations from west to east and potential impacts.

### 4.2.3 Right-of-Way Preparation, Construction, Restoration and Maintenance

**Right-of-Way Preparation**

Primarily agricultural and pasture lands will be crossed by the Project. For safety purposes and to meet NERC guidelines for reliability standards, tree and shrub clearing may be required in some areas in the ROW. However, where safety requirements permit, trees and low growing shrubs may remain (generally less than 15 feet in height). Significant amounts of grading are not anticipated for preparation of the transmission ROW. Some grading will be required for the fiber optic regeneration stations and their associated access roads, as well as temporary access roads required for river crossings (if site conditions deem necessary) and other areas in which direct access is challenged and may require temporary access measures.

**Transmission Construction Procedures**

Construction will begin after required federal, state, and local approvals are obtained, sufficient property and ROWs are acquired, soil conditions are determined and final design is completed. The precise timing of construction will depend upon various requirements that may be in place due to permit conditions, weather conditions, and available workforce.

Transmission line structures are generally designed for installation at existing grades. Typically, structure sites with 10 percent or less slope will not be graded or leveled. At sites with more than 10 percent slope, working areas will be graded level or fill will be brought in for working pads. If

the landowner permits, Minnkota prefers to leave the leveled areas and working pads in place for use in future maintenance activities. If the landowner does not wish to leave the area leveled, the site will be graded back to its pre-construction condition as much as possible, and all imported fill will be removed.

Laydown areas will be established for the Project to handle delivery and temporary storage of equipment and materials necessary to construct the new transmission line facilities. Structures may either be delivered to the staked location or may be stored temporarily at a laydown area. When the structures are delivered to the location where they will be installed, they will be placed on the ROW out of the clear zone of any adjacent roadways or designated pathways. Insulators and other hardware will be attached while the structure is on the ground. The structure will then be lifted, placed, and secured using a crane.

Minnkota proposes that the majority of structures have a concrete foundation. The foundation contractor will establish batch plants, which may be portable, and may be located within laydown areas. If batch plants are located away from a laydown area, then concrete trucks will be required to bring concrete from a concrete batch plant. The foundation contractor will be responsible for all appropriate permits and agreements. Holes will be drilled in preparation for concrete. Depending on soil conditions, drilled pier foundations for tangent (in-line structures) may vary in diameter from 7 to 10 feet, and be 30 to 40 (or more) feet deep. Drilled pier foundations for deadend structures (angle), which have higher load bearing requirements, may vary in diameter from 11 to 15 feet, and be 45 to 87 (or more) feet deep. After the concrete foundation is set, the structure will erected and bolted to it.

Most of the construction activity will be limited to the area immediately around each structure. Little additional ground disturbance will be needed at the structure sites. The total area temporarily disturbed in the vicinity of each structure is expected to be confined to an area of about 60 feet in diameter (2,827 square feet). Temporary construction access roads may be needed to access structure locations and will be located within the ROW. If a temporary access road is needed outside of the ROW, Minnkota will use existing public and private roads where possible. Where no existing roads provide access and if needed, temporary access roads up to 30-feet-wide will be constructed and located through disturbed uplands (e.g., farmed land) once any necessary access easements have been secured from the landowner(s).

Once the structures have been erected, conductors will be installed by establishing stringing setup areas within the ROW. These areas are usually established every 2 to 5 miles along the Route. Conductor stringing operations require brief access to each structure to secure the conductor wire to the insulator hardware and to install shield wire clamps once final sag is established. Stringing equipment generally consists of wire pullers, tensioners, conductor reels, shield wire reels, and sheave blocks. Stringing operations involve pulling lightweight cables or ropes through the stringing sheaves located at every structure site. This cable or rope will be used to pull the conductors through the sheaves under sufficient tension to keep the conductor from coming into contact with the ground. Temporary guard or clearance poles will be installed as needed over existing distribution or communication lines, streets, roads, highways, or other obstructions, after any necessary notifications are made and permits obtained. This ensures that conductors will not obstruct traffic or contact existing energized conductors or other cables. Helicopters would be utilized to string wires across the Missouri River. The use of helicopters may also aid construction in the alkali flats and other sensitive areas.

**Fiber Optic Regeneration Station Construction**

Four fiber optic regeneration station sites will be located at about 50 mile intervals along the route and not located in wetlands or near the Missouri River. Each station will be located adjacent to a proposed transmission line structure within the ROW and near an existing road. The power line to each regeneration station will be underground from the point of interconnection with the local distribution line to the regeneration station. A permanent access road to each station will be required, but siting them adjacent to an existing road will reduce the length of each proposed access road. Each site will be a fenced, graded, and graveled area of 50-foot by 50-foot. A small heated and air conditioned control building will be placed within this area to house the electronic equipment, heating and air conditioning equipment, and a battery bank for backup power.

**Restoration Procedures**

During construction, crews will attempt to limit ground disturbance wherever possible. Upon completion of construction activities, landowners will be contacted to determine if any damage has occurred as a result of the Project. If damage has occurred to crops, fences, or the property, Minnkota will fairly reimburse the landowner for the damages sustained. As is necessary, Minnkota may engage an outside contractor to restore the damaged property to as near as possible to the preconstruction condition. Disturbed areas will be restored to their preconstruction condition to the maximum extent practicable or as required by regulatory agencies. Post-construction reclamation activities include removing and disposing of debris, dismantling all temporary facilities (including laydown areas and temporary access roads), leveling disturbed soil, alleviating soil compaction, and reseeding non-cultivated areas disturbed by construction activities with vegetation similar to that which was removed.

Erosion control measures will be implemented as necessary to minimize runoff during construction. Specific measures will be determined once final design of the route is complete and a field review is made to determine any areas of concern. Erosion control measures such as silt fencing, straw bale fencing, mulching, seeding, or mesh fabric overlay will be installed when and where appropriate. Access routes to structure locations will be reviewed prior to the mobilization of equipment so erosion concerns can be avoided or minimized. Construction crews will exercise caution when equipment is within 50 feet of streams and rivers and will not drive equipment through streams or rivers crossed by the transmission line.

**Maintenance Procedures**

Transmission infrastructure has very few mechanical elements and is built to withstand normal weather extremes. With the exception of severe weather, such as tornadoes and extreme ice storms, transmission lines rarely fail. They are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system; such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent.

Over the life of the Project, Minnkota will use the ROW to perform inspections (usually by fixed wing aircraft), maintain equipment, and make repairs. Minnkota will also conduct routine maintenance to remove undesired vegetation that may interfere with the safe and reliable operation of the proposed line.

### 4.2.4 Easement/Right-of-Way Acquisition

For transmission lines, utilities typically acquire easement rights to accommodate the facilities. The evaluation and acquisition process includes title examination, owner contacts, survey work, document preparation, and payment.

The first step in the ROW process is to identify all persons and entities that may have a legal interest in the real estate upon which the facilities will be built. To compile this list, a ROW agent completes a public records search of all land involved in the Project. A title report is then developed for each parcel to determine the legal description of the property and the owner(s) of record of the property and to gather information regarding easements, liens, restrictions, encumbrances, and other conditions of record.

The next step is evaluation of a specific parcel. Once landowners are identified, a ROW agent contacts each property owner or the property owner's representative. The ROW agent describes the need for the transmission facilities, explains how the specific project may affect each parcel, and seeks information from the landowner about any specific construction concerns. The ROW agent requests the owner's permission for survey crews to enter the property to conduct preliminary survey work. Permission may also be requested to take soil borings to assess soil conditions and determine appropriate foundation design. Surveys are then conducted to locate section corners, cultural resources, wetlands, man-made features, and associated elevations to be used during the detailed engineering of the transmission line. All surveys are performed by experienced professionals.

The ROW agent next prepares an offer that is specific for the property owner(s) based on several factors, including the local market value of land, the calculated acreage required for the ROW, current land usage, and an additional per pole payment for the rights to build, operate, and maintain the transmission facilities within the easement area and reasonable access to the easement area. The landowner is allowed a reasonable amount of time to consider the offer and present any documentation that the owner believes is relevant to determining the property's value. Initially, the ROW agent may obtain an option to purchase an easement for the proposed route.

Utilities are usually able to work with the landowners to address their concerns and an agreement is reached for the utilities' purchase of land rights. The ROW agent prepares all of the documents required to complete each transaction. Required documents generally include: option, notice of option, easement, and payment agreement. If an agreement cannot be reached, condemnation may be used.

Once sufficient ROW has been obtained and the construction phase begins, to the fullest extent that is possible, individual property owners will be advised of construction schedules, needed access to the site, and any vegetation clearing required for the Project. The ROW will be cleared of the amount of vegetation necessary to construct, operate, and maintain the transmission line, and landowners will be compensated for crop and property damages as provided for in the easement. To ensure safe construction of the transmission line, special consideration may be needed for fences, crops, or livestock. For instance, fences may need to be moved, or temporary or permanent gates may need to be installed; crops may need to be harvested early; and livestock may need to be moved. In each case, the ROW agent will coordinate these processes with the landowner. Where possible, location of temporary laydown areas will be limited to previously disturbed or developed areas. When additional property is temporarily required for construction, appropriate temporary easement agreements will be obtained from landowners for the duration

of construction. These temporary easements will be limited to special construction access needs or additional laydown areas required outside of the proposed ROW.

### 4.2.5 Route Modifications Based on Corridor Compatibility Public Hearings and Subsequent Landowner Discussions

The purpose of this section is to discuss the route selection process for those segments of the Project that were specifically addressed in the public testimony presented at the Corridor Compatibility Application public hearings before the Commission and during subsequent landowner discussions.

**Oliver County – Expanded Corridor in Sections 35 and 36, T142N, R83W and Sections 31 and 32, T142N, R82W**

Public testimony identified a concern regarding the placement of the proposed Project in proximity to an occupied duplex residence located in the southern portion of Section 29, T142, R82W. The owner of the residence proposed that the Project be shifted south, in closer proximity to an existing 250 kV DC transmission line located near the quarter-section line in Sections 31 and 32. The proposed Project Corridor was expanded by the Commission to allow further consideration of this request.

Potential concerns initially identified for this segment included the potential for cultural sites on the ridge tops in Section 31, T142N, R82W, electrical interaction between the existing DC transmission line and the proposed Project if in close proximity for an extended length, and the presence of a residence located just north of the existing 250 kV DC transmission line in the southern portion of the northwest quarter of Section 32.

The proposed Project Route runs diagonally to the southeast in Sections 31 and 32, T142, R82W, and traverses east through Section 32 as close as possible to the mid-way point between the existing 250 kV DC line and the occupied residence in Section 29. Then the Project Route goes diagonally northeast in Sections 32 and 33, T142, R82W. The proposed Project Route maximizes the distance between the occupied residence and the Project, while minimizing the potential for electrical interaction between the DC and AC transmission lines. Additionally, landowners have confirmed that the residence in Section 32, T142, R82W is unoccupied, cultural resource surveys performed indicate that the Project Route will not impact cultural sites, and further analysis of the route has confirmed the topography will not prohibit utilizing the route selected.

**Burleigh Co. – Public Testimony Regarding Section 14, T142N, R81W**

Public testimony identified a concern regarding a potential route across and tree removal in the southern portion of Section 14, T142N, 81W. No alternative routes that did not impact adjacent landowners were suggested.

The proposed Project Route was developed as a result of public meetings with Painted Woods Township and associated landowners. The Project Route crosses a low-lying drainage area, which was chosen to minimize agricultural land use and vegetation impacts. During several discussions with adjacent landowners, no alternatives were proposed that would further minimize impacts to land use or vegetation removal, or that would be viable options given the input and recommendations from Painted Woods Township. Within the Project Route, only a few trees would potentially need to be removed.

**McLean Co. – Public Testimony Regarding Sections 18 through 13, T143N, R80W**

Public testimony included a request to shift the proposed Project Corridor to the north side of the landowner's properties in Sections 18 through 13, T143N, R80W, rather than traversing the same properties on the quarter-section line.

Potential concerns identified in this area included occupied residences in the southern portions of Sections 10 and 11, T143N, R80W, and the presence of a number of small wetland areas and a railroad crossing. A route along the northern section line would place a transmission facility very close to the occupied residences in Sections 10 and 11, T143N, R80W, and would require waivers of the 500 foot avoidance area criteria.

The proposed Project Route maximizes the distance from occupied residences by following the quarter-section line. In addition, the route minimizes land use impacts because it is closer to field edges than would be possible running parallel to the northern section line.

**Sheridan Co. Diagonal – Public Testimony Regarding Sections 23 and 26, T147N, R78W**

Public testimony included a request to alter the proposed Project Corridor along the diagonal located in Sections 23 and 26, T147N, R78W in Sheridan County. In addition, alternatives were presented to Minnkota outside of the Corridor Compatibility Application public hearings.

Potential concerns identified in this area included the presence of a high concentration of wetlands, previously identified cultural resource sites, and USFWS easements, as well as the need to coordinate the location of the Project with the proposed Sheridan Ridge II wind farm facilities.

The alternatives proposed to Minnkota did not minimize land use impacts, presented severe design challenges due to crossing numerous, large wetlands, and were contrary to requests by other landowners in the vicinity. The proposed Project Route, on the other hand, minimizes impacts to agricultural land, avoids wetlands, avoids previously identified cultural sites, and minimizes USFWS wetland/grassland easements, and does not conflict with the proposed Sheridan Ridge II wind farm.

**Sheridan Co. Diagonal – ND Department of Trust Lands Letter Regarding Section 8, T146N, R78W**

During discussions with landowners along the diagonal segment in Sheridan County, the ND Department of Trust Lands (NDDTL) (formerly known as the ND State Land Department) identified an area in Section 8, T146N, R78W as containing potential commercial aggregate. Discussions with the NDDTL and adjacent landowners identified a route that would reduce the potential for impact to the future recovery of aggregate, and does not result in any additional land use or environmental impacts. However, the Project Route extends beyond the Project Corridor in this area, and modification of the Project Corridor would be necessary (see Corridor Modification and Waiver Request).

**Sheridan and Wells Co. – Expanded Corridor from Mountain City Township (T147N, R77W) to Crystal Lake Township (T147N, R73W)**

Public testimony questioned why the proposed Project Corridor was adjacent to the quarter-section line and not closer to the southern section line through the east-west segment extending from Mountain City Township (T147N, R77W) to Crystal Lake Township (T147N, R73W) in Sheridan and Wells Counties. The proposed Project Corridor was expanded by the Commission to allow further consideration of this issue.

Potential concerns identified in this area included the proximity to occupied residences, the presence of numerous large wetlands and waterbodies, and the need to coordinate the location of the Project with the proposed Sheridan Ridge I and II wind farm facilities. The proposed Project Route addresses these concerns.

The portion of the Project Route that extends east from Mountain City Township (T147N, R77W) to midway through Boon Township (Section 10, T147N, R74W) was selected because it facilitated coordination with the Sheridan Ridge I wind farm, avoided several large waterbodies on the southern portions of the sections crossed and had landowner acceptance.

At the midpoint of Section 10, T147N, R74W, the proposed Project Route parallels the southern section line for about 4 miles and then shifts north to the quarter-section line for approximately 1 mile through Sections 8 and 9, T147N, R73W to avoid a large water body located on the southern section line in those sections. The proposed Project Route then shifts south to parallel the southern section line until approximately 0.25 miles west of ND-3 in Section 11, T147N, R73W.

**Wells Co. – Expanded Corridor from Crystal Lake Township (T147N, R73W) to South Cottonwood Township (T147N, R70W)**

Public testimony identified resistance to the proposed corridor in Wells County from Crystal Lake Township (T147N, R73W) to South Cottonwood Township (T147N, R70W), but presented no reasonable alternatives through this segment of the Project. The proposed Project Corridor was expanded by the Commission to allow further consideration of routing options through this segment. Subsequent to the Corridor Compatibility Application public hearings, Minnkota met with a group of landowners to discuss proposed routing alternatives.

Potential concerns identified in this area were occupied residences, the presence of numerous large waterbodies and wetlands, USFWS easements, and four federal or state managed areas (Ehni WPA, Monk WPA, Hoornaert WPA, and Hoornaert WMA). The proposed Project Route minimizes the proximity to occupied residences and managed areas, while minimizing land use impacts.

The proposed Project Route proceeds east-west along the southern portion of Sections 1 and 2, T147N, R73W, and Sections 1, 2, 3, 4, 5 and 6, T147N, R72W. In Section 1, T147N, R72W (about 2 miles east of the James River), the proposed Project Route shifts one mile north to 12th St NE and proceeds east-west for about nine miles.

**Eddy County –Landowner Discussion Regarding Sections 28 and 27, T148N, R67W**

During discussions with a landowner in Eddy County, the landowner requested that the Project investigate an alternative route. As proposed by the landowner, the re-route would remain on the landowner's property, but would be further from the landowner's residence and would enable Minnkota to avoid certain cultural resources identified within the Project Corridor. The proposed Project Route turns and goes north along the west side of Section 28, T148N, R67W, then turns and runs east through the northern half of Sections 28 and 27, T148N, R67W, and then turns south along the eastern edge of Section 27 before turning east again. However, the Project Route extends beyond the Project Corridor in this area, and modification of the Project Corridor would be necessary (see Corridor Modification and Waiver Request).

**Eddy and Foster Co. – Expanded Corridor from Pleasant Prairie (T148N, R65W) and Nordmare Townships (T147N, R65W) to Cherry Lake (T148N, R63W) and Florance Townships (T147N, R63W)**

Public testimony identified a concern with the proximity of the proposed Project to a group of residences, as well as general opposition to the proposed Project, in Eddy County. The proposed Project Corridor was expanded by the Commission to allow further consideration of routing options through this segment.

Potential concerns identified in this area included proximity to occupied residences, center pivot irrigation systems on the eastern side of the segment, the Topp WPA, and numerous large wetlands and waterbodies. The proposed Project Route addresses these concerns.

One alternative proposed by a landowner was to locate a route along the northern portion of Sections 34 and 35, T148N, R64W to avoid the residences in those sections. However, routing along the northern portion of Sections 34 and 35 is not feasible because the only viable location to cross the large wetland areas would result in the route being closer to the residences in Sections 34 and 35 than it will be utilizing the proposed Project Route.

**Grand Forks Co. – Alkali Flats (Fairfield (T150N, R52W) and Oakville (T151N, R52W) Townships) and NDDTL Letter**

Public testimony identified a concern regarding potential impacts of the Project on avian species and native grassland/saline wetlands within an area referred to as the alkali flats in Oakville (T151N, R52W) and Fairfield (T150N, R52W) Townships of Grand Forks County. The Commission widened the proposed Project Corridor at Minnkota's request to allow further consideration of a routing request across an NDDTL parcel in Grand Forks County. The Commission also requested that Minnkota engage in further consultation with the Grand Forks County Prairie Partners and Audubon Dakota regarding transmission line construction and minimization of potential impacts. Minnkota consulted with the NDDTL, the Grand Forks County Prairie Partners, and Audubon Dakota when selecting the proposed Project Route in this area.

The proposed Project Route proceeds north along the quarter-section line through Section 1, T150N, R52W, and Sections 25 and 36, T151N, R52W. In Section 24, T151N, R52W, the Project Route turns east and then north along the section line through Section 24 and half of Section 13. This alignment was selected to minimize impacts to native grassland, occupied residences, and agricultural land identified by the NDDTL, other landowners, the Grand Forks County Prairie Partners, and Audubon Dakota. However, the Project Route extends beyond the Project Corridor in this area, and modification of the Project Corridor would be necessary (see Corridor Modification and Waiver Request).

**Grand Forks Co. – Brenna Township (T151N, R51W)**

Public testimony noted concerns regarding proximity of the Project to occupied residences, as well as concerns regarding flight operation limitations and flight safety for the Grand Forks International Airport. An additional potential concern in this area is agricultural land impacts, since the area contains high quality farmland.

Utilizing input from landowners, agencies and others, Minnkota selected the proposed Project Route in Brenna Township. The proposed Project Route balances the number of residences in proximity to the Project with minimizing land use impacts by placing the proposed Project Route adjacent to the quarter-section line near field edges and paralleling existing transmission

corridors where feasible. However, the Project Route extends beyond the Project Corridor in this area, and modification of the Project Corridor would be necessary (see Corridor Modification and Waiver Request).

Discussions are ongoing with the Grand Forks International Airport, the University of North Dakota Aeronautics Department, and the Federal Aviation Administration. Previous discussions have indicated that the Project can and will be designed within stated guidelines and will not have adverse impacts on flight operations or flight safety.

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# 5.0 Environmental Analysis

This section describes the environmental setting as it relates to the Project ROW and Route. The Project ROW is the 150-foot-wide area in which the transmission line facilities will be constructed and the Project Route refers to the specific locations of the transmission line facilities. The following subsections discuss resources within the Project ROW, potential impacts from the Project, and mitigation measures.

The impact discussion describes the potential effects from the Project. Impacts are discussed in terms of short-term vs. long-term and indirect vs. direct, depending upon the resource. Temporary impacts are associated with the construction areas around structure locations for the Project Route and 230 kV Tie Line, a temporary access road within the ROW, and laydown areas. Permanent impacts are associated with the structure locations for the Project Route and 230 kV Tie Line, restricted tillage area (cropland only), Center 345 kV Substation expansion, and fiber optic regeneration stations and associated access roads. **Table 5.0-1** provides a summary of the temporary and permanent impacts for the Project Route.

**Table 5.0-1. Project Route Summary Table**

| | Impact | Route |
|---|---|---|
| | Total Length (mile) | 250.2 |
| | Total ROW Acres[1] | 4,544 |
| | Approximate Number of Structures (includes 230 kV Tie-Line) | 1,335 |
| Temporary Impacts | Temporary Structure Impact (acres) | 85.5 |
| | Access Road Impact (acres) | 908 |
| | Laydown Areas (7 areas) (acres) (Impact does not include 1A) | 80 |
| | Fiber Optic Regeneration Station Access Roads (4) (acres) | 0.06 |
| | 230 kV Tie Line Structures Impact (acres) | 0.24 |
| | 230 kV Tie Line Access Road Impact (acres) | 1.2 |
| | Total Temporary Impact (acres) [2] | 1,021 |
| | Percent of ROW – Temporary Impact | 22.5 |
| Permanent Impacts | Permanent Structure Impact (acres) | 2.5 |
| | Fiber Optic Regeneration Station (4) (acres) | 0.2 |
| | Fiber Optic Regeneration Station Access Roads (4) (acres) | 0.13 |
| | Center 345 kV Substation Expansion (acres) | 0.5 |
| | 230 kV Tie Line Structure Impact (acres) | <0.01 |
| | Total Permanent Impacts (acres) | 3.4 |
| | Percent of ROW – Permanent Impacts | 0.07 |
| | Restricted Tillage Area (acres) | 4.2 |

*1: Project Route, 230 kV Tie Line, laydown areas, Center 345 kV Substation Expansion*
*2: Does not reflect sum of numbers because some impact types overlap in impact areas.*

Impact calculations for this Project were completed using the ArcInfo license of ESRI® ArcMap™ 10.0, using UTM NAD83 projection. The following assumptions were used to estimate resource impacts on land cover, vegetation, soils, prime farmland, wetlands, floodplains, and managed resource areas based on the preliminary structure locations:

- Average of 1,000-foot-long span between mono-pole structures (tangent and deadend).
- Average of 700-foot-long span between H-frame structures.
- Majority of structures are single pole, self-supporting.
    - Structures near the Grand Forks International Airport will be H-frame. Twelve of 14 are in cropland where it is not possible to farm the space between the poles of each structure.
    - Structures on either side of the Missouri River will be 3 poles, i.e., 1 pole for each conductor.
- The ROW will be 150-feet-wide and one temporary access road is proposed to be located within the ROW for the length of the proposed transmission line.
- The ROW will be 250-feet-wide at the Missouri River crossing.
- Temporary impacts will include:
    - 30-foot radius for each mono-pole structure location (approximately 2,827 square feet per structure).
    - 30-foot-wide access road which will follow the proposed centerline.
    - 5 laydown areas along the line (approximately 10 acres each) and two laydown areas at the Project substations (approximately 15 acres each).
    - Four 30-foot-wide access roads to the fiber optic regeneration stations that are 60 to 100 feet long .
    - 200-foot-by-200-foot area (3 poles at 6-foot radius including the space between the poles) for each of the Missouri River structures.
    - 150-foot-by-100-foot area (2 poles per structure and about 26-feet between the poles) for each H-frame structure near Grand Forks Airport.
    - Temporary impacts for the 230 kV Tie Line will include a 25-foot radius area around each pole for three 3-pole structures (3,909 square feet per structure) and one 2-pole H-frame structure (2,936 square feet per structure). Poles in each structure are spaced 20-feet apart.
- Permanent impacts will include:
    - 5-foot radius for each mono-pole structure location (approximately 78.5 square feet per pole).
    - Four 50-foot-by-50-foot fiber optic regeneration station pads with a 10-foot-by-15-foot building on the pad.
    - Four 20-foot-wide access roads for fiber optic regeneration stations that are 60 to 100 feet long .
    - 100-foot-by-20-foot area around each Missouri River structure.
    - 3.5-foot radius for each H-frame pole (77 square feet per structure).
    - Center 345 kV Substation will be 22,500-square foot (0.5 acre) expansion beyond the existing fenced boundary.
    - Permanent impacts for the 230 kV Tie Line will include a 3.5-foot radius area around each pole of three 3-pole structures (115.5 square feet per structure) and a 2.5-foot radius around each pole for one 2-pole H-frame structure (39.3 square feet per structure).
- A Restricted Tillage Area was added as a permanent impact to each structure location on tillable land. This area was added to the calculated impacts on tillable land as a landowner may not wish to farm the land any closer than five feet from the structure base. Extent

of tillable land was determined using 2004 North Dakota Gap Analysis Program (ND GAP) Land Cover data (cropland).
    - The additional area buffer (5-foot radius) was added to each mono-pole structure location on tillable land (about 235.5 square feet per structure). Therefore, the total permanent impact of each structure on tillable land equals a 10-foot radius (about 314 square feet per structure).
    - The additional area for each H-frame structure on tillable land would include an area that equals about 17-foot by 50-foot area, or about 850 square feet. This area includes an additional 10-foot radius buffer for each pole, plus the area between the poles, which would be inaccessible for tilled farming.
- Temporary and permanent impacts associated with the relocation of transmission line structures at the Center 345 kV Substation and Prairie Substation are not included in the impact discussions, since any impact will occur on previously disturbed Minnkota-owned property and within an area of the same land use, therefore, impacts would be the same as existing conditions.

The mitigation discussion provides potential measures to reduce or eliminate anticipated impacts identified for each resource area. Mitigation measures are not discussed for identified potential effects that are either not anticipated to occur under construction or operation of the Project or are anticipated to result in a positive effect. The mitigation discussion addresses typical high voltage transmission line permit conditions issued by state and federal agencies, mitigation strategies proposed by Minnkota and additional mitigation measures that may be warranted.

# *5.1 Demographics*

## 5.1.1 Description of Resources

The Project ROW crosses portions of 11 counties in North Dakota and several farm-based communities. The largest cities located near the Project ROW include Grand Forks (population 52,838), Aneta (population 222), and Northwood (population 945) (U.S. Census 2010). The Spirit Lake Nation lands, which have the nearest minority population, are located approximately 10 miles north of New Rockford, Eddy County, North Dakota. The Project ROW does not cross the Spirit Lake Nation lands.

**Economic Characteristics**

Most counties along the Project ROW identify agricultural practices as a foundation of both the social and economic fabric of the county. Aggregate mining for sand or gravel is also an important economic activity in rural areas and in several instances, this type of extractive land use contributes directly to county and local road projects or other developments. Minnkota's Milton R. Young Generation Station and the lignite mining operations at the nearby Center Mine, owned and operated by BNI Coal Ltd., are important regional sources of employment in the western vicinity of the Project.

As the Project ROW proceeds from west to east, the employment base of counties diversifies closer to Grand Forks County. Refer to Table 5.1-1 in the Corridor Certificate Application for a list of the top four employment industries within the 11 counties crossed by the Project.

**Social Characteristics**

Population characteristics considered relevant to the social setting of the Project ROW include the total population, projected population, per capita income, and poverty status. Communities in central North Dakota toward the west end of the Project ROW have gradually experienced reductions in total population. In general, per capita incomes rise as the Project ROW proceeds from east-central North Dakota towards Grand Forks, North Dakota and towards the west end of the Project ROW. This increase is a function of several factors including, but not limited to, higher cost of living, higher paying jobs, and higher property values. Aside from Oliver and Burleigh counties, poverty levels are generally higher at the west end of the Project ROW when compared to the east end of the Project ROW.

**Population by Race and Ethnicity**

A variety of racial and ethnic groups are present in the vicinity of the Project ROW. Race is defined as a self-identification data item based on an individual's perception of his or her racial identity. Respondents to the 2010 Census selected the race(s) with which they most closely identified themselves. Ethnicity is defined as a classification of a population that share common characteristics such as religion, cultural traditions, language, tribal heritage, or national origin. All counties along the Project ROW have populations with 95 percent or higher of White/Caucasian. The remaining populations in all of the counties include Black/African American, American Indian, Hawaiian, some other race alone, or two or more races.

## 5.1.2 Impacts

The short-term impacts of the Project on demographic resources will be relatively minor. Permanent agricultural land conversion associated with the Project Route will constitute a small socioeconomic impact to those landowners with facilities on their land. Section 5.2.2 discusses

impacts to agricultural land. Agricultural areas surrounding transmission line structures will be able to be farmed following construction of the Project Route. There is no indication that any minority or low-income population is concentrated in any one area of the Project ROW, or that the transmission line will be placed in an area occupied primarily by a minority group.

Construction of the transmission line and associated facilities will provide temporary increases to the total personal income of the area through expenditures for housing, lodging, food services and general supplies by the major contractors. Opportunity exists for sub-contracting to local contractors for gravel, fill, and civil work. During peak construction an estimated 200 to 225 workers may be active at several locations along the Project ROW. Additional personal income will also be generated by circulation and recirculation of dollars paid out by Minnkota as business expenditures and state and local taxes. Labor relations will not be affected.

As part of the federal scoping process for the Project, questions and concerns about property value were raised. Generally, it has been found that a new transmission line may potentially result in a small decline in residential property values in urban and suburban areas immediately following construction, but this effect diminishes after a few years. Studies of the effect of a transmission line on rural property values have concluded that power line structures and easements do not have a significant impact on rural property values. For instance, a recent study concluded that the differences in sale prices and market values for rural Wisconsin properties with a high-voltage electric transmission line were not statistically significant (1.11 to 2.44 percent) when compared to properties without a transmission line (Jackson 2010).

Minnkota will offer to conduct staking reviews with the landowner to minimize potential impacts to the land to the extent practicable. Minnkota will obtain an easement from each landowner whose property will be crossed by the Project ROW. The easements allow Minnkota to locate transmission facilities on the property and enter for maintenance when needed. The landowner retains ownership and use of the land subject to the easement, which restricts certain activities within the easement in order to avoid compromising the safety and efficiency of the transmission line.

### 5.1.3 Mitigation

Socioeconomic impacts associated with the Project will be primarily positive due to an influx of wages and expenditures made at local businesses during construction and an increase in the county's tax base from the operation of the transmission line. Minnkota and the specialty contractors will use local labor and sub-contractors to the extent practicable. Impacts to landowners will be minimized to the extent practicable by discussing final structure location with landowners, establishing good lines of communication, negotiating easement payments, and maintaining communication with landowners along the Project ROW. Easements will allow Minnkota to locate transmission facilities on the property and enter for maintenance when needed. In return, the landowner receives compensation comprised of the following, as applicable: a per acre impacted land value payment for the easement area (based on land-use type); a structure payment (based on land-use value and type); and a crop damage payment for damages caused by construction. Minnkota will pay higher easement payments for diagonal crossings. The Project is not anticipated to impact minority or low-income populations, therefore no mitigation measures are proposed.

## *5.2 Land Use*

The Project ROW is primarily dominated by rural agricultural land use, i.e., pasture or cropland and nearby farmsteads. Less common types of land use in the vicinity of the Project ROW include small farm-based towns, utility scale wind energy facilities, utility ROWs, airports, aggregate mining, wild game habitat, and livestock production. Larger urban areas are generally not present outside of Carrington, Cooperstown, and Grand Forks.

Data sources used to analyze land use in the Project ROW include local, state, and federal agencies, nonprofit organizations, and field work conducted by Minnkota's consultants. Land use and land cover data were gathered from the North Dakota GAP data (USGS 2004). Mapping was completed using the ArcInfo license of ESRI® ArcMap™ 10.0.

### 5.2.1 Description of Resources

**Agriculture**

Land use within the Project ROW primarily consists of agricultural production of cultivated crops and livestock with some dispersed areas used for hay production. Table 5.2-1 identifies acres of agricultural land use within the Project ROW. Cultivated croplands (farmland) generally increase as the Project ROW proceeds from west to east towards the city of Grand Forks and the Red River Valley. Pasture lands are more abundant in the western portion of the Project. As demonstrated by the high percentage of cropland and pasture land across the Project ROW, agriculture is one of the most important industries in North Dakota.

**Table 5.2-1. Agricultural Land Use in Project ROW**

| GAP Land Cover Category | Acres in ROW | Percent of ROW |
|---|---|---|
| Cropland | 2,460 | 54.1 |
| Pasture | 787 | 17.3 |
| Total Agricultural Area | 3,247 | 71.4 |

*Source: USGS2004*

**Human Settlement**

Farmsteads are widely distributed, but are typically located near rural roads running along section lines. In general, farmstead density increases as the Project ROW heads from west to east towards the Red River Valley. Small, farm-based communities are located within the vicinity of the Project. These communities range in size from unincorporated areas with a few houses to more established, incorporated municipalities. Incorporated municipalities near the Project ROW include Aneta, Northwood, and Grand Forks. In addition to homes, more developed communities may include other structures such as businesses, schools and other government facilities, churches, and cemeteries.

According to the North Dakota Administrative Code (NDAC), the edge of the nearest transmission line facility, usually the end of the transmission structure arm or conductor, must be 500 ft or greater from the edge of an occupied residence (home) (NDCC Section 49-22-05.1 and NDAC Rules 69-06-08-02(2)(e)).

**Table 5.2-2** identifies the homes within 500 feet of the transmission structure arm. The nearest home is 49 feet from the transmission structure arm, but it is owned by Minnkota (Home Number 1 in **Table 5.2-2**). The house locations are displayed on Figure 2.

**Table 5.2-2. Homes within 500 feet of the Transmission Facility**

| Home (West to East) | Distance from Home to Structure Arm (ft) | County | PLSS Township | Civil Township | Section | Comment | Waiver Status |
|---|---|---|---|---|---|---|---|
| 1 | 49 ft | Oliver | T142N, R83W | Unorganized Territory | 26 | Occupied | Waiver granted |
| 2 | 205 ft | Wells | T147N, R71W | West Ontario | 4 | Occupied | Waiver granted |
| 3 | 320 ft | Griggs | T148N, R60W | Willow | 34 | Vacant, habitable | Waiver granted |
| 4 | 0 ft | Griggs | T147N, R60W | Addie | 2 | Vacant, not habitable | Waiver granted |
| 5 | 496 ft | Griggs | T148N, R58W | Lenora | 33 | Occupied | Waiver granted |
| 6 | 431 ft | Nelson | T149N, R57W | Ora | 33 | Occupied | Waiver granted |
| 7 | 482 ft | Grand Forks | T150N, R54W | Avon | 33 | Occupied | Waiver granted |
| 8 | 370 ft | Grand Forks | T151N, R51W | Brenna | 18 | Occupied | Waiver granted |
| 9 | 165 ft | Grand Forks | T151N, R51W | Brenna | 14 | Occupied | Waiver granted |
| 10 | 479 ft | Grand Forks | T151N, R51W | Brenna | 14 | Occupied | Landowner discussion |
| 11 | 161 ft | Grand Forks | T151N, R51W | Brenna | 11 | Occupied | Waiver granted |

## Existing Infrastructure

Developed infrastructure in the vicinity of the Project ROW includes federal, state, county, and township roads; utility scale wind energy facility; utility ROWs; radar facilities; and railroads. It is likely rural water lines are present in the Project ROW (see Section 5.3). Airports are discussed in Section 5.3. Figures 2 and 3 display the known location of various infrastructure types within and adjacent to the Project ROW.

**Table 5.2-3** shows existing infrastructure and paralleling linear ROWs within and adjacent to the Project ROW. Existing ROWs (transmission lines, railway, or roads) adjacent to the Project ROW present opportunities for paralleling as these features are typically disturbed corridors and are considered compatible with the construction and operation of a new transmission line. In some cases, these ROWs may present siting challenges or have to be spanned.

**Table 5.2-3. Existing Infrastructure within and adjacent to the Project ROW**

| Infrastructure Type | |
|---|---|
| Point Features | Count |
| - Cemetery (Yucca Catholic Cemetery) | 1 |
| - Agriculture Buildings and Structures (including 3 outbuildings on Minnkota- | 7 |

| Infrastructure Type | |
|---|---|
| owned farmstead. Excluding homes – Homes are referenced in Table 5.2-2) | |
| Paralleling Linear ROW | Miles |
| - Transmission Line | 7.4 |
| - Highway [1] | 10.6 |
| - Other Roads[2] | 41.9 |
| Total Length of ROW Parallel to Existing Corridors | *59.9 (23.9%)* |
| Railroads Crossed by Project ROW | Location |
| - Burlington Northern Santa Fe Railway | T142N, R81W, Section 28 |
| - Dakota Missouri Valley and Western Railroad | T143N, R80W, Section 17 |
| - Canadian Pacific Railway | T148N, R70W, Section 25 |
| - Red River Valley and Western Railroad | T148N, R66W, Section 30 |
| - Burlington Northern Santa Fe Railway (2 lines at 1 location) | T148N, R65W, Section 35 |
| - Burlington Northern Santa Fe Railway | T148N, R57W, Section 6 |
| - Burlington Northern Santa Fe Railway | T150N, R54W, Section 32 |
| Pipelines Crossed by Project ROW | Location |
| - Williston Basin Interstate (gas) | T143N, R81W, Section 13 |
| - CHS/Cenex (gas) | T148N, R65W, Section 35 |
| - Williston Basin Interstate (gas) | T148N, R67W, Section 25 |
| - Alliance Pipeline (gas) | T148N, R67W, Section 29 |
| - TransCanada Pipeline (oil) | T149N, R57W, Section 22 |
| - Enbridge Pipeline (gas) | T151N, R52W, Section 24 |

*1: This analysis includes existing transmission lines paralleling highways.*
*2: Features include graded and drained roads, gravel, paved, trail, and unimproved roads.*

As noted in the Corridor Certificate Application, one communication tower is located within the Project Corridor (T148N, R57W, Section 19); this communication tower is avoided by the Project ROW. The Project ROW overhangs the northern portion of the Yucca Catholic Cemetery in T142N, R82W, Section 34. Seven railroads and six pipelines are crossed by the Project Route (**Table 5.2-3**). No center pivot irrigation (CPI) systems are crossed by the Project ROW. Seven structures, such as sheds and outbuildings, are located within the Project ROW.

## Planned Wind Energy Facilities

Although wind energy development is increasing in North Dakota, the exact size and location of future wind energy developments are uncertain at the present time. The Project ROW crosses through two potential wind energy development areas in Sheridan County and one potential wind energy development area in Oliver County. Minnkota is in contact with the development companies and no substantive impacts to the wind projects are anticipated. In general, a transmission line may be seen as a benefit to a wind energy project for transfer of energy output.

## Mining Resources

Due to the glacial history of the landscape, several aggregate gravel pits are found in this region of North Dakota. These areas are typically used for gravel or sand extraction. The gravel pits are often expanding and their operation requires the use of heavy machinery. Transmission line

development may be compatible with aggregate resource extraction, if structure placement and overhead lines will not interfere with future operations at the gravel pit facility.

There are two gravel pits crossed by the Project ROW, as listed in **Table 5.2-4**. Minnkota has contacted the landowners regarding future plans for extraction and there are no plans to expand these facilities. Figure 2 displays the location of gravel pits. Coal surface mines are present near the western portion of the Project, but are not crossed by the Project ROW.

**Table 5.2-4. Gravel Pits within the Project ROW**

| Gravel Pit (West to East) | PLSS Township |
|---|---|
| 1 | T144N, R80W, Section 25 |
| 2 | T148N, R67W, Section 25 and 26 |

**Conservation Areas**

USFWS grassland and wetland easements and NRCS CRP and CREP parcels are crossed by the Project. These areas have been assigned various levels of legal protection and are intended to serve as wildlife habitat, to protect natural features, or to preserve water quality.

NRCS CRP contracts are considered confidential and information is not released without landowner permission. As such, information about the location of these easements is unknown. Construction of a transmission line within CRP or CREP lands is not incompatible; the impacts would be minimal and limited. Minnkota's land agents will work with individual landowners to identify CRP and CREP parcels and to minimize potential impacts if any are located within the Project ROW.

USFWS grassland easements are surface easements that minimize impacts to land cover. Likewise, USFWS wetland easements protect the wetland basin(s) within the easement land. The USFWS provided locations of wetland and grassland easements as shown on Figure 5. A grassland easement covers all land cover types within the easement property. However, a wetland easement only covers the wetland basins; upland areas on the property are not covered by a wetland easement.

Minnkota obtained USFWS grassland and wetland easement locations in April 2011. The acreage of the wetland easements reflects both wetland and upland land cover types. Wetland easements within the Project ROW total 773 acres, but the acreage of wetland basins within those easements is significantly less and will be determined based on USFWS file review, historic aerial photo interpretation, and field review. The USFWS data identified 19 acres of grassland easements within the Project ROW. Minnkota's consultant is working with the USFWS to refine wetland easement and grassland easement impacts and to obtain the necessary Special Use Permit for the Project.

The Project ROW will not cross any National Forests, National Grasslands, National Waterfowl Production Areas, or National Wildlife Refuges.

Private Lands Open to Sportsmen (PLOTS) is a voluntary program offered to landowners by the North Dakota Game and Fish Department (NDGF), which provides landowners with monetary compensation for allowing public access to their land for fishing or hunting. Land parcels are typically enrolled in the PLOTS program for two to three years, but some are under a

long-term agreement. The location of these parcels is made public by the NDGF. Some CRP parcels are enrolled in the PLOTS program. Minnkota's land agents will work with individual landowners to identify CRP parcels and to minimize potential impacts if any are located within the Project ROW. Within the Project ROW there are 6 PLOTS lands totaling 29.4 acres. PLOTS lands are displayed on Figure 5.

The Nature Conservancy (TNC) and Ducks Unlimited own property near the Project which is used specifically to provide habitat for sensitive species native to North Dakota and nesting areas for waterfowl along their migratory pathway. These areas are generally concentrated near the Missouri River and none are crossed by the Project ROW (**Figure 5**).

**State Trust Lands**

The North Dakota Department of Trust Lands (NDDTL) (formerly known as the North Dakota State Land Department) manages the State Trust Lands and School Trust Lands in North Dakota, which were granted at statehood for the support of primary and secondary education. Some of these tracts have identifiable assets in addition to the current pastureland or cultivated land uses. NDDTL's primary concerns were related to the Project's potential to impact future wind development or aggregate extraction on these tracts; however the presence of a transmission line does not preclude a tract from wind development or gravel extraction, if properly sited. NDDTL's provided comments on the Project in which it discussed (1) tracts not recommended for the transmission line, tracts that can accommodate the transmission line, and areas of future gravel extraction. However, some tracts were not addressed by the NDDTL in their Project comments. **Table 5.2-5** identifies the numbers and acres of State Trust Lands within the Project ROW which are depicted on Figure 5.

**Table 5.2-5. NDDTL Recommendations for State Trust Lands within Project ROW**

| NDDTL Recommendation | Total Number of Tracts | Acres |
|---|---|---|
| Tracts Not Recommended for Transmission Line | 2 | 19.6 |
| Tracts Minimally Impacted by the Transmission Line | 3 | 18.2 |
| Tracts Not Addressed by the NDDTL | 4 | 33.9 |
| TOTAL | 9 | 71.7 |

## 5.2.2 Impacts

**Agriculture**

Land use in the Project ROW is dominated by agricultural cropland, which totals about 54 percent of the ROW followed by pastureland, which totals about 17 percent of the ROW. The most common form of agricultural land use is row crops. The only agricultural land that will be permanently removed from production is the area directly affected by structure placement and fiber optic regeneration stations (and associated fiber optic regeneration station roads). The area directly under the transmission line that is outside of the structure location may continue to be used for agriculture. **Table 5.2-6** identifies temporary and permanent impacts anticipated for agricultural land for the Project .

**Table 5.2-6. Agricultural Land Use Impacts for Project**

| GAP Land Cover Category | Temporary Impacts (acres) | Permanent Impacts (acres)[1] |
|---|---|---|
| Cropland | 534.8 | 5.7[1] |
| Pasture | 180.6 | 0.8 |
| Total Agricultural Area | 715.4 | 6.5 |

*1. A Restricted Tillage Area was added as a permanent impact to each structure location on tillable land. Without the Restricted Tillage Area, permanent impacts total 3.4 acres for the entire Project, regardless of land use.*

Where appropriate, the Project ROW follows existing field edges or crosses fields in a manner designed to minimize impacts to plowing and harvest patterns or as discussed with the landowner in the easement agreement. In addition, Minnkota will offer to stake individual structure locations on each landowner's property for their visual review and input.

For construction that takes place outside of the winter months, temporary impacts to agriculture could occur as a result of construction activity. These impacts could include, but are not limited to, loss of planting opportunity, crop damage, and soil compaction. Minnkota will work directly with landowners to minimize impacts and to provide appropriate compensation for lost planting opportunities and crop damage. Soils compacted by construction activities will be restored using a deep tillage practice, such as sub-soiling.

Drain tiles may be present along the transmission line route. Minnkota will work with the landowners to identify locations of drainage tiles along the route and will minimize interference with drain tile, where possible. In the event that Minnkota encounters a tile that the landowner did not identify, Minnkota will relocate the structure and repair the tile line, if damaged.

The Project may make certain agricultural activities more difficult, such as maneuvering equipment around structures and aerial spraying. Landowners may conduct aerial spraying to apply pesticides, fungicides, and fertilizers. Aerial spraying is typically conducted by small aircraft with low flying altitudes. After the Project is constructed, aerial sprayers will need to employ the same flight patterns as used when working adjacent to tree rows, distribution lines, or communication structures.

**Human Settlement**

Short-term impacts to residents and local business owners in the vicinity of the Project primarily will be related to disruption caused by temporary construction activities, such as elevated noise levels and increased vehicle traffic.

The NESC requires certain clearances between transmission line facilities and buildings for safe operation of the transmission line. Minnkota developed a route for the Project sufficient to maintain clearances required to safely operate the transmission line.

Ten homes (occupied or vacant, but habitable) are located within 500-feet of transmission facility. One vacant home is located within the Project ROW. The nearest home is 49 feet from the transmission facility; this home is owned by Minnkota. Minnkota has obtained waivers from most of the affected landowners to route the transmission facility within 500 feet of their residence. Long-term effects upon residences will be visual in nature and include building restrictions within the easement. Homes located near the Project may experience short-term

effects during construction such as elevated noise levels, increased fugitive dust, and increased vehicle traffic.

**Existing Infrastructure**

One communication tower is located within the Project Corridor (T148N, R57W, Section 19), but is avoided by the Project Route. The communication tower located within the Project Corridor will limit where adjacent transmission structures are placed with relation to the tower, but will not impact operation of the Project or the communication tower.

The northern half of the Yucca Catholic Cemetery is crossed by the Project ROW in T142N, R82W, Section 34. Minnkota has obtained an overhang easement from Yucca Catholic Cemetery.

Seven structures are located within the Project ROW, but are either spanned or are adjacent to the Project Route. Structures located within the proposed ROW will be voluntarily displaced; typically, this means that the structure will be purchased by Minnkota and the structure will be moved from the area. In some instances, the structures will be left in place or relocated consistent with landowner agreements.

Typically, CPI systems are located in the center of a quarter-section and have a 360 degree rotation for field irrigation. No CPI systems are crossed by the Project ROW and Minnkota is working with landowners that have expressed future irrigation plans.

Seven railroads and six pipelines are crossed by the Project ROW. These crossings will be spanned.

**Planned Wind Facilities**

The Project ROW crosses three potential wind energy facilities. Minnkota is in communication with the wind energy developers and no impacts are anticipated. Construction of the Project may provide wind developers with more direct access to transmission on which to distribute their power.

**Mining Resources**

Minnkota has contacted the landowners regarding future plans for extraction from the two gravel pits crossed by the Project ROW and there are no plans to expand these facilities. Preliminary structure locations indicate that a structure will be placed at the assumed northern edge of gravel pit Number 1 and that structures will be placed on the assumed eastern and western edges of gravel pit Number 2. Minnkota is also contacting the landowner of the gravel pit south of the Project ROW in T147N, R73W, Section 8 to determine the extent of future operations. Minnkota will continue to work with landowners to minimize potential impacts to future gravel operations.

Lignite mining is active near the western terminus of the Project at the BNI Center Mine. The current location of this mine is approximately 6 miles west of the Center 345 kV Substation. The mining operation is expanding south. Impacts to coal mining are not anticipated from the Project.

**Conservation Areas**

USFWS maintains grassland and wetland conservation easements within the Project ROW. A grassland easement would be impacted by placement of a structure within the easement. A wetland easement would be impacted by placement of a structure within a wetland basin under

easement. Minnkota is working with local USFWS wetland management districts and landowners to determine the exact location and size of these wetlands under easement and to avoid or minimize impacts. Impacts based on preliminary structure locations are shown in **Table 5.2-7**.

**Table 5.2-7. Temporary and Permanent Impacts to USFWS Easements from the Project Route**

| Easement Type | Temporary Impacts (Acres) | Permanent Impacts (Square Feet) |
|---|---|---|
| USFWS Wetland[1] | 27 | 406 |
| USFWS Grassland | 4 | 471 |
| Total | 31 | 877 |

*[1] Wetland easement impact is based upon the desktop and field reviewed wetland boundaries as of November 8, 2011. Actual impact of easement wetlands will be less, since construction access will likely avoid wetlands. Wetland easement impacts are based on actual wetland basin location as verified by field visits and desktop evaluation. Minnkota will review delineated boundaries with USFWS for wetland basins within wetland easements.*

NRCS oversees CRP-enrolled parcels in the Project ROW; however, the location of these parcels is not publically available because the contracts are considered confidential. Minnkota will work with local NRCS offices and landowners to determine the location of and address concerns regarding CRP parcels. Individuals using PLOTS lands will have access under the transmission line to access the property. For the transmission line structures (preliminary locations) placed on PLOTS land, there will be 3.2 acres of temporary impacts and 628 square feet of permanent impacts. The transmission line will not impact recreational opportunities on PLOTS lands.

**State Trust Lands**

The NDDTL indicated that some State Trust Lands have identifiable assets in addition to the current pastureland use, such as aggregate deposits, wind farm development, or cultivated land that may be impacted by construction of the Project Route. **Table 5.2-8** identifies temporary and permanent impacts (acres) to State Trust Lands from the transmission line facility. Direct impacts to State Trust Lands could not be completely avoided by the Project Route.

**Table 5.2-8. Land Impacts to State Surface Tracts from the Project Route**

| NDDTL Tract Recommendations | Temporary Impacts (ac) | Permanent Impacts (ac) |
|---|---|---|
| Tracts Not Recommended for Transmission Line | 4.0 | 0.03 |
| Tracts Minimally Impacted by the Transmission Line | 3.8 | 0.01 |
| Tracts Not Addressed by the NDDTL | 7.5 | 0.02 |
| TOTAL | 15.3 | 0.06 |

### 5.2.3 Mitigation

**Agriculture**

The Project Route was designed to minimize impacts to agricultural land use. Several measures will be utilized to mitigate impacts, including:

- Working with the landowners to site the Project Route so as to minimize impacts on their property. Minnkota will offer to conduct a staking review with landowners, to the extent practical.
- Siting the final Project Route along existing field edges.
- Crossing fields parallel to existing plowing patterns or by crossing fields at 90 degree angles.
- Monetarily compensating landowners for crop or other (fence or drain tile) damage caused by construction or operation and maintenance activities.
- Monetarily compensating landowners for a structure on their land.
- Minnkota will apply herbicide around the base of structure if requested by landowners.

**Human Settlement**

Minnkota developed a Project Route to avoid occupied homes by maximizing setbacks to the extent practicable. In some instances, it was preferable for the Project Route to pass within 500 feet of an occupied residence due to other routing factors and, in such cases, Minnkota is working with the landowners affected and obtained a waiver of the 500-foot setback requirement.

Residents and local business owners in the vicinity of the Project primarily will be affected by temporary construction activities and long-term aesthetic changes. In addition, landowners may be affected by temporary changes in land use by development of the Project Route. Specifically, agricultural land will be temporarily disrupted during construction. To minimize impacts to landowners, Minnkota will utilize the following mitigation measures:

- The exact location of structure sites, the ROW, and other disturbed areas will be determined with landowner's input.
- The minimum area necessary will be disturbed.
- Construction activities will be limited to the 150-foot-wide ROW, unless temporary easements or access permission across adjacent property are obtained from the landowner(s).

Landowner compensation will be established in conjunction with easement acquisition for each landowner. As discussed in Section 5.1.3, compensation is based on the footprint of the easement upon the property, the number of structures, and crop damage.

**Existing Infrastructure**

Minnkota obtained an overhang easement for the portion of the Project ROW that crosses the Yucca Catholic Cemetery. No additional mitigation is planned.

Mitigation for impacts to other public airports and communication structures will not be required as these features will be avoided or impacts will be minimized by through Project sighting and design.

Minnkota will work with pipeline operators and railway companies to minimize impacts to their facilities during construction and operation. Minnkota will negotiate approvals with railway and pipeline operators, as necessary.

**Planned Wind Facilities**

Minnkota will continue to work with the wind energy project development companies. No impacts are anticipated, therefore no mitigation is proposed. In general, a transmission line may be seen as a benefit to a wind energy project for transfer of energy output.

**Aggregate Mining**

The landowners indicated that there were no future extraction plans for the gravel pits, therefore no mitigation is necessary.

**Conservation Areas**

Minnkota is working with local NRCS offices and landowners to determine the location of lands enrolled in CRP and to avoid or minimize impacts. If impacts cannot be avoided, Minnkota will work with the appropriate agency and landowner to remove the area from CRP, if necessary. Minnkota is working with the USFWS and applying for a Special Use Permit for impacts to grassland and wetland easements.

**State Surface Tracts**

The Project Route was designed to minimize or avoid impacts to existing resources on State Trust Lands. Minnkota will work with NDDTL to complete a Right-of-Way Permit application to cross State Trust Lands.

## *5.3 Public Services*

### 5.3.1 Description of Resources

Public services generally refer to services provided by government entities to their citizens. Public services are often those services that are used to benefit public health and safety, such as education and emergency services (fire, ambulance, and police). Public services are concentrated within the municipalities near the Project ROW. There are three municipalities within the vicinity of the Project (Aneta, Grand Forks, and Northwood). Fiber optics, pipelines, transmission lines, rural water lines, and associated facilities exist within or are crossed by the Project ROW.

**Airports**

No commercial or general aviation airports are present within the Project ROW. The R. Leep Airstrip located in T147N, R73W, Section 14, the closest private airstrip to the Project Route, is approximately 0.8 miles away. Nearby airport facilities are predominantly general aviation airports, but some are smaller private facilities.

The Grand Forks International Airport has planned improvements for the existing airport layout because of a forecasted increase in aircraft operations. According to the July 2006 Land Use Compatibility Plan for Grand Forks International Airport, the future plans include construction of two additional runways. Grand Forks International Airport intends to make additional upgrades, including extending the current main runway and existing crosswind runway. Portions of the Project ROW fall within Airport Zone D (airspace protection buffer area) of the Grand Forks International Airport.

**Roads**

County and township (section line) roads characterize the existing roadway infrastructure in and around the Project. The Project ROW will cross state and U.S. highways at 16 locations (**Table 5.3-1**). The average daily traffic volumes on the area's highways are documented in Figure 6. Determining the specific capacity of any highway is a complex process; however, general estimates are used for planning purposes. For purposes of comparison, the functional capacity of a two-lane paved rural highway is approximately 5,000 vehicles per day, referred to as the average annual daily traffic (AADT). In general, the state highways in and near the Project ROW carry higher levels of traffic than the average for rural North Dakota, but represent only a fraction of the roadway capacity.

### 5.3.2 Impacts

Many public services near or within the Project ROW are located within municipality boundaries, but rural water, fiber optic, transmission lines, and distribution lines are also located outside of municipalities. Several of these municipalities have medical centers, hospitals, fire stations, police stations, and schools.

Potential temporary impacts to public services, mainly emergency services, are related to construction activities that may disrupt roadways and access. Generally, construction activities will be staged such that public roads will not be closed for any substantial period. Emergency access for local residents, should they need emergency services, will be provided by halting construction and relocating equipment so emergency vehicles could access the residence. Once construction is complete, the transmission line will span all roads and therefore will not impede emergency services.

The Project is not anticipated to have any long-term negative direct or indirect effects to public services. The Project will have a positive effect on public services by providing improved reliability and capacity to meet the growing demands for electrical service in the Minnkota service area. The added transmission will reduce the risk of brownouts (leading to potential blackouts) by providing a means to transmit additional base load power to the Minnkota service area. Aside from the identified electrical impacts that are being addressed and mitigated through existing processes with neighboring utilities, Minnkota does not anticipate additional direct or indirect impacts to existing utilities from this Project.

**Airports**

Transmission lines can present an important safety concern to airports and aircraft. The FAA has established guidelines to determine the appropriate setback distance for tall structures, including transmission lines, from public use airports and heliports. Federal Aviation Regulation (FAR) Part 77 establishes standards and notice requirements for reporting airspace obstructions for objects currently impacting or that could impact navigable airspace around aviation facilities. FAR Part 77 defines a series of imaginary surface zones surrounding airports that specify height restrictions for structures based on slope ratios. These imaginary surfaces include the primary surface, horizontal surface, conical surface, approach surface and the transitional surface. According to FAR Part 77, "an object will be considered an obstruction to a public airport (excluding seaplane bases and heliports) if it is of greater height" than any of the aforementioned imaginary surfaces. Each of these imaginary surfaces have corresponding slopes, based in part on the airport's use designation, flight volumes, and plane size capabilities. All surfaces are measured at the mean sea-level elevation of the airport.

Certain objects such as steel pole transmission line structures have the potential to conflict with the operation of airport navigational aids and weather observation station facilities, including radar facilities used for aircraft navigation. These facilities may require routing regulations similar to those applicable to airports and airstrips. Coordination with the Grand Forks International Airport and University of North Dakota (UND) Aerospace staff indicate that the project would not impact airport navigational aids or weather observation facilities.

In accordance with the Land Use Compatibility Plan for Grand Forks International Airport (July 2006) and the FAA, pursuant to the requirements set forth by FAR Part 77, Subsection 13, Minnkota completed an airspace review for all structures within Zone D. Due to results of the FAA determination, Minnkota has reduced the height of structures by using H-frame structures within Zone D therefore no impacts to airspace are anticipated. The Project has completed and submitted the paperwork necessary for the FAA to provide preliminary concurrence of the Project design. Letters from the Grand Forks International Airport and UND Aerospace were filed with the Commission during the Corridor Public Hearings as Exhibits 24 and 25.

**Roads**

The construction workforce is expected to generate increased vehicle trips on local roadways. Since many of the area roadways have limited traffic currently, the anticipated increased vehicle traffic during peak construction represents a large percentage increase and will be perceptible to daily users of the roads. Slow moving construction vehicles may cause delays on smaller roads, similar to farm equipment during harvest. In addition, delays may occur as the transmission line is being strung across a roadway. These impacts will be short term and temporary.

Two of the 16 potential State and US highway construction access locations may require a temporary impact within Department of Transportation (DOT) ROW. No permanent impacts are anticipated. **Table 5.3-1** shows the highway crossing and access locations from west to east and potential impacts. As necessary, Minnkota will apply for approval from the North Dakota DOT for an access permit.

**Table 5.3-1. Highway Crossing and Construction Access Locations**

| ND or U.S. Hwy | North or East Access | South or West Access | Temporary Impact Anticipated | Description of Temporary Impact |
|---|---|---|---|---|
| 25 | Drive off access | Existing field access | Yes | Remove and replace fence east side |
| 1804 | Existing field access | Existing field access | No | N/A |
| 83 | Drive off access | Drive off access | Yes | Remove and replace fence both sides |
| 41 | Access from side road | Drive off access | No | N/A |
| 200 | Drive off access | Access from side road | No | N/A |
| 14 | Existing field access | Existing field access | No | N/A |
| 3 | Drive off access | Access from side road | No | N/A |
| 52 | Access from side road | Drive off access 500' south | No | N/A |
| 30 | Drive off access | Existing field access | No | N/A |
| 281 | Existing field access | Existing field access | No | N/A |
| 20 | Existing field access | Existing field access | No | N/A |
| 1 | Existing field access | Existing field access | No | N/A |
| 45 | Access from side road | Access from side road | No | N/A |
| 32 | Existing field access | Existing field access | No | N/A |
| 15 | Existing field access | Existing field access | No | N/A |
| 18 | Drive off access | Drive off access | No | N/A |

*Existing field access - Construction access will be via existing field access which is adequate in size and strength to handle construction equipment.*

*Drive off access - Construction access will be through existing shoulder which is shallow enough and has adequate strength to handle construction equipment.*

*Access from side road - Construction access will not be along highway, but rather will access ROW via side road close to crossing location.*

### 5.3.3 Mitigation

Proper safeguards will be implemented for construction and operation of the Project facilities. The Project facilities will be designed according to local, state, and NESC standards regarding ground clearance, crossing utilities clearance, building clearance, strength of materials, and ROW widths. Construction crews and/or contract crews will comply with local, state, and NESC standards regarding facility installation and standard construction practices. Minnkota will establish industry safety procedures that will be followed during and after installation of the transmission line, including clear signage during all construction activities.

**Airports**

Following consultation with the Grand Forks International Airport, UND Aerospace and the FAA, Minnkota has proposed H-frame structures near the Grand Forks International Airport to reduce structure height and avoid impacts to airport operations, therefore no impacts are anticipated and mitigation will not be necessary. Minnkota will continue to work with the Grand Forks International Airport, UND Aerospace and the FAA and does not anticipate any impacts to airport navigational aids, weather observation station facilities, airspace, and glide slope intercept for public airports near the Project Route.

**Roads**

Minnkota will ensure that all safety requirements are met during the construction and operation of Project facilities. Additionally, when crossing roads or railroads during stringing operations, guard structures may be utilized as necessary to eliminate traffic delays and provide safeguards for the public. Minnkota is working with counties and townships to develop construction traffic plans that will be made available prior to construction. With the construction traffic plans, proper safeguards, and protective measures implemented as described above, no additional mitigation should be needed.

## *5.4 Human Health and Safety*

Human health and safety concerns include potential issues such as electric and magnetic fields (EMF) (collectively referred to as electromagnetic fields), stray voltage, and air quality. The majority of the information in this section was obtained from federal and state agencies and national and international organizations, including the National Institute of Environmental Health Sciences (NIEHS), U.S. Environmental Protection Agency (EPA), and World Health Organization (WHO).

### 5.4.1 Description of Resources

**Electric and Magnetic Fields**

EMF, as it relates to transmission lines, references two separate fields: electric fields and magnetic fields. Electric fields are produced by the line voltage, and magnetic fields are produced by the electric current in the lines. An electric field results from the voltage on an electrical wire as caused by electric charges, and electric fields can exert forces on other nearby charges. The intensity of the electric field is related to the voltage of the line and proximity to the conductor. Electric fields are measured in volts per meter (V/m) or kilovolts per meter (kV/m) where 1 kV = 1,000 V.

A magnetic field is created when charges move along a wire. The moving charges produce an electric current. The intensity of the magnetic field is proportional to the current flow through the conductors and proximity to the conductor. Magnetic fields are measured in milligauss (mG) or microTeslas (uT). Peak magnetic field levels can vary considerably depending upon the amount of current carried by the line.

Electric fields and magnetic fields are produced both by the natural world around us and the electricity we use on a daily basis. The earth's steady state electric field is approximately 100 V/m and the earth's steady state magnetic field is approximately 550 mG. These do not have the 60-times-per-second time variation of power line fields, but we experience them as time-varying fields as we move through them. Thunderstorms can temporarily increase the electric field in a given location to several thousand V/m.

The EMF produced by electrical equipment, which includes transmission lines, varies in time at a frequency of 60 cycles per second or "60 Hertz (Hz)." According to the Electric Power Research Institute (EPRI), the average household background 60-Hz magnetic field is between 0.5 and 4 mG with an average of 1 mG, and the average 60-Hz electric field is 1-20 V/m. **Table 5.4-1** displays typical 60-Hz magnetic field levels from common household appliances. The EMF produced by electrical appliances and transmission lines are considered to be extremely-low-frequency (ELF) fields. High frequency EMF are associated with radio, TV, radar, and cell phone signals. ELF-EMF are produced by any electric appliance or electric circuit. Both the electric and magnetic fields that constitute EMF are strongest close to the sources of voltage and current, and decrease rapidly with distance.

**Table 5.4-1. Typical 60-Hz Magnetic Field Levels from Common Household Appliances**

| Appliance | Median magnetic field 6 inches from appliance (mG) | Median magnetic field 2 feet away (mG) |
|---|---|---|
| Refrigerator | 2 | 1 |
| Vacuum cleaner | 300 | 10 |

| Appliance | Median magnetic field 6 inches from appliance (mG) | Median magnetic field 2 feet away (mG) |
|---|---|---|
| Electric oven | 9 | - |
| Dishwasher | 20 | 4 |
| Microwave oven | 200 | 10 |
| Hair dryer | 300 | - |
| Computers | 14 | 2 |
| Fluorescent lights | 40 | 2 |

*Source: NIEHS 2002*
*Note: Dash means the magnetic field at this distance from the operating appliance could not be distinguished from background measurements taken before the appliance had been turned on.*

There are no standards established for safe levels of exposure to 60-Hz EMF. Although some states have established standards or guidelines with regard to transmission line electric and magnetic fields, there are no North Dakota published guidelines for EMF. The EMF standards and guidelines established by other states for transmission lines are displayed in **Table 5.4-2**. The phrase "On ROW" refers to the location directly under the transmission line and the phrase "Edge ROW" refers to a distance 75 feet from directly underneath a transmission line.

**Table 5.4-2. State EMF Standards and Guidelines for Transmission Lines**

| State/Line Voltage | | Electric Field (kV/m) | | Magnetic Field (mG) | |
|---|---|---|---|---|---|
| | | On ROW | Edge ROW | On ROW | Edge ROW |
| Florida[c] | 69-230 kV | 8.0 | 2.0[f] | -- | 150 |
| | 230-500 kV | 10.0 | 2.0[f] | -- | 200 |
| | >500 kV | 15.0 | 5.5[f] | -- | 250[e] |
| Massachusetts | | -- | 1.8 | -- | 85 |
| Minnesota | | 8.0 | -- | -- | -- |
| Montana | | 7.0[a] | 1.0[b] | -- | -- |
| New Jersey | | -- | 3.0 | -- | -- |
| New York | | 11.8 | 1.6 | -- | 200 |
| | | 11.0[d] | | | |
| | | 7.0[a] | | | |
| Oregon | | 9.0 | -- | -- | -- |

[a] *Maximum for highway crossings*
[b] *May be waived by the landowner*
[c] *Magnetic fields for winter-normal, maximum line current-carrying capability*
[d] *Maximum for private road crossings*
[e] *Includes 500 kV double-circuit lines built on existing ROWs*
[f] *Includes the property boundary of a substation*

*-- No Guidelines*

Some organizations have set EMF advisory limits that serve as guidelines for permissible EMF exposure levels. For example, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) recently established a continuous magnetic field exposure limit of 2,000 mG and a continuous electric field exposure limit of 4,200 V/m (4.2 kV/m) for members of the general public. The American Council of Governmental Industrial Hygienists (ACGIH) has set a

Threshold Limit Value for occupational exposure to 60-Hz magnetic fields of 10,000 mG and electric fields of 25,000 V/m (25 kV/m).**Table 5.4-3** displays EMF guidelines established by health and safety organizations.

**Table 5.4-3. Electric and Magnetic Field Exposure Guidelines for Power-Line Fields**

| Organization | Electric Field (kV/m) | | Magnetic Field (mG) | |
|---|---|---|---|---|
| | General Public | Occupational | General Public | Occupational |
| ICNIRP (2010) | 4.2 | 8.3 | 2,000 | 4,200 |
| IEEE (2002) | 5 | 20 | 9,040 | 27,100 |
| ACGIH (2009) | -- | 25 | _ | 10,000 |

*ICNIRP – International Commission on Non-Ionizing Radiation Protection*
*IEEE – Institute of Electrical and Electronic Engineers*
*ACGIH – American Conference of Governmental Industrial Hygienists*

Minnkota conducted an analysis of calculated EMF levels for the Project. **Table 5.4-4** shows the calculated EMF levels for the Project and how the calculated levels at any location within the ROW are below the ICNIRP guidelines (2,000 mG and 4.2 kV/m) for public exposure to EMF. Computations were performed using industry standard approaches as outlined in the Transmission Line Reference Book – 345 kV and Above; Second Edition, 1982, Electric Power Research Institute, Inc., Palo Alto, CA, USA, and modified by data approaches developed by Bonneville Power Administration and Washington State University.

**Table 5.4-4. Calculated EMF Levels for the Project**

| Project Load Condition | Electric Field (kV/m) | | Magnetic Field (mG) | |
|---|---|---|---|---|
| | On ROW | Edge ROW | On ROW | Edge ROW |
| Normal Operating Condition[a] | 2.4 | 1.2 | 75 | 23 |
| Maximum Operating Condition[b] | 4.5 | 1.2 | 341 | 100 |

[a] *Normal Operating Condition was assumed to be 404 MVA for winter-normal at maximum allowable voltage.*
[b] *Maximum Operating Condition was assumed to be that condition of operating parameters which would result in the highest field levels.*

## Electric and Magnetic Field Research

Concerns about potential health effects of EMF from transmission lines were first raised in the late 1970s, triggered by a weak statistical correlation between living in proximity to utility distribution systems and childhood leukemia cases. There has been much public debate and research regarding ELF-EMF for over 35 years. Considerable research has been undertaken to understand how electric and magnetic fields interact with the physical nature of matter. Because electric fields are blocked by ordinary substances that conduct electricity, such as skin, foliage, and house structures, magnetic fields have been the focus of most of the research regarding possible health effects to both humans and livestock. While there are numerous internet sites devoted to EMF (whether from transmission lines, cell phones, or radio frequency signals), the vast majority of public-health agencies believe that EMF from transmission lines do not cause health problems. In part, these scientific consensus groups note the physical impossibility of any health effect (or adverse biological effect) being caused by exposure to low-frequency, low-intensity magnetic fields. Exhaustive reviews of the health effects from power-frequency fields conclude that the evidence of health risk is weak and there is little laboratory evidence

correlating extra low frequency EMF exposure with health risk, as demonstrated in the following discussion.

*EMF and Leukemia*

After reviewing more than two decades of research, NIEHS scientists concluded that the overall pattern of results suggests a weak association between increasing exposure to EMF and an increased risk of childhood leukemia (NIEHS 1999). In the President's Cancer Panel 2008-2009 Annual Report (published in April 2010), the weaknesses of the childhood-leukemia epidemiologic associations in the studies were discussed: (1) EMF were not measured, but distance to power lines was used to estimate exposures inside of a home, (2) all sources of EMF were not considered, and (3) the selection of cases and controls was likely biased.

ICNIRP reviewed the scientific evidence relating to extremely low magnetic fields and increased risk of childhood leukemia and concluded that the evidence "is too weak to form the basis for exposure guidelines" (ICNIRP 1998, 2010). Several scientific organizations including the American Medical Association (AMA 1994), American Cancer Society (ACS 1996), American Physical Society (APS 2005), and National Academy of Sciences (NAS 1997) have stated that the body of evidence in regard to ELF-EMF, particularly magnetic fields, indicates that exposure to these fields do not present a human health hazard.

A large number of credible, scientific organizations have come to similar conclusions about ELF-EMF and public health:

- The epidemiology studies on EMF are not based on actual EMF exposures and show weak and generally inconsistent correlations between estimates of EMF exposure and health statistics.
- Laboratory research has not been able to establish either cause and effect relationship between exposure to magnetic fields and any human disease, or a plausible biophysical or biological mechanism by which exposure to EMF could cause cellular changes that would lead to disease.
- The magnetic fields produced by power lines do not have the energy necessary to break chemical bonds and cause DNA mutations, and hence cannot interfere with basic biological function at the molecular level.

Many public health agencies (e.g., American Cancer Society, Environmental Protection Agency, Food and Drug Administration, Centers for Disease Control) have not established numerical guidelines for power line EMF because they have not found scientific studies sufficiently supportive of the need to set either an EMF exposure guideline or a "safe distance" criterion. No legitimate public health agency has proposed that an "unsafe" region exists in the proximity of overhead transmission lines.

*EMF and Livestock*

The vast amount of laboratory animal research focused on EMF effects on living organisms has not demonstrated that power line magnetic fields affect reproductive function. In addition, a considerable amount of research on EMF and livestock (particularly cows) has been conducted in Quebec, Canada and has been funded by Hydro-Quebec. A recent joint study conducted by McGill University, Ministere de l'Agriculture, des Pecheries et de l'Alimentation du Quebec (MAPAQ) and the Quebec Dairy Committee exposed cows to high levels of EMF. This study did not show any changes in the hormonal profile and dairy production of Holstein cows. This, in addition to several other studies conducted since the 1970s, provides reassurance that no

biological disorder can be attributed to the exposure of livestock to EMFs generated by high-voltage transmission lines. In addition, no harmful effect on the health, productivity, fertility, reproduction, or behavior of livestock exposed to EMFs has been observed, and typical EMF exposures are not anticipated to be harmful to farm animals.

In addition, Minnkota, and other utilities in agricultural regions of the country, have operated 345 kV systems for many years. Through the years, no statements concerning the potential adverse effects of the 345 kV power system on cattle have ever been received.

*EMF and Implantable Medical Devices*

Implantable medical devices, for example cardiac pacemakers, defibrillators, neurostimulators, and insulin pumps may experience interference from strong EMF. The 2004 EPRI report indicated that implantable medical devices may be more susceptible to interference from electric fields than from magnetic fields. Electric fields will be strongest directly under the transmission line and will decrease with increasing distance from the transmission line towards the ROW edge. Although no actual real-world events have been reported in people near high-voltage transmission lines, laboratory research has shown the following potential effects can occur to pacemakers exposed to electric fields:

- Rate increasing
- Erratic pacing
- Switching to asynchronous pacing or fixed-rate pacing
- Single beat inhibition (i.e., a single beat is missed by the pacemaker)
- Total inhibition

Research completed by Toivonen et al. (1991) indicated that the lowest field intensity suggestive of possible interference was in electric fields ranging from 1.2 to 1.7 kV/m (near a 110 kV power line), but some pacemakers maintained normal function in electric fields up to 8 kV/m (near a 400 kV power line). The 15 patients in this study collectively had 12 different models of pacemakers from four manufacturers. Scholten et al. (2004) concludes that the risk of interference inhibition of unipolar cardiac pacemakers from high voltage power lines in everyday life is small. In the unlikely event a pacemaker experiences interference, the pacemaker goes into a default pacing mode and then returns to its normal operation when the person moves away from the source of the interference. Scholtenet al. (2004) indicated that moving 20 meters (66 feet) away from the point directly underneath the line (two 380 kV circuits) resulted in the most precipitous drop in electric fields. **Table 5.4-1** illustrated that by moving an additional foot or so away from the source of the magnetic fields, that the values decrease significantly, which is true for all sources of EMF.

Modern bipolar devices are much less susceptible to interactions with electric fields. Dyrda et al.'s (2009) review of Trigano et al. (2005) concluded "risks with bipolar sensing [in bipolar pacemakers] appeared negligible." In addition, major manufacturers (Medtronic and Guidant) of pacemakers and implantable medical devices have indicated that electric fields below 6 kV/m are unlikely to cause interactions affecting operation of most of their devices (Tower Project 2005).

## Induced Voltage

Induced voltage is an electrical condition through which very low levels of voltage are transferred to and may be measured in objects in the near vicinity of a high voltage transmission line. Near objects could be buildings, fences, pipelines, railways, or other equipment in very close proximity to the transmission line. The electric field from a transmission line can interact with a

conductive object, such as a metal fence, which is in proximity to the transmission line. This will induce a voltage on the object, the magnitude of which is dependent on many factors, including the weather; object shape, size, orientation, and capacitance; object to ground resistance; and object location along the ROW. Electrically grounded objects exhibit no induced voltage, but if nearby objects are insulated or semi-insulated from the ground and a person touches them, a small current will pass through the person's body to the ground. This might be accompanied by a spark discharge and mild shock, similar to what can occur when a person walks across a carpet and touches a grounded object or another person. Induced voltage from capacitive coupling normally is not a problem. Where it is, the problem can be mitigated with proper grounding of the affected objects.

**Stray Voltage**

Stray voltage is a condition that can occur on the electric service entrances to structures from distribution lines (i.e., the smaller, lower-voltage electric line that brings power from utility substations to a house, barn, and other farm buildings), not transmission lines (i.e., the electric line that brings power from the generation source to substations and hence to the distribution system). Stray voltage describes a special case of voltage developed on the grounded neutral of the electrical wiring system of a farm and/or a utility's electric power delivery system. If this voltage reaches sufficient levels, animals coming into contact with grounded devices may receive a mild electric shock that can cause a behavioral response. For example, if a cow touches a poorly grounded metal object in a building with its nose and is standing on a damp floor, and if the metal object and the floor have different electrical potentials, then a weak electric current will pass through the cow's body. This current, if strong enough for the animal to feel, may cause some discomfort. A good resource on stray voltage issues is the USDA Agricultural Handbook (#696): *Effects of electrical voltage/current on animals: how to detect and remedy problems* (1991).

**Air Quality**

Corona consists of the breakdown or ionization of air within a few centimeters of transmission line conductors and hardware. Usually some imperfection such as a sharp edge, a protrusion on hardware, a scratch on the conductor, or water is necessary to cause corona. Corona can produce ozone and oxides of nitrogen in the air surrounding the conductor. Ozone also forms in the lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants, such as hydrocarbons from auto emissions. In the case of air pollutants, the natural production rate of ozone is directly proportional to temperature and sunlight and inversely proportional to humidity. Thus, humidity or moisture, the same factor that increases corona discharges from transmission lines, inhibits the production of ozone from air pollutants. Ozone is a very reactive form of oxygen molecules and combines readily with other elements and compounds in the atmosphere. Because of its chemical reactivity, ozone is relatively short-lived.

### 5.4.2 Impacts

**Electric and Magnetic Fields**

EMF will be strongest directly under the transmission line and decrease with increasing distance from the transmission line towards the ROW edge. Minnkota conducted an analysis of EMF calculated levels for the Project (as shown in **Table 5.4-4**). As load changes on the transmission line, the electric current flow changes, therefore the magnetic fields change.

At the maximum-load operating condition under the transmission line, the electric field is 4.5 kV/m and the magnetic field is 341 mG. This is considered the worst-case scenario for the Project. The results of Minnkota's analysis shows that calculated EMF levels for the Project under maximum operating conditions and normal operating conditions are below the published guidelines from organizations (such as ICNIRP and ACGIH) (**Table 5.4-3**) and the states that have published safe-exposure guidelines (**Table 5.4-2**).

The effects that may occur to a person with an implantable medical device are usually temporary and the medical device generally resumes normal function once the person is removed from the source of electric fields. At levels associated with high-voltage transmission lines, the Project will not have regular, temporary interference with implantable medical devices. No other EMF-related impacts to humans or animals are anticipated.

**Induced Voltage**

The main concern with induced voltage on an object is the current flow through the person to ground if a person were to touch an ungrounded metal object under the lines. Insulated electric fences used in livestock operations may pick up an induced charge from transmission lines. Usually, the induced charge will drain off when the charger unit is connected to the fence. When the charger is disconnected either during maintenance or when the fence is being built, minor shocks may result but can be avoided by grounding the wire when disconnected from the charger.

As discussed below, Minnkota will utilize appropriate mitigation measures to prevent induced voltage impacts to railway or pipeline facilities. There are no anticipated induced voltage impacts expected as a result of the construction or operation of the Project.

**Stray Voltage**

Since transmission lines do not produce stray voltage, there are no anticipated stray voltage impacts as a result of the construction or operation of the Project.

**Air Quality**

No impacts to air quality due to the operation of the transmission line are anticipated. The federal government has regulations regarding permissible ambient air concentrations of ozone and oxides of nitrogen. North Dakota has incorporated these federal ambient air quality standards into its air quality rules. The ambient air quality standard for ozone is 0.075 parts per million (ppm) based upon a three-year average of the annual fourth-highest daily maximum 8-hour average (40 CFR §50.15) concentration. Humid conditions and rain may cause transmission line insulators to release corona-discharge electricity, converting oxygen to ozone. Calculations done for a 345 kV project showed that the maximum 1-hour concentration during foul weather (worst case) will be 0.0007 ppm, which is far below both federal and state standards.

Temporary air quality impacts caused by construction-vehicle emissions and fugitive dust from ROW clearing and construction may occur, but will be minimal and temporary.

### 5.4.3 Mitigation

The NESC provides standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and ROW widths. Minnkota will design the Project to adhere to NESC standards. The U.S. Occupational Safety and Health Administration (OSHA) regulates worker safety in both construction and industrial settings and has developed and enforces regulations that are designed to protect workers from potential accidents. Minnkota will

require OSHA-compliant safety procedures that will be followed during and after installation of the transmission line, including clear signage during all construction activities. The transmission lines will be equipped with protective devices (breakers and relays located where transmission lines connect to substations) to safeguard the public in the event of an accident. The protective equipment will de-energize the transmission line should such an event occur. In addition, the substation facilities will be properly fenced and accessible only by authorized personnel.

**Electric and Magnetic Fields**

As demonstrated by the conclusions of the numerous studies presented in Sections 5.4.1 and 5.4.2 and the results of Minnkota's analysis of calculated EMF levels, normal operating conditions and maximum operation conditions will create EMF levels nearby the lines that will be at or below published guidelines. Minnkota does not anticipate any affects from EMF; thus it is not anticipated that any mitigation will be necessary.

**Induced Voltage**

As part of the design and engineering process, the Project Route will be designed to minimize any induced voltages in objects in proximity to the facilities. NESC clearances will be met, and the transmission line engineered in such a way as to ensure that induced voltages are minimized. To ensure that any electric discharge from induced voltages does not reach unsafe levels, the NESC requires that any discharge be less than 5 milliamperes (ma). Following construction, Minnkota will assure, as necessary, that any fixed object, such as a fence or other large permanent conductive object close to or parallel to the Project Route, will be grounded so any discharge will be less than the 5 ma NESC limit.

Insulated electric fences used in livestock operations may pick up an induced charge from transmission lines. Potential shocks can be prevented by shorting out one or more of the fence insulators to ground with a wire when the charger is disconnected or installing an electric filter to ground charges induced from a power line, while still allowing the charger to be effective.

**Stray Voltage**

Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences. No impacts from stray voltage are anticipated; therefore no mitigation is proposed.

**Air Quality**

Best Management Practices (BMPs) will be used to control fugitive dust during construction, including operating vehicles at reduced speeds and use of water and dust abatement methods. Dust suppression will be required of the construction contractors who will access and maintain the ROW and haul roads during construction. Minnkota or the construction contractors will apply for a permit from the State Water Commission for water appropriations related to construction purposes.

# *5.5 Noise*

## 5.5.1 Description of Resources

Noise is defined as unwanted sound. Noise may include a variety of sounds of different intensities across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The A-weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA. A noise level change of 3 dBA is barely perceptible to average human hearing. A 5 dBA change in noise level, however, is clearly noticeable. A 10 dBA change in noise levels is perceived as a doubling or halving of noise loudness, while a 20 dBA change is considered a dramatic change in loudness.

Cumulative noise increases occur on a logarithmic scale. If a noise source is doubled, there is a 3 dBA increase in noise, which is barely discernible to the human ear. For cumulative increases resulting from sources of different magnitudes, the rule of thumb is that if there is a difference of greater than 10 dBA between noise sources, there will be no additive effect (i.e., only the louder source will be heard and the quieter source will not contribute to noise levels). Table 5.5-1 below provides noise levels associated with common, everyday sources and places the magnitude of noise levels discussed here in context.

**Table 5.5-1. Noise Levels Associated with Common Sources**

| Sound Pressure Level (dBA) | Noise Source |
|---|---|
| 140 | Jet Engine (at 25 meters) |
| 130 | Jet Aircraft (at 100 meters) |
| 120 | Concert |
| 110 | Pneumatic chipper (powered by compressed air or hydraulics) |
| 100 | Jointer/planer |
| 90 | Chainsaw |
| 80 | Heavy truck traffic |
| 70 | Business office |
| 60 | Conversational speech |
| 50 | Library |
| 40 | Bedroom |
| 30 | Secluded woods |
| 20 | Whisper |

*Source: A Guide to Noise Control in Minnesota, MPCA (revised, 1999)*

For this Project's design process, Minnkota has adopted the following criteria that are consistent with other 345 kV transmission projects in the area, such as the CapX2020 Fargo to St. Cloud Project. The land use activities associated with residential, commercial, and industrial land have been grouped together into Noise Area Classifications (NAC). Each NAC is assigned daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) limits for land use activities within the NAC.

The limits are expressed as a range of permissible dBA within a one hour period. L50 is the dBA that may be exceeded 50 percent (30 minutes) of the time within an hour, while L10 is the dBA

that may be exceeded 10 percent (6 minutes) of the time within an hour. Residences, which are typically considered sensitive to noise, are classified as NAC 1. **Table 5.5-2** shows the daytime and nighttime limits in dBA for residential areas (NAC 1).

**Table 5.5-2. Noise Limits by Noise Area Classification (dBA)**

| Noise Area Classification | Daytime | | Nighttime | |
|---|---|---|---|---|
| | L10 | L50 | L10 | L50 |
| 1 | 65 | 60 | 55 | 50 |

The state of North Dakota does not regulate noise with measureable standards. There has been recent comment on proposed noise level targets, which were prepared by the North Dakota Legislative Council for the Energy Development and Transmission Committee. The proposed noise level targets reference 50 dB at the property line for noise sensitive land uses such as residences. As there is no weighting to this metric, Minnkota assumes that this is an un-weighted metric to account for predominant low frequency noise.

### 5.5.2 Impacts

**Transmission Line**

Construction activities will generate noise that is short-term and intermittent. Noise generated during operation of construction equipment and worker presence will create a short-term impact to nearby residences.

Transmission lines produce noise under certain conditions. The level of noise depends on conductor conditions, voltage level, and weather conditions. In foggy, damp, or rainy weather, transmission lines can create a crackling sound due to the small amount of electricity ionizing the moist air near the conductors. During heavy rain the background noise level of the rain is usually greater than the noise from the transmission line. As a result, people do not normally hear noise from a transmission line during heavy rain. During light rain, dense fog, snow and other times when there is moisture in the air, transmission lines will produce audible noise approximately equal to household background levels.

The Project Route was modeled to evaluate audible noise from high voltage transmission lines using the EMF Tools software developed at the BPA based on methodologies in *Transmission Line Reference Book – 345 kV and Above* from the Electric Power Research Institute (see Exhibit 11 from the Certificate of Corridor Compatibility Hearings). The model was executed as a worst-case scenario benchmark, to ensure that noise was not under-predicted. The L50 is a noise level that will not be exceeded more than 50 percent of the time. Using the L50 for demonstrating compliance with nighttime L50 standard is the most conservative because the nighttime L50 is the most stringent of noise metrics. The maximum predicted L50 for the proposed transmission line of the Project for a single pole, 345 kV, single circuit tangent in the rain at a height of 2 meters is 47.2 dBA.

The Commission's guidelines require that the Project Route be no closer than 500 feet from a residence unless a waiver is granted. Therefore, it was assumed that any residences within 500 feet of a transmission facility will fall within the NAC 1 category. As such, L50 from the Project must not exceed nighttime levels of 50 dBA at these residences. Noise levels generated by the Project will be the same at night as those generated during the daytime, and compliance with the

nighttime levels (more restrictive) will also demonstrate compliance with the daytime noise standards due to greater noise sensitivity of humans at night.

In summary, noise associated with the operation of the Project facilities at the Project Route is not predicted to exceed the nighttime L50 standard. Minnkota anticipates that coronal noise from the Project Route will be far enough away from residences so as to not be heard above the ambient noise produced by wind and other natural phenomena.

**Substation**

The loudest noise levels associated with substation operation are when the cooling fans and oil pumps are in operation. Both of the substations proposed for transmission and equipment upgrades are located on Minnkota property. Noise levels around the substations are not anticipated to increase as a result of these upgrades.

### 5.5.3 Mitigation

Construction activities will generate noise that is short-term and intermittent. Noise impacts associated with construction will be mitigated in noise sensitive areas by limiting the hours of work to daytime hours. Heavy equipment used in construction will be equipped with sound attenuation devices, such as mufflers, to minimize the daytime noise levels. No long-term noise impacts are anticipated, thus no mitigation is necessary.

## *5.6 Visual Impacts*

### 5.6.1 Description of Resources

The discussion of visual quality and aesthetics is based on a qualitative review of the existing landscape environment surrounding the Project ROW. Visual and aesthetic resources within the vicinity of the Project ROW were identified through discussions with state and local agency officials, comments received from participating citizens at open houses, ROW agent discussions with landowners, and through a review of aerial photography and field observation. Generally, visual and aesthetic resources within the Project ROW and surrounding vicinity include historic residential or commercial structures, parklands, cultivated agricultural land, rural open space areas (i.e., rolling pasture lands, CRP), water features, and wooded and shrubland draws.

The landscape topography crossed by the Project ROW is a mixture of agriculture, farmsteads, fallow fields, large open vistas, and gently rolling hillside topography. The Project ROW is primarily located in rural areas of North Dakota, where the landscape is mostly flat in the Red River Valley to rolling agricultural lands towards the Missouri River that can be classified as rural open space. Rural residences and farm buildings (inhabited and uninhabited) scattered along rural county roads are focal points in the open space character of the landscape. Scattered areas of tree cover occur throughout the Project ROW, primarily in areas considered unsuitable for farming, or planted as protection from the wind and sun around rural residences or farmsteads. Many residents have surrounded their homes with a mix of deciduous and coniferous trees that serve as natural windbreaks, shade, and enhanced privacy for homes.

High scenic integrity and significance areas include river and open water features, historic structures, wooded draws, public recreation areas, and tours or trails. State highway 1804 and roadway 1806 (labeled as 22nd Avenue NW within the Project ROW), associated with the Lewis and Clark Trail, are located along the east and west sides of the Missouri River in Burleigh and Oliver counties. The North Country National Scenic Trail is located along the McClusky Canal in McLean and Sheridan counties and along the Sheyenne River in Griggs County.

Land parcels along the Project ROW considered to contain outstanding natural features that warrant protection or management have been placed into state and federal conservation easement programs or fee trust lands such as WMAs or wildlife habitat areas under the jurisdiction of the USFWS.

In addition to the naturally occurring landscape features and the historic/scenic roads, historic structures are located at various points along the Project ROW. Data from the State Historic Preservation Office (SHPO) and the National Register of Historic Places (NRHP) were obtained to identify historic structures along the Project ROW.

### 5.6.2 Impacts

The visual impact of the transmission line facilities could affect landowners who live along or near the roads that the Project Route follows or community residents who regularly travel along these roads. Depending on a viewer's physical location, the terrain, and natural landscape features such as tree cover, the transmission structures could be visible for 1.5 to 2 miles. A viewer's degree of discernable detail decreases as physical distance from an object increases. Beyond 2 miles in physical distance, the outline of structures most likely will not be seen. The transmission line conductors are unlikely to be seen clearly beyond distances of one-half to three-quarters mile.

Several areas that the Project ROW crosses may be considered visually sensitive, specifically the crossing points of the Missouri River, Sheyenne River, James River, Goose River, McClusky Canal, and various creeks.

### 5.6.3 Mitigation

The Project Route is located in areas where compatible land uses have been identified by the public and agencies. Typical structures will be between 95 and 180-feet-tall, typically located just outside the field break or public road ROW. Many of these roads currently do not share a ROW with a transmission line. However, they often include power distribution lines serving rural residences and farmsteads.

Care will be taken to avoid the placement of structures in visually sensitive areas and ecologically sensitive areas, typically identified by the public as areas of scenic significance. Minnkota will work with landowners who have property in the Project ROW by conducting staking reviews where feasible to minimize the impact of the transmission line to the surrounding landscape and limit the removal of trees. If trees are removed, Minnkota will follow the Commission's tree and shrub replacement guidelines.

The Project Route will be a contrast to surrounding land uses and Minnkota has engaged landowners and public agencies to identify concerns related to the transmission line facilities and aesthetics. In general, mitigation includes enhancing positive effects as well as minimizing or eliminating negative effects. Potential mitigative measures include the following:

- Where feasible, the location of structures, ROWs, and other disturbed areas will be finalized by considering input from landowners or land management agencies to minimize visual impacts.
- Structure types (design) will be uniform to the extent practical. Minnkota proposes to mostly use self-weathering, self-supporting, single pole steel structures. The height of the structure may be reduced, as feasible, to minimize impacts within areas of high scenic importance. The self-weathering structure will turn a brownish color to help blend in with the landscape.
- Final structures will be placed at the maximum feasible distance from scenic highways, waterways, and trail crossings, within the limits of structure design.
- Care will be taken to preserve the natural landscape; construction and operation will be conducted to prevent any unnecessary destruction, scarring or defacing of the natural surroundings in the vicinity of the work.
- To the greatest extent possible, waterways are crossed in the same location as existing disturbances, such as utility lines or roads.

## *5.7 Cultural Resources*

As the lead agency for the federal permitting process, the RUS is coordinating compliance with both the Section 106 procedures of the National Historic Preservation Act of 1966, as amended (NHPA)(16 U.S.C. § 470 et seq.), and the steps taken to meet NEPA requirements in development of a Programmatic Agreement (PA).

### 5.7.1 Description of Resources

Although there is no legal definition, for purposes of the NEPA, "cultural resources" refer to historic, aesthetic, and cultural aspects of the human environment. These can include natural and built resources, and the relationship that people have to those resources. Section 106 of the NHPA recognizes that certain types of cultural resources exhibiting historic associations may meet specific evaluation criteria developed by the National Park Service (NPS) that qualify them for listing in the National Register of Historic Places (NRHP). Those cultural resources that are listed in or are eligible for listing in the NRHP are designated "historic properties." Historic properties can include archaeological and historical resources as well as properties of traditional religious and cultural importance that have special meaning for traditional communities. These resources vary in size, shape, condition, and importance. Some may be visually evident on the landscape, while others may be buried or only visible to knowledgeable people.

### 5.7.2 Archaeological Resources and Impacts within the ROW

Minnkota reviewed SHPO records to identify known archaeological resources within the Project ROW. The list of known resources is limited to those identified through previous surveys in specific locations, often tied to urban and rural development and infrastructure projects. The Class I literature review included reports of previously surveyed areas relevant to the broad macro-corridors and Government Land Office maps. The Class I literature review was filed as Appendix F in the Corridor Certificate Application. The archaeological resources recorded in the Project Area are grouped into seven categories to aid in assessment. These are Mound sites (sites with or without burials or additional features), Stone Features (sites containing circles, cairns, effigies or other stone alignments), Isolated Finds (single or very few chipped or ground stone flakes, tools, or broken tools), Cultural Material Scatter (chipped stone, animal bone, tools, or ceramics, either historic or prehistoric), Habitation (prehistoric earthlodges, hearths, caches, depressions), Multi-component (containing both prehistoric and historic habitation materials or features), Unknown (not enough information on site form to categorize the site), and Historic Districts.

An archaeological inventory of the Project ROW has not been completed, so it is not possible to quantify reliably the potential for impacting archaeological sites. With RUS and SHPO consultation and to aid archaeological inventory, an archaeological predictive model was developed for this Project that is based on geographic information about the Project Area that is provided by multiple sources, such as the US Geological Survey, Department of the Interior, Department of Agriculture, and SHPO. Some basic landscape data, such as surface slope, directional exposure, and distance to nearest stream or river, are derived from these larger data sets in GIS.

Information such as surface slope, soil type, vegetation cover, distance to water, etc., are examined in relation to known sites and areas of high and low site density were identified by statistical analysis. The significant variables are combined in a multivariate procedure called logistic regression, which generates probabilities of site occurrences for (in this case) various

combinations of soil types and vegetation covers. These scores are grouped into high, medium, and low probability zones and a color coded map is generated. Minnkota reviewed the location of the Project ROW relative to the predictive model results.

Beginning in October 2010, areas of high probability and some areas of medium and low probability within the ROW underwent archaeological surveys (pedestrian and shovel testing). Additional pedestrian surveys were conducted in May, June, October, and November 2011. Subsurface testing of selected areas began after the pedestrian survey in June, October, and November 2011. Depending on the results of the field surveys, some locations might be subject to archaeological inventory. Archaeological surveys not completed this fall will be conducted in spring 2012.

**Table 5.7-1** identifies the previously recorded archaeological resources within SHPO's database and sites from the June 2011 Project surveys within the Project ROW and laydown areas. No previously recorded sites are listed on the NRHP.

Within SHPO's database there are site lead boundaries that often encompass an entire section or quarter-section of land and are defined as locations identified by a non-cultural resource professional as containing artifacts or historic value, or a location exhibiting four or fewer artifacts, that a cultural resource professional feels has a strong possibility of containing more artifacts/features. In instances where the Project ROW transects a site lead boundary, archaeological survey was completed within the Project ROW using pedestrian survey and/or shovel testing, as needed. During the archaeological survey, no cultural materials or features were observed within the Project ROW that is located within a site lead boundary and no impacts to site leads are anticipated. If during construction archaeological material should be identified within one of these site lead boundaries, Minnkota will follow the procedures described in Section IX, Post-Review Unanticipated Discoveries within the PA (**Appendix C**).

Physical avoidance of resources was considered in locating the Project Route and will continue to be considered as structure locations are finalized. Where avoidance of a cultural resource is not feasible, it will be evaluated, and if eligible, treated according to the stipulations outlined in the PA.

Minnkota anticipates that all direct impacts to archaeological resources will be avoided by completing additional investigations and by spanning the resource. If, in the unlikely event, avoidance of effects is not feasible, any adverse effects will be mitigated as stated in the PA.

The Spirit Lake Nation lands are located 11 miles north of the Project Route in Eddy County and the Knife River Indian Villages National Historic Site is located south of Washburn on the west end of the Project Route. These resources will not be impacted during construction or operation of the Project. Minnkota has contacted Native American tribes with an interest in the Project. Minnkota will follow the conditions regarding the identification and treatment of resources as stated in the PA.

**Table 5.7-1. Archaeological Resources within the Project ROW**

| County | Site Number | Site Type/ Name | NRHP Status | Location | | | Affected | Comment |
|---|---|---|---|---|---|---|---|---|
| | | | | T | R | S | | |
| Oliver | 32OL641 | Stone features and artifact scatter | Not evaluated | 142 | 82 | 31 | 1 structure within site– No impacts anticipated | One structure is within the site boundary. Additional shovel testing will be completed at the proposed structure location to ensure significant archaeological deposits are not affected |
| Oliver | 32OL642 | Stone features and artifact scatter | Not evaluated | 142 | 82 | 27 | 2 structures within site– No impacts anticipated | Additional shovel testing was completed at both proposed structure locations to further delineate site boundaries and to ensure that significant archaeological deposits are not affected |
| Burleigh | 32BLX146 | Stone circles | Not evaluated | 144 | 79 | 5 | 1 structure within Site Lead–No impacts anticipated | One structure is within the Site Lead boundary. During the pedestrian survey, no stone circles were relocated within the portion of the Project ROW that transects the Site Lead |
| Burleigh | 32BL718 | Lithic scatter | Not evaluated | 142 | 80 | 6 | Spanned– No impacts anticipated | This site will be spanned |
| Burleigh | 32BL720 | Isolated find | Not eligible | 142 | 81 | 1 | Spanned– No impacts anticipated | This site will be spanned |
| Burleigh | 32BLX287 | Isolated find | Not eligible | 142 | 80 | 19 | Spanned– No impacts anticipated | This site will be spanned |
| Burleigh | 32BLX288 | Isolated find | Not eligible | 144 | 79 | 6 | Spanned– No impacts anticipated | This site will be spanned |
| McLean | 32ML1237 | Lithic scatter | Not evaluated | 143 | 81 | 36 | Spanned– No impacts anticipated | This site will be spanned |
| McLean | 32ML1238 | Stone features and artifact scatter | Not evaluated | 143 | 81 | 24 | Spanned– No impacts anticipated | This site will be spanned |
| McLean | 32ML1239 | Stone feature | Not evaluated | 143 | 81 | 24 | Spanned– No impacts anticipated | This site will be spanned |

| County | Site Number | Site Type/ Name | NRHP Status | Location | | | Affected | Comment |
|---|---|---|---|---|---|---|---|---|
| | | | | T | R | S | | |
| McLean | 32ML1240 | Stone feature | Not evaluated | 144 | 80 | 24 | Spanned– No impacts anticipated | This site will be spanned |
| McLean | 32MLX767 | Isolated find | Not eligible | 143 | 81 | 36 | Spanned– No impacts anticipated | This site will be spanned |
| McLean | 32MLX768 | Lithic scatter | Not evaluated | 143 | 81 | 36 | Spanned– No impacts anticipated | This site will be spanned |
| Sheridan | 32SHX88 | Unknown | Not evaluated | 147 | 76 | 9 | Spanned– No impacts anticipated | This site will be spanned |
| Sheridan | 32SHX12 | Mound and Stone circle | Not evaluated | 147 | 78 | 26 | Spanned– No impacts anticipated | This site will be spanned |
| Sheridan | 32SH270 | Stone feature | Not evaluated | 147 | 76 | 9 | Spanned– No impacts anticipated | This site will be spanned |
| Sheridan | 32SH271 | Stone features | Not evaluated | 147 | 76 | 9 | Spanned– No impacts anticipated | This site will be spanned |
| Griggs | 32GGX117 | Mound-unknown prehistoric earthen mound | Not evaluated | 147 | 59 | 1 | Spanned– No impacts anticipated | This site will be spanned |
| Griggs | 32GG180 | Depression and artifact scatter | Not evaluated | 147 | 60 | 2 | Spanned– No impacts anticipated | This site will be spanned |
| Grand Forks | 32GFX24 | Listed as a Mound and Cultural material scatter | Not evaluated | 150 | 52 | 19 | 5 structures– No impacts anticipated | The boundary of Site Lead 32GFx24 includes the entirety of Section 19. During the pedestrian survey, the area suspected to be a mound was relocated and recorded. The cultural material scatter was not relocated. The proposed locations of the five structures are outside the area recorded as a potential mound. |
| Grand Forks | 32GF3552 | Depressions and artifact scatter | Not evaluated | 150 | 52 | 19 | Spanned– No impacts anticipated | This site will be spanned |

### 5.7.3 Deeply Buried Archaeological Resources

In January 2011, Strata Morph Geoexplorations (Strata Morph) prepared an assessment for Minnkota concerning the potential for deeply buried soil horizons that could possibly hold archaeological resources along the proposed Project Corridor in the Corridor Certificate Application (**Appendix D and E**). The Strata Morph assessment analyzed the likelihood that particular geologic environments along the proposed Project Corridor in the Corridor Certificate Application were stable enough to have been occupied by early Americans and that these geologic environments were later buried by soils (sand, silt, loess) deposited by water or wind. A deeply buried surface soil in this context is one that is 50 centimeters or deeper from today's surface. Currently, the assessment is being updated for the Project Route as proposed within this Route Permit Application.

Strata Morph identified 51 discrete areas along the proposed Project Corridor in the Corridor Certificate Application that had potential for buried paleosols. Of these 51 areas, 12 were ranked as having high potential, 25 ranked as having moderate potential, and 13 ranked as having moderate-to-low potential. Most of the proposed Project Corridor in the Corridor Certificate Application has little to no potential for deeply buried surface soils. To mitigate any potential affects, archaeologists will monitor soil augering at each foundation location during construction within the high potential areas to identify and record any historic properties.

### 5.7.4 Architectural Resources and Impacts within the APE

Minnkota reviewed records sent from the SHPO to identify known historical structures within the Architectural Area of Potential Effects (APE). The Architectural APE, was developed in consultation with the SHPO and RUS for direct and visual effects, which extends 0.5 mile on either side of the Project ROW centerline and 1 mile on either side of the Project ROW centerline at the Missouri River crossing. Approximately 461 points from the SHPO and other state GIS data were found to contain buildings and structures within the Architectural APE. To help summarize the results of the records review, sites were grouped into categories as follows: Civic Buildings (post office, school, town hall), Farmstead Features (farmstead, house, ranch, elevator, windmill, dump, depression, foundation, corral, fence, barn), Cemetery (cemetery and burial), Bridge, Church, Trail, Railroad (track and facility), Town Site, Camp Site (camp and expedition), District, and Miscellaneous (steamboat, Sheyenne River, unknown).

In April, May, and November 2011, the buildings and structures within the Architectural APE were visually inspected for their potential to be determined historic properties. The goal of this historic building inventory and evaluation was to develop and make recommendations concerning whether the construction of the Project would have an adverse visual or direct effect on historic properties in its vicinity. An adverse effect to historic property might occur due to direct effects such as demolition, or indirect effects such as visual intrusion.

A total of 267 locations with buildings and structures throughout the Architectural APE were visually inspected for their potential to be historically significant. Of these, the majority were not of historic age (50 years of age or older). Of those that were of historic age, most had lost integrity, having undergone extensive unsympathetic alterations (major additions to the original structure, synthetic siding, replacement windows and doors in altered openings, etc.), which eliminated them from consideration as historic property. A second common trend was the loss of contributing buildings such as residences or barns—sites often just had a vacant house or a barn and the remainder of the buildings had been demolished. The third pattern involved the

introduction of large, modern vintage, prefabricated, metal storage buildings into the historic period complex.

The inventory identified nine sites as eligible for listing on the NRHP and one previously listed eligible site within the Architectural APE. The *Historic Building Inventory and Evaluation of the Proposed Route of a 345 kV Electrical Transmission Line from Center to Grand Forks in North Dakota* summarizes the April and May 2011 inventory methods and results (**Appendix E**). SHPO has concurred with the inventory findings (**Appendix E**). Currently, the assessment is being updated for the Project Route as proposed within this Route Permit Application.

**Table 5.7-2** identifies the SHPO-previously recorded and new-inventoried eligible architectural properties within the Architectural APE.

One historic property will be impacted for visual effects by the Project Route. SHPO concurs that site #32NE80 involves an adverse affect that can be mitigated with screening. Minnkota has developed a Treatment Plan that is under review by RUS and SHPO. No other architectural resources will be adversely affected by the Project Route.

**Table 5.7-2. Architectural Properties within the Architectural APE**

| County | Site Number | Site Type/Name | NRHP Status | Location | | | Affected | Comment |
|---|---|---|---|---|---|---|---|---|
| | | | | T | R | S | | |
| Burleigh | 32BLX19 | Hoiland House | Not evaluated | 142 | 81 | 24 | N | |
| Grand Forks | 32GF120 | Farmstead-Alden Gronlie Octagonal Elevator Site | Not evaluated | 150 | 53 | 20 | N | Octagonal grain elevator non-extant |
| Nelson | 32NEX61 | House | Not evaluated | 149 | 57 | 31 | N | |
| Nelson | 32NEX69 | House | Not evaluated | 149 | 57 | 31 | N | |
| Nelson | 32NEX70 | House | Not evaluated | 149 | 57 | 31 | N | |
| Nelson | 32NEX71 | House | Not evaluated | 149 | 57 | 31 | N | |
| Nelson | 32NEX72 | House | Not evaluated | 149 | 57 | 31 | N | |
| Oliver | 32OL388 | Farmstead | Not evaluated | 142 | 81 | 28 | N | Non-extant |
| Wells | 32WEX38 | Stavenger Lutheran Church | Not evaluated | 148 | 68 | 28 | N | Non-extant |
| Burleigh | 32BL119 | Farm | Not evaluated | 142 | 81 | 22 | N | Non-extant |
| Burleigh | 32BLX131 | Mercer's Ranch | Not evaluated | 142 | 81 | 15 | N | Non-extant |
| Burleigh | 32BLX133 | Painted Woods Post Office | Not evaluated | 142 | 81 | 26 | N | |
| Burleigh | 32BLX139 | Grads Lake Post Office | Not evaluated | 143 | 79 | 7 | N | Non-extant |
| Eddy | 32ED222 | Rocky Run | Not evaluated | 148 | 66/67 | 30/25 | N | Non-extant |
| Eddy | 32EDX2 | Brantford Townsite | Not evaluated | 148 | 65 | 35 | N | |
| Grand Forks | 32GF3219 | Bridge | Recommended National Register ineligible | 150 | 55 | 35/36 | N | |
| Grand Forks | 32GFX49 | | Not evaluated | 151 | 51 | 19 | N | |
| Grand Forks | 32GFX250 | | Not evaluated | 151 | 51 | 15/22 | N | |
| Griggs | 32GG81 | Farmstead | Not evaluated | 148 | 59 | 35 | N | |
| McLean | 32ML885 | Historic archaeological site | Recommended National Register ineligible | 145 | 79 | 23 | N | |
| Nelson | 32NEX1 | Aneta Post Office | Not evaluated | 149 | 57 | 32 | N | |

| County | Site Number | Site Type/Name | NRHP Status | Location | | | Affected | Comment |
|---|---|---|---|---|---|---|---|---|
| | | | | T | R | S | | |
| Oliver | 32OL389 | Historical archaeological site-depression | Not evaluated | 142 | 81 | 28 | N | |
| Oliver | 32OL435 | Price School | Not evaluated | 142 | 81 | 28 | N | Non-extant |
| Oliver | 32OL436 | Pricetown Site | Recommended National Register ineligible | 142 | 81 | 28 | N | |
| Sheridan | 32SH348 | Heavily modified sod house | Not evaluated | 147 | 75 | 8 | N | |
| Wells | 32WEX24 | Delger Post Office | Not evaluated | 147 | 72 | 9 | N | |
| Eddy | 32ED160 | Farmstead | Recommended National Register eligible | 148 | 67 | 28 | N | SHPO and RUS concur on eligibility |
| Grand Forks | 32GF3554 | Former schoolhouse/town hall | Recommended National Register eligible | 150 | 52 | 16 | N | SHPO and RUS concur on eligibility |
| Grand Forks | 32GF3555 | Farmstead | Recommended National Register eligible | 150 | 53 | 26 | N | SHPO and RUS concur on eligibility |
| Grand Forks | 32GF3556 | Farmstead | Recommended National Register eligible | 150 | 54 | 24 | N | SHPO and RUS concur on eligibility |
| Nelson | 32NE78 | Farmstead | Recommended National Register eligible | 149 | 57 | 12 | N | SHPO and RUS concur on eligibility |
| Nelson | 32NE79 | Farmstead | Recommended National Register eligible | 149 | 57 | 23 | N | SHPO and RUS concur on eligibility |
| Nelson | 32NE80 | Farmstead | Recommended National Register eligible | 149 | 57 | 33 | Y | SHPO and RUS concur on eligibility. Treatment Plan under review. |

| County | Site Number | Site Type/Name | NRHP Status | Location | | | Affected | Comment |
|---|---|---|---|---|---|---|---|---|
| | | | | T | R | S | | |
| Sheridan | 32SH272 | Vacant schoolhouse | Recommended National Register eligible | 147 | 78 | 13 | N | SHPO and RUS concur on eligibility |
| Wells | 32WEX118 | Farmstead | Recommended National Register eligible | 148 | 69 | 28 | N | SHPO and RUS concur on eligibility |
| Eddy | 32ED32 | Sylvanus Marriage Octagonal Barn | National Register-listed | 148 | 66 | 28 | N | National Register-listed |

### 5.7.5 Mitigation

**General Project**

During final engineering, Minnkota will strive to avoid archaeological sites and historic properties. If avoidance of a NRHP listed or eligible archaeological site or historic property is not feasible, Minnkota will follow the terms of the PA to develop appropriate mitigation measures tailored to the values that make it significant. Where sites that have not been evaluated for listing on the NRHP may be physically impacted by Project facilities, Minnkota will follow steps outlined in the PA to determine eligibility and effects, and will develop mitigation measures to mitigate potential adverse effects. Mitigation may involve the following:

- Preservation in place
- Site stabilization
- Protection from erosion
- Interpretation or data recovery, if necessary, as appropriate
- Protection from looting/vandalism
- Revegetating to counteract wind erosion
- Fencing off sensitive areas during construction
- Trees cut at ground level with stumps left in place
- An archaeologist monitors soil augering at each foundation location during construction within the high potential areas of deeply buried sites to identify and record any historic properties, according to the PA

The construction contractor will be required to comply with environmental, cultural, archaeological, and historical guidelines set forth as a result of the Section 106 consultation process. Guidelines will include an unanticipated discoveries plan and monitoring at auger locations in high potential areas. Additional actions will include notification and working with the proper and applicable authorities.

**Architectural Resources**

Minnkota has developed a Treatment Plan to mitigate affects to the architectural site #32NE80. The Plan is being reviewed by the RUS and SHPO. The proposed mitigation measure will be screening between the Project and the architectural site. SHPO has indicated preliminary concurrence with this effort, please see **Appendix E**.

## *5.8 Recreational Resources*

### 5.8.1 Description of Resources

Many recreational resources exist in the Project ROW vicinity, including trails, rivers, lakes, federal lands, and state lands. Outdoor recreational opportunities include riding all-terrain vehicles (ATVs) and snowmobiles, hiking, boating, fishing, camping, swimming, hunting, and nature observation. Recreational resource and land management data were gathered from state and federal agencies. Figure 5 displays the location of managed recreation lands near the Project Route.

**State-Managed Lands**

NDGF's WMAs and North Dakota Parks and Recreation Department's (NDPR) state parks, nature preserves, and recreation areas play a large role in North Dakota's outdoor recreation system. There are no state parks or nature preserves located within the Project ROW. The Wilbur Boldt WMA is crossed by the Project ROW (T142N, R83W, Section 34).

**Federally Managed Lands**

USFWS manages WPAs, Wildlife Development Areas (WDAs), and National Wildlife Refuges (NWRs). The U.S. Bureau of Reclamation (USBOR) manages the Chain of Lakes Recreation Area/McClusky Canal through Sheridan, Burleigh, and McLean counties. East Park Lake, West Park Lake, Heckers Lake, and New Johns Lake are four in-line lakes on the McClusky Canal that make up the Chain of Lakes Recreation Area. These federally managed lands provide habitat for a variety of fish, waterfowl, shorebirds, grassland birds, plants, insects, and wildlife as well as provide opportunities for public access and wildlife dependent recreation such as hunting, fishing, wildlife watching, photography, camping, boating, canoeing, fishing, and ATV/snowmobile riding (refer to Figure 5). The Chain of Lakes Recreation Area (McClusky Canal) in McLean County (T145N, R79W, Section 26) and the McClusky Canal lands in Sheridan County (T147N, R76W, Section 7) will be crossed by the Project ROW. About 3.7 acres of the Chain of Lakes Recreation Area and 4.3 acres McClusky Canal lands in Sheridan County are located in the Project ROW.

As discussed in the Land Use section (Section 5.2.1), USFWS also holds easements on private lands for the protection of wetland and grasslands resources. The purpose of wetland easements is to preserve the wetland areas, whereas the grassland easements preserve the wetland areas and adjacent grassland buffers for the reproduction and growth of waterfowl and wildlife species. Minnkota is working with the USFWS to secure a Special Use Permit to cross easement lands.

**Trails**

NPS administers the North Country National Scenic Trail, which crosses seven states (New York, Pennsylvania, Ohio, Michigan, Wisconsin, Minnesota, and North Dakota). NPS explains that the trail is a collection of certified and proposed segments. Within North Dakota, beginning at Valley City, North Dakota, the trail follows the Sheyenne River to the Garrison Diversion then to the McClusky and New Rockford Canals. Most of the certified segments occur on public lands, i.e., USFWS, USBOR, and U.S. Forest Service (USFS). Currently, the NPS is reviewing segments on the western portion of the trail in order to connect with the Lewis and Clark National Historic Trail and the Knife River Indian Village National Historic Site (an NPS property). A portion of the trail runs parallel to the McClusky Canal and Chain of Lakes Recreation Area. Recreational opportunities include hiking and camping at some locations.

In addition, the NPS administers the Lewis and Clark National Historic Trail that crosses 11 states. The NPS attempts to preserve the remnants of the historic route of 1804-1806 Corps of Discovery Expedition and to provide a comprehensive interpretation of its history, including the American Indian perspective, to allow for better visitor understanding and appreciation of its significance. Recreational opportunities include canoeing the Missouri River and driving State Highway 1804 and 22nd Avenue NW (roadway 1806). Table 5.8-1 outlines the trails crossed by the Project ROW.

**Table 5.8-1. Trails Crossed by the Project ROW**

| Trail Name | Associated Resource Land | County |
|---|---|---|
| North Country National Scenic Trail | McClusky Canal - Chain of Lakes Recreation Area | McLean County |
| North Country National Scenic Trail | McClusky Canal | Sheridan County |
| North Country National Scenic Trail | Sheyenne River | Griggs County |
| Lewis and Clark National Historic Trail | Missouri River and State Highway 1804 and 22nd Avenue NW (roadway 1806) | Burleigh and Oliver Counties |

## National Heritage Area

A National Heritage Area is "a place designated by Congress where natural, cultural, historic and recreational resources combine to form a cohesive, nationally distinctive landscape arising from patterns of human activity shaped by geography." The Northern Plains Heritage Foundation received funding from Congress through the NPS to undertake a study to identify and evaluate a range of alternatives for managing, preserving, and interpreting the assemblage of nationally important historic sites, structures, stories, legends, and landscapes existing within the free flowing segment of the Missouri River in central North Dakota. The boundaries of the Northern Plains National Heritage Area are as follows: "The proposed east/west boundary of the study area encompasses a distance of ten miles across or approximately five miles from the banks of the free flowing segment of the Missouri River. The north/south boundary encompasses an approximate eighty mile distance from the Huff Mandan Village south of Mandan to the Big Hidatsa Village north of Stanton ND" (NPHF 2010). This boundary includes a core area of resources in Burleigh, McLean, Mercer, Morton, and Oliver Counties and any sites, buildings, and districts within the core area recommended by the management plan for inclusion in the Heritage Area (Omnibus Public Land Management Act of 2009).

## Automobile Tours

No designated state or federal scenic byways or backways are crossed by the Project ROW. The Sakakawea Scenic Byway near Washburn, North Dakota is located approximately 10 miles north of the Project ROW along State Highway 200A from Washburn, North Dakota to Stanton, North Dakota. State Highway 1804 and and 22nd Avenue NW (roadway 1806) are a part of the Lewis and Clark National Historic Trail. State Highway 1804 and 22nd Avenue NW (roadway 1806) are located on the east and west sides of the Missouri River, respectively, and are crossed by the Project ROW.

## Other Recreational Resources

No additional designated recreational resources, such as boat landings, golf courses, and playgrounds/ball fields, are located within the Project ROW. The Project Route crosses the

Missouri and Sheyenne rivers, which are recreation resources for fishing, canoeing, and nature observation.

PLOTS is a voluntary program offered to landowners by the NDGF, which provides landowners with monetary compensation for allowing public access to their land for fishing or hunting. Section 5.2.1 discusses PLOTS lands within the Project ROW.

TNC owns three properties near the western terminus of the Project ROW: Cross Ranch Preserve, John E. Williams Memorial Nature Preserve, and Davis Ranch Preserve, located 3, 4.5, and 10 miles away from the Project, respectively. Wildlife observation is allowed on TNC-owned lands.

### 5.8.2 Impacts

Direct impacts to recreational resources will be minimized to the extent feasible. Potential direct effects involve altering or physically changing recreation resources, conflicting with recreation area goals, or affecting accessibility to areas. Indirect effects are visual impacts to the scenic quality and natural appearance of the landscape as viewed from the recreational use area by a recreational user. The transmission line will span recreational resources, such as rivers and lakes, to minimize impacts to the extent practical. In general, recreational impacts will be visual in nature and limited to individuals using public or private property in the corridor for hiking, hunting, fishing, or nature observation. The Project will not cause any direct changes to the use of the existing recreational resources.

The Project will likely be visible from all recreational resources located within and adjacent to the Project Route and will have the potential to be visible from all recreation resources within approximately 1 mile of the Project Route depending on the surrounding topography and vegetation.

**State-Managed Lands**

A portion of the Project ROW crosses the state-managed Wilbur Boldt WMA, but no structures will be placed within the WMA and the conductors will not span the WMA. Minnkota has submitted an application for an overhang easement to the NDGF to cross the Wilbur Boldt WMA.

**Federally Managed Lands**

Based on preliminary structure locations, one structure will be located within the Chain of Lakes Recreation Area and one structure will be located within the fence line of the McClusky Canal lands in Sheridan County totaling about 1.7 acres of temporary impact (0.8 acres to the Chain of Lakes Recreation Area and 0.9 acres to the McClusky Canal lands) and about 157 square feet of permanent impact (78.5 sq ft of impact to both areas). Although two structures will be located within the Chain of Lakes Recreation Area and the McClusky Canal, the structures will not interfere with the recreation use of the Chain of Lakes and canal or affect access to the land. An indirect effect may be visual in nature. Minnkota has proposed to cross the Chain of Lakes Recreation Area adjacent to State Highway 41 and Minnkota is applying for a Special Use Permit from the USBOR for impacts on USBOR lands and will comply with all permit conditions, thereby reducing the potential recreational and visual impacts.

The Project Route crosses USFWS wetland and grassland easements. Impacts to easements are discussed in Section 5.2.2. Minnkota is working with the USFWS to adjust the location of transmission line structures in the grasslands and wetlands to minimize or avoid potential

impacts. Minnkota is coordinating with the USFWS to obtain a Special Use Permit to cross easement lands.

**Trails**

The Project Route will span two trails. The transmission line will span the North Country National Scenic Trail in McLean, Sheridan, and Griggs counties. The transmission line will span the Lewis and Clark National Historic Trail at the Missouri River, State Highway 1804 and 22nd Avenue NW. No structures will be placed directly on the trails. Individuals using these trails will continue to have access; during construction there may be short periods of disruption due to construction activity in the area.

Users of the recreational areas and trails may experience short-term effects during construction such as elevated noise levels, increased fugitive dust, and increased vehicle traffic.

**National Heritage Area**

The Project Route will cross the Northern Plains National Heritage Area. No structures will be placed within the Missouri River or block trail access. Individuals using the river and trails will continue to have access to the resources. However, during construction there may be short periods of disruption due to construction activity in the area.

**Automobile Tours**

No designated state or federal scenic byways or parkways are crossed by the Project ROW, therefore no impacts are anticipated. State Highway 1804 and 22nd Avenue NW (undesignated) are part of the Lewis and Clark National Historic Trail. Users of the recreational areas and trails may experience short-term effects during construction such as elevated noise levels, increased fugitive dust, and increased vehicle traffic.

**Other Recreational Resources**

No impacts to other recreation resources, such as golf courses, parks, and camps are anticipated.

No impacts to TNC lands are anticipated. Individuals using PLOTS lands will have access under the transmission line to access the property. Impacts to PLOTS lands are discussed in Section 5.2.2. The transmission line will not impact recreational opportunities on PLOTS lands as hunting may continue on the land.

### 5.8.3 Mitigation

Minnkota will obtain a ROW overhang easement from the NDGF and will minimize impacts of crossing the Wilbur Boldt WMA by not placing structures within the WMA or having wires cross the WMA. Minnkota is applying for a Special Use Permit from the USBOR for the two structures on their lands; one structure within the Chain of Lakes Recreation Area and one structure on McClusky Canal lands in Sheridan County, respectively. Minnkota is applying for a Special Use Permit from the USFWS to cross grassland and wetland easements. Minnkota will comply with all permit conditions. The Project will avoid impacts to other federally managed lands, therefore no mitigation is proposed.

The Project Route will span existing trails, State Highway 1804, and 22nd Avenue NW. Since it is not anticipated that any recreational resources will be removed from service by implementation of the Project, no adjacent land will need to be converted or dedicated to recreational use or wildlife management. Secondary recreational uses of Project ROW may be allowable, such as

walk-in access to PLOTS for hunting or trail use for walkers or bicyclists. No other mitigation is anticipated to be necessary.

# *5.9 Effects on Land-Based Economics*

## 5.9.1 Description of Resources

**Agriculture**

Agriculture is the primary land-based economic resource in the Project ROW. The highest yield resources include wheat, corn, soybeans, hay, barley, and sunflowers. Much of the agricultural land is designated as "prime farmland," indicating land that is most desirable for agricultural production. Federal regulations define prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses" (7 CFR, 657.5 (a) (1)). Prime farmland is discussed in the Soils Section (Section 5.10). Livestock operations are also located within the Project vicinity including cattle, hogs, turkey, and sheep farms.

According to the North Dakota 2007 Agricultural Statistics published by the USDA, the state of North Dakota ranks 18th among the states in total crop cash receipts. In 2002, there were an estimated 30,619 farms in North Dakota, and in 2007 the number increased by 4 percent to an estimated 31,970 farms. Three of the counties crossed by the Project ROW (Grand Forks, McLean, and Wells) are ranked in the top 20 for the state's total value of agricultural products sold (USDA 2007).

In 2008, North Dakota had a total of 152 certified organic farms and ranked third in the country for number of certified organic cropland acres. North Dakota is the leader in production of organic oilseeds (flax and sunflowers), producing 50 percent of the total U.S. production (North Dakota Organic Advisory Board 2010).

Table 5.9-1 in the Corridor Certificate Application summarized farmland, cropland, and agricultural production for all counties within the Project Corridor based on 2007 USDA census data. The primary crop is wheat, and additional high production crops include hay, soybeans, corn, and barley. The number of farms increased in all counties from 2002 to 2007 with the exception of Sheridan and Oliver counties. Grand Forks County is ranked third in the state for highest total agricultural products sold.

**GPS**

GPS navigation systems are becoming more common on farm equipment. GPS units collect location data from at least four or more satellites at any given time. The accuracy of the location data is affected by the number of satellites, how they are dispersed across the sky at any instant and atmospheric and satellite information factors. Since satellites are in constant motion above the earth, GPS units are constantly picking up and dropping satellite signals. At times there might be instances when the GPS unit is not able to connect to enough satellites and the required accuracy is not met.

In 2002, the IEEE published a study that investigated the effects of overhead power lines on GPS receivers (IEEE *Transactions On Power* October 2002). Measurements evaluated whether GPS signal could be blocked by overhead conductors or whether use of GPS signal could be affected by electromagnetic interference (EMI) (i.e., corona discharge or gap discharge noise). The study found that neither occurred.

**Forestry**

The Project ROW is located primarily in pasture and cultivated land with some forested areas adjacent to farmsteads, waterways, and within state and federally managed lands. There are no economically important forestry resources within the Project ROW.

**Tourism**

Minnkota identified tourism activities that are located within the Project ROW along with resources within the vicinity that may be indirectly impacted by the Project because of viewshed effects or alteration of the landscape. The majority of tourism opportunities in the vicinity of the Project are associated with recreational resources including WMAs, WPAs, Chain of Lakes Recreation Area, Cross Ranch State Park, TNC Nature Preserves, Missouri River, PLOTS, and the North Country National Scenic Trail.

**Mining**

North Dakota's most important mined products are petroleum, coal, and natural gas. Other mined products include sand, gravel, clays, and salt. Of these, only sand and gravel are produced in the area of the Project ROW (refer to Section 5.2).

### 5.9.2 Impacts

**Agriculture**

The Project will result in permanent and temporary impacts to farmland. During construction, temporary impacts, such as soil compaction, crop damage, construction and use of access roads, and structure building within a ROW will occur. Temporary impacts to agricultural lands are outlined in **Table 5.2-7**.

Permanent impacts to agricultural lands will occur as a result of structure placement. The permanent agricultural land impacts are outlined in **Table 5.2-7** (including Restricted Tillage Area). A Restricted Tillage Area was added as a permanent impact to each structure location on tillable land. This area was added to the calculated impacts on tillable land as a farmer may not wish to cultivate the land any closer than 5 feet from the structure base. As noted in **Table 5.2-7**, the direct impacts to agricultural land will be very limited. As a result, the Project will not affect the overall agricultural economies of the affected counties.

**GPS**

The 2002 IEEE study did not find that conductors and associated EMI would block or affect use of GPS satellite signal. However, it should be noted that a GPS receiver may experience less accuracy due to temporarily poor satellite alignment and/or outages to the base station or transmitter. On rare occasions, a transmission line structure may cause a temporary drop in GPS accuracy due to blockage of line-of-sight to one satellite, but this will only occur if the receiver, structure, and satellite are in a line, which is rare. Connection is usually restored within minutes and the GPS units return to normal function.

**Forestry**

Woodlands are primarily associated with homesteads and shelterbelts. Permanent impacts as a result of ROW clearing are discussed in Section 5.14.2. No impacts to economically important forestry resources will occur, as these resources are not located within the Project ROW.

**Tourism**

Refer to Section 5.8 for a discussion of the impacts to recreational resources. Direct impacts to tourism resources will be very limited. As a result, the Project will not affect the overall tourism-based economy of the affected counties.

**Mining**

Impacts to mining are discussed in Section 5.2.2. Direct impacts to mining land will be very limited. As a result, the Project will not affect the overall mining-based economy of the affected counties.

### 5.9.3 Mitigation

**Agriculture**

Minnkota will work with landowners to minimize impacts to all farming and grazing operations along the Project Route. By aligning the transmission line along existing ROWs such as roads and section and field lines, impacts will be minimized. Minnkota will compensate landowners for any crop damage, soil compaction, or damages that may occur during construction. Areas disturbed during construction will be repaired and restored to preconstruction contours to the extent practicable so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural re-vegetation, provide for proper drainage, and prevent erosion.

**GPS**

Some landowners use GPS navigation systems on farm equipment; however, interference with such systems is unlikely and, if it does occur, will be temporary. Following construction, Minnkota will provide GPS coordinates for the transmission line structures to landowners, if requested. No other mitigation measures should be necessary.

**Forestry**

The Project will be routed to minimize impacts to trees to the maximum extent possible. Minnkota will conduct a tree and shrub inventory of the ROW and will follow the Commission's replacement ratio of 2:1 for tree and shrub impacts.

**Tourism**

Refer to Section 5.8 for a discussion of the potential mitigation measures for recreational resources.

**Mining**

Refer to Section 5.2.3 for a discussion of the potential mitigation measures for mining resources.

## *5.10 Soils*

Soil Survey Geographic (SSURGO) soils data made available by the NRCS were analyzed using the ArcInfo license of ESRI® ArcMap™ 10.0 to determine impacts to prime farmland and to comply with the Farmland Protection Policy Act (FPPA). General State Soil Geographic (STATSGO) soil associations, which consist of groupings of soils with distinctive characteristics, were also reviewed as part of this analysis.

### 5.10.1 Description of Resources

**General Soils**

Soils within the Project ROW range from black loam in the Red River Valley to a more porous, sandy soil in the west. Table 5.10-1 summarizes the primary STATSGO soil series for the Project ROW. Gravel and cobble are relatively frequent soil components within the western Project ROW. Figure 7 displays the soil map units across the Project ROW.

Loamy soils are ideal for agricultural uses because it retains nutrients and allows for water flow. This soil type is commonly considered prime farmland, and covers the majority of the eastern portions of the Project ROW. The sandy, rocky soil in the west is primarily used as pasture land.

**Table 5.10-1. STATSGO Soil Associations within the Project ROW**

| Soil Association | Acres of Soil Type in ROW | Percent of ROW | Description of Primary Soil Series |
|---|---|---|---|
| Bearden-Antler (s4801) | 161 | 3.5 | The Bearden series consists of very deep, somewhat poorly drained, moderately to slowly permeable soils that formed in calcareous silt loam and silty clay loam lacustrine sediments. These soils are on glacial lake plains and have slopes of 0 to 3 percent. |
| Buse-Barnes (s4751) | 42 | 0.9 | The Buse series consists of very deep, well-drained soils that formed in loamy glacial till on moraines. These soils have moderate and moderately slow permeability. They have slopes of 3 to 60 percent. |
| Glyndon (s4728) | 67 | 1.5 | The Glyndon series consists of very deep, somewhat poorly drained soils that formed in silty glacial lacustrine sediments and delta sediments on glacial lake plains. They have moderate permeability in the upper part and moderately rapid permeability in the lower part. They have slopes of 0 to 3 percent. |
| Heimdal-Esmond-Emrick (s4770) | 308 | 6.8 | The Heimdal series consists of very deep, well drained, moderately permeable soils that formed in calcareous glacial till. These soils are on glacial till plains and moraines. Slope ranges from 0 to 40 percent. |
| Heimdal-Fram-Emrick (s4768) | 272 | 6.0 | |
| Heimdal-Fram-Emrick (s4769) | 528 | 11.6 | |
| Heimdal-Hecla-Embden-Egeland (s4732) | 115 | 2.5 | |
| La Prairie-Fairdale (s4779) | 20 | 0.4 | The La Prairie series consists of very deep, moderately well drained, moderately permeable soil that formed in loamy alluvium. These soils are on terraces and bottom lands in stream valleys. Slope ranges from 0 to 6 percent. |
| Lamoure-La Prairie-Heimdal-Emrick (s4782) | 13 | 0.3 | The Lamoure series consists of very deep, somewhat poorly drained or poorly drained soils formed in silty alluvium on flood plains. Permeability is moderate or moderately slow. Slopes are less than 2 percent. |
| Lankin-Gilby-Antler (s4739) | 101 | 2.2 | The Lankin series consists of deep, moderately well drained, moderately slowly permeable soils that formed in lacustrine sediments overlying till. These soils are on glacial lake plains and in interbeach areas and have slopes ranging from 0 to 3 percent. |
| Lohnes-Claire (s4749) | 34 | 0.7 | The Lohnes series consists of very deep, well drained, rapidly permeable soils that formed in coarse and medium sands. These soils are on glacial lake and outwash plains and have slopes ranging from 0 to 15 percent. |
| Miranda-Larson-Heimdal-Emrick (s4771) | 42 | 0.9 | The Miranda series consists of very deep, moderately well or somewhat poorly drained soils formed in till on uplands. Permeability is very slow. Slopes range from 0 to 9 percent. |
| Ojata-Bearden (s4785) | 109 | 2.4 | The Ojata series consists of deep, poorly drained, moderately slowly or slowly permeable soils that formed in silty lake sediments. These soils are on slightly depressed flats, swales, and channels in glacial lake and outwash plains and have slopes less than 1 percent. |
| Perella-Colvin-Bearden (s3435) | 14 | 0.3 | The Perella series consists of very deep, poorly drained soils that formed in lacustrine sediments. Saturated hydraulic conductivity is moderately high. These soils are in depressions on glacial lake plains. Slope ranges from 0 to 1 percent. |

| Soil Association | Acres of Soil Type in ROW | Percent of ROW | Description of Primary Soil Series |
|---|---|---|---|
| Renshaw-Divide-Arvilla (s4741) | 79 | 1.7 | The Renshaw series consists of very deep, somewhat excessively drained soils formed in loamy sediments and the underlying sand and gravel on outwash plains and terraces. Permeability is moderate in the upper part and very rapid in the underlying material. Slopes range from 0 to 25 percent. |
| Renshaw-Overly-Lankin-Brantford (s4740) | 18 | 0.4 | |
| Svea-Barnes (s4758) | 141 | 3.1 | The Svea series consists of very deep, well or moderately well drained soils that formed in calcareous till and local alluvium from the till. Permeability is moderate in the solum and moderate or moderately slow in the C horizon. These soils are on concave positions on till plains and have slopes ranging from 0 to 25 percent. |
| Svea-Buse-Barnes (s4760) | 30 | 0.7 | |
| Svea-Cresbard (s4764) | 95 | 2.1 | |
| Svea-Cresbard-Cavour-Barnes (s4766) | 104 | 2.3 | |
| Svea-Hamerly-Barnes (s4759) | 340 | 7.5 | |
| Svea-Kloten-Edgeley (s4752) | 49 | 1.1 | |
| Tiffany-Hecla-Glyndon-Embden (s4729) | 28 | 0.6 | The Tiffany series consists of very deep, poorly drained soils that formed in glacial outwash. These soils have moderately high or high saturated hydraulic conductivity. These soils are in depressions and on glaciolacustrine deltas and outwash plains. Slope ranges from 0 to 1 percent. |
| Tiffany-Swenoda-Barnes (s4730) | 39 | 0.9 | |
| Tonka-Svea-Hamerly-Barnes (s4754) | 162 | 3.6 | The Tonka series consists of very deep, poorly drained, slowly permeable soils that formed in local alluvium over till or glaciolacustrine deposits. These soils are in closed basins and depressions on till and glacial lake plains and have slopes of 0 to 1 percent. |
| Towner-Embden (s4762) | 87 | 1.9 | The Towner series consists of very deep, well or moderately well drained soils that formed in wind and water deposited sands over glacial till or lacustrine sediments. Permeability is rapid or moderately rapid in the upper part and moderate or moderately slow in the 2Bk and 2C horizons. These soils are on sand-mantled till or glaciolacustrine plains and have slopes ranging from 0 to 15 percent. |
| Trembles-Lohler-Havrelon (s4825) | 18 | 0.4 | The Trembles series are very deep, well and moderately well drained soils formed in alluvium. They are on floodplains, bottomlands, and low terraces. Slopes range from 0 to 4 percent. |
| Vallers-Svea-Hamerly-Buse-Barnes (s4756) | 304 | 6.7 | The Vallers series consists of very deep, poorly drained soils that formed in calcareous fine-loamy till on till plains, moraines and lake plains. These soils have moderately slow permeability. Slopes range from 0 to 3 percent. |
| Vebar-Reeder-Cabba-Amor (s4829) | 20 | 0.4 | The Vebar series consists of well drained, moderately deep, moderately rapidly permeable soils that formed in residuum weathered from soft calcareous sandstone. These soils are on uplands and have slope ranging from 0 to 65 percent. |
| Velva-LaDelle-Barnes-Arvilla (s4780) | 39 | 0.9 | The Velva series consists of very deep, well drained, moderately or moderately rapidly permeable soils that formed in stratified recent alluvium. These soils are on flood plains and low terraces and have slopes of 0 to 6 percent. |

| Soil Association | Acres of Soil Type in ROW | Percent of ROW | Description of Primary Soil Series |
|---|---|---|---|
| Wabek-Ruso (s4820) | 38 | 0.8 | The Wabek series consists of very deep, excessively drained, rapidly and very rapidly permeable soils formed in sand and gravel glaciofluvial deposits. These soils are on outwash plains, beach ridges, terraces, and terrace escarpments and have slope of 0 to 45 percent. |
| Walum-Kensal-Brantford-Binford (s4743) | 29 | 0.6 | The Walum series consists of very deep, moderately well drained, soils that formed in glaciofluvial sand and gravel containing appreciable amounts of shale. Permeability is moderately rapid above the sand and gravel and rapid or very rapid in the sand and gravel. These soils are on glacial outwash plains and have slopes ranging from 0 to 3 percent. |
| Williams-Bowbells (s4786) | 269 | 5.9 | The Williams series consists of very deep, well drained, moderately slow or slowly permeable soils formed in calcareous glacial till. These soils are on glacial till plains and moraines and have slope of 0 to 35 percent. |
| Wilton-Williams-Temvik-Mandan (s4797) | 216 | 4.8 | The Wilton series consists of very deep, well drained soils that formed in a silty loess mantle overlying till. Permeability is moderate in the silty loess mantle and moderately slow in the till. These soils are on uplands and have slopes of 0 to 9 percent. |
| Wyndmere-Barnes-Arvilla (s4747) | 45 | 1.0 | The Wyndmere series consists of very deep, somewhat poorly drained, moderately rapidly permeable soils formed in calcareous moderately coarse and coarse glaciofluvial and glaciolacustrine deposits. These soils are on delta, outwash, and glaciolacustrine plains, and on beach ridges. Slope ranges from 0 to 3 percent. |
| Wyndmere-Hecla-Embden-Arvilla (s4733) | 79 | 1.7 | |
| Zahl-Williams (s4792) | 174 | 3.8 | The Zahl series consists of very deep, well drained, moderately slow or slowly permeable soils that formed in calcareous glacial till. These soils are on glacial till plains, moraines, and valley side slopes and have slopes of 1 to 60 percent. |
| Zahl-Williams-Vida-Bowbells (s4787) | 205 | 4.5 | |
| Zahl-Zahill-Williams-Cabbart-Cabba (s4811) | 105 | 2.3 | |

*Source: USDA, NRCS. 2006.*

**Prime Farmland**

Federal agencies have a mandate under the FPPA to minimize unnecessary and irreversible conversion of farmland to nonagricultural uses. A Farmland Conversion Impact Rating (Form AD-1006) will be completed by the NRCS for the Project. Soils are generally classified as Prime Farmland, Prime Farmland if Drained, and Farmland of Statewide Importance. Figure 8 displays the location of these farmland classifications along the Project ROW.

Soils considered Prime Farmland are widespread throughout the Project ROW, but are most densely concentrated along the central and eastern portions of the Project. In general, Prime Farmland is abundant in and east of Sheridan County to the Red River Valley. As the Project ROW approaches the Red River Valley, Prime Farmland becomes more concentrated into large contiguous blocks of the landscape. Prime Farmland is less common in the vicinity of the Missouri River (McLean and Oliver Counties).

Soils classified as Prime Farmland if Drained are more common along the eastern portions of the Project ROW. These soils are generally concentrated into two areas. The western block of soils considered Prime Farmland if Drained is oriented along a northwest/southeast axis generally situated between Harvey, North Dakota and Carrington, North Dakota. The eastern block is concentrated in the Red River valley within Grand Forks County, North Dakota. This eastern block frequently abuts the contiguous blocks of Prime Farmland within the valley to form an expansive block covering most of the southwestern portions of Grand Forks County.

Soils designated as Farmland of Statewide Importance are less common along the Project ROW. These soils are most common in the vicinity of Sharon, North Dakota, in Steele and Grand Forks counties. These soils are not as widespread as Prime Farmland at any location. Table 5.10-2 displays farmland classifications for the Project ROW.

**Table 5.10-2. Farmland Classifications for Project ROW**

| Farmland Classification | Acres of ROW | Percent of ROW |
|---|---|---|
| Prime Farmland | 1,275 | 28.1 |
| Prime Farmland if Drained | 644 | 14.1 |
| Farmland of Statewide Importance | 535 | 11.8 |
| Total | 2,454 | 54.0 |

*Source: SSURGO*

**Potentially Erodible Soils**

The North Dakota soil databases do not have attributes to identify erodible or highly erodible soils. In general, soils of 6 percent or greater slope have a higher potential for erosion due to surface water runoff, if disturbed. Therefore, Minnkota calculated slope using GIS from the 30 meter National Elevation Dataset for North Dakota. Approximately 500 acres (11.0 percent of the Project ROW) have a 6 percent or greater slope.

## 5.10.2 Impacts

**General Soils**

Surface soils will be disturbed by site clearing, grading, and excavation activities at structure locations, pulling and tensioning sites, setup areas, and during the transport of crews, machinery,

materials, and equipment over access routes (primarily along the Project ROW). This disturbance is minimal, and is generally less invasive than typical agricultural practices such as plowing and tilling. Soil compaction will occur on access roads, laydown areas, and along the Project ROW. Minnkota will attempt to utilize existing, disturbed areas for laydown areas to the extent practical. **Table 5.10-3** provides temporary and permanent impact by soil association.

**Table 5.10-3. Temporary and Permanent Impacts by Soils Association**

| Soil Association | Temporary Impacts (acres) | Permanent Impacts (sq ft) |
|---|---|---|
| Bearden-Antler (s4801) | 37 | 4,141 |
| Buse-Barnes (s4751) | 9 | 942 |
| Glyndon (s4728) | 14 | 1,492 |
| Heimdal-Esmond-Emrick (s4770) | 64 | 6,990 |
| Heimdal-Fram-Emrick (s4768) | 56 | 6,362 |
| Heimdal-Fram-Emrick (s4769) | 133 | 12,252 |
| Heimdal-Hecla-Embden-Egeland (s4732) | 24 | 2,592 |
| La Prairie-Fairdale (s4779) | 4 | 393 |
| Lamoure-La Prairie-Heimdal-Emrick (s4782) | 3 | 236 |
| Lankin-Gilby-Antler (s4739) | 21 | 2,278 |
| Lohnes-Claire (s4749) | 7 | 785 |
| Miranda-Larson-Heimdal-Emrick (s4771) | 9 | 942 |
| Ojata-Bearden (s4785) | 23 | 2,513 |
| Perella-Colvin-Bearden (s3435) | 19 | 393 |
| Renshaw-Divide-Arvilla (s4741) | 17 | 1,806 |
| Renshaw-Overly-Lankin-Brantford (s4740) | 4 | 393 |
| Svea-Barnes (s4758) | 29 | 3,299 |
| Svea-Buse-Barnes (s4760) | 6 | 628 |
| Svea-Cresbard (s4764) | 19 | 2,042 |
| Svea-Cresbard-Cavour-Barnes (s4766) | 21 | 2,356 |
| Svea-Hamerly-Barnes (s4759) | 70 | 7,775 |
| Svea-Kloten-Edgeley (s4752) | 10 | 1,100 |
| Tiffany-Hecla-Glyndon-Embden (s4729) | 6 | 707 |
| Tiffany-Swenoda-Barnes (s4730) | 8 | 942 |
| Tonka-Svea-Hamerly-Barnes (s4754) | 33 | 3,691 |
| Towner-Embden (s4762) | 18 | 2,042 |
| Trembles-Lohler-Havrelon (s4825) | 3 | 2,079 |
| Vallers-Svea-Hamerly-Buse-Barnes (s4756) | 73 | 6,912 |
| Vebar-Reeder-Cabba-Amor (s4829) | 4 | 471 |
| Velva-LaDelle-Barnes-Arvilla (s4780) | 18 | 864 |

| Soil Association | Temporary Impacts (acres) | Permanent Impacts (sq ft) |
|---|---|---|
| Wabek-Ruso (s4820) | 8 | 864 |
| Walum-Kensal-Brantford-Binford (s4743) | 16 | 707 |
| Williams-Bowbells (s4786) | 56 | 6,122 |
| Wilton-Williams-Temvik-Mandan (s4797) | 45 | 5,105 |
| Wyndmere-Barnes-Arvilla (s4747) | 9 | 1,100 |
| Wyndmere-Hecla-Embden-Arvilla (s4733) | 16 | 1,728 |
| Zahl-Williams (s4792) | 36 | 4,006 |
| Zahl-Williams-Vida-Bowbells (s4787) | 54 | 5,187 |
| Zahl-Zahill-Williams-Cabbart-Cabba (s4811) | 21 | 2,435 |

Extended periods of saturation during Project construction may make soils prone to compaction and rutting. Soil compaction has a restrictive action on water penetration, root development, and the rate of oxygen diffusion into soils. Low density and change of vegetation types may be an indirect effect of soil compaction. Soil characteristics that affect soil compaction include soil texture, soil moisture, and grain size. All soil types are susceptible to compaction and will also be susceptible to rutting if construction occurs when the upper layers of these soils are moist or near saturation.

**Prime Farmland**

**Table 5.10-4** provides the temporary and permanent impacts of prime farmlands and farmlands of statewide importance.

**Table 5.10-4. Temporary and Permanent Impacts to Prime Farmland Classifications**

| Prime Farmland Classification | Temporary Impacts (acres) | Permanent Impacts (acres)[1] |
|---|---|---|
| Prime Farmland | 281 | 2.2 |
| Prime Farmland if Drained | 110 | 1 |
| Farmland of Statewide Importance | 151 | 1.8 |
| Total | 542 | 5 |

*1. A Restricted Tillage Area was added as a permanent impact*

**Potentially Erodible Soils**

Disturbed soils can be subject to erosion, defined as the detachment and transport of individual soil grains by wind or water. Erosion by wind is related to soil moisture, soil texture, organic matter content, soil structure, vegetative cover, and climate. Wind erosion often occurs on dry, fine sandy soils when vegetation cover is sparse and strong winds are prevalent. Water erosion is related closely to a soil's infiltration capacity and the coherence of the soil particles that comprise the soil. Slopes of 6 percent or greater tend to have a higher potential for erosion.

Approximately 106 acres of temporary impact and 1 acre of permanent impact will occur on slopes of 6 percent or greater for the Project ROW. Soil properties that influence water erosion

include soil texture, percent organic matter, soil structure, soil infiltration capacity, and soil permeability. Soils containing high proportions of silt and very fine sand are most erodible. Well-drained and well-graded gravels and gravel sand mixtures with little or no silt are the least erodible soils. Water erosion is also influenced by slope length and gradient, as well as frequency, intensity, and duration of rainfall and the amount of time bare soils are exposed. Erosion could be caused by site clearing and earthmoving in addition to natural processes.

### 5.10.3 Mitigation

A National Pollutant Discharge Elimination System (NPDES) Permit will be applied for and a Stormwater Pollution and Prevention Plan (SWPPP) will be developed and field with the North Dakota Department of Health (NDDOH) that includes appropriate BMPs for construction. All disturbed areas will be re-vegetated once construction is complete. Seed mixes will be specified based on site characteristics and in accordance with regulatory permits. Where disturbance and excavation cannot be avoided entirely, impacts will be minimized using BMPs. Sediment and erosion control plans will be developed that specify the types of BMPs necessary. Depending on the site, BMPs may include installation of silt fencing, straw bales, or ditch blocks and/or covering bare soils with mulch, plastic sheeting, or fiber rolls to protect drainage ways and streams from sediment runoff from exposed soils. Erosion controls will be inspected during construction, especially during significant precipitation events. Soil compaction will be treated and restored through tillage operations after construction is complete, and in consultation with the landowner.

Impacts to prime farmland will be minimized by the use of soil and erosion BMPs and adjusting final structure placement to the extent practicable. Further impacts to prime farmlands will be minimized by paralleling the Project adjacent to existing ROW features and field lines. Minnkota will coordinate with NRCS to determine if anticipated impacts require evaluation under FPPA and will coordinate this review.

To the extent practicable, soil disturbance and excavation activities on steep slopes will be avoided. Slopes of 6 percent or greater will require BMPs if soils are graded or cleared.

## *5.11 Geologic and Groundwater Resources*

Descriptions of the surficial and bedrock geology were obtained from digital GIS-based files obtained from the North Dakota Geological Survey, except as noted.

### 5.11.1 Description of Resources

**Geology**

Most of the Project ROW is underlain by Quaternary-age glacial sediments deposited by glacial ice originating from the Keewatin Ice Sheet. Glacial till of the Coleharbor Group is the dominant type of surficial sediment. Bluemle (2006) describes the till as an unsorted, unbedded mixture of boulders, gravel, and sand in a matrix of silt and clay, yellowish-brown to olive-gray in color. Smaller pockets of cross-bedded sand, also part of the Coleharbor Group, exist near some streams. The most extensive (approximately 10 miles) of these is near Baldhill Creek in Griggs County. Coleharbor Group thickness averages 100 feet in the Project ROW. Recent-age sediments, in the form of river-deposited clay, silt, and sand, and windblown sand, underlie most of the remainder of the Project ROW. The only part of the Project ROW where glacial and post-glacial sediments are absent is in the Sheyenne River valley, where the Pierre Formation (bedrock) has been exposed through erosion effects of the river and its tributaries.

Bedrock in the eastern two-thirds of the Project ROW is primarily shale formed in offshore marine environments during the Cretaceous Period. The Pierre, Niobrara, and Belle Fourche formations are the major shale units present, and they range in thickness from 75 to 700 feet. Bedrock in the western third of the Project ROW is composed of sandstone and lignite of the Tertiary and Cretaceous periods, which is generally 400 to 650 feet thick.

**Groundwater**

Groundwater resources in the Project ROW exist in both surficial (unconsolidated) and bedrock aquifers. Major surficial aquifers are composed of river alluvium, such as along the Missouri River, and glacial outwash. These types of aquifers tend to be long and narrow in shape, and are not widespread in the Project ROW. The Spiritwood Aquifer is a sand and gravel aquifer that trends north-to-south and intersects the Project ROW in Griggs County. This aquifer is composed of sand and gravel that was deposited in a pre-existing bedrock valley, and is overlain by till in many areas. The depth to groundwater varies widely across the Project ROW, and ranges from near the ground surface adjacent to streams, to more than 100 feet in topographically high areas underlain by thick till sequences.

### 5.11.2 Impacts

Permanent in-ground structure foundations that extend below the water table will have minimal impact on groundwater flow patterns. Impacts will be limited to the displacement of surficial sediments and groundwater during construction of structure foundations. A boring for structural foundations may extend 40 to 100 feet below ground surface depending on soil conditions and structure type. Boring diameter may be 7 to 10 feet. Given these values, the maximum volume of displaced soil and groundwater will be approximately 7,854 cubic feet (291 cubic yards) at a structure location. The removal of soil and groundwater at each structure location is not anticipated to impact local groundwater flow patterns due to the temporary and small-scale nature of the removal. Construction spoils, including soil cuttings and boring stabilization fluids, will be disposed of offsite unless otherwise requested by the landowner or a local permitting

authority. Topsoil will be left on site, if desired by the landowner. Groundwater from dewatering will be discharged on site into an approved BMP structure.

The storage and use of fuels, greases, and other chemicals during construction has the potential, if not handled properly or spilled, to impact geologic materials and groundwater. In addition, there is potential for construction activities to encounter previously contaminated soil.

### 5.11.3 Mitigation

Impacts to geologic and groundwater sources will be avoided and/or mitigated by the following:

- The depth and diameter of structure foundations will be minimized during the design phase.
- In the event that previously contaminated soils are discovered during construction, the contractor will stop work immediately, contact the NDDOH, and consult with the agency with respect to an acceptable plan of action.
- A Spill Pollution and Prevention Plan will be developed that includes procedures for proper storage and disposal of all hazardous and non-hazardous wastes generated during the construction process.
- Controlled laydown areas may be used for refueling, for hazardous material loading and unloading operations, and to provide adequate spill cleanup materials and equipment. Spill impacts, if any, will be mitigated in compliance with applicable federal, state, and local cleanup standards.
- Specific equipment inspection and maintenance procedures to identify and minimize any potential for hazardous material spillage or leakage (i.e. fuel spillage, oil or grease leakage, etc.) will be in place, with inspections performed periodically and results documented.

# *5.12 Surface Water and Floodplain Resources*

## 5.12.1 Description of Resources

There are many surface water resources (lakes, rivers, and streams) within or adjacent to the Project ROW (**Figure 9**). The Missouri River is the largest watercourse that is crossed by the Project Route and is associated with large sandbars and wooded riparian habitat. In general, perennial watercourses are more frequent in the eastern half of the Project ROW. Lakes are fairly evenly scattered throughout the vicinity of the Project.

**Rivers, Streams, and Lakes**

Table 5.12-1 summarizes surface waters crossed by the Project ROW, which includes three perennial rivers, three intermittent rivers, and one canal. While most of the watercourses crossed by the Project Route are intermittent in nature, aerial photography indicates that some of these intermittent surface waters may support open water for extended periods of time. The Missouri, James and Sheyenne rivers are subject to frequent flooding during the spring as a result of snow melt.

While some "lakes" in North Dakota are in a traditional sense actually large wetlands, for the purpose of this application, lakes were identified according to surface waters that have been named "Lake."

**Table 5.12-1. Surface Waters Crossed by the Project ROW – From West to East**

| Surface Water | Number of Crossings | Crossing Comments |
|---|---|---|
| Named Rivers and Canals | | |
| Missouri River – perennial | 1 | Approximate river width at crossing 1,750 feet |
| McClusky Canal | 2 | Crossed in Sheridan Co. and McLean Co.; canal typically maintains perennial flow at crossings; surface water is typically 150 feet wide or less at crossings, upper banks at Sheridan crossing may be more than 300 feet wide |
| James River – perennial and intermittent | 2 | Crossed in Eddy Co.; river 150 feet or less at crossing; James River also has an intermittent crossing in Wells Co. |
| Sheyenne River – perennial | 1 | Crossed in Griggs Co.; river is highly sinuous, meandering across an approximately 3,469-foot-wide floodplain |
| Goose River – intermittent | 1 | Crossed in Grand Forks Co.; river crossing is about 20 feet with an approximately 1,644-foot-wide floodplain |
| Little Goose River – intermittent | 1 | Crossed in Grand Forks Co.; river 150 feet or less at crossing with an approximately 1,155-foot-wide floodplain |
| Named Streams/Creeks with Open Water | | |
| Yanktonai Creek – intermittent | 1 | Narrow meandering surface water that is crossed in McLean Co. near US 83 |
| Painted Woods Creek – intermittent | 1 | Crossed in McLean Co. |
| Rocky Run – intermittent | 3 | Crossed in Eddy Co.; stream generally 50 feet wide except for crossing at Rosefield Slough, which is about 400 feet wide |
| Pickerel Lake Creek – perennial | 1 | Creek narrow (approximately 20 feet) at Griggs Co. crossing location |

| Surface Water | Number of Crossings | Crossing Comments |
|---|---|---|
| Goose Creek - intermittent | 1 | Crossed in Grand Forks Co.; river crossing is about 10 feet wide with an approximately 150-foot wide floodplain |
| English Coulee – intermittent | 5 | Crosses three meanders of Coulee within 2.5 miles; crosses two ditched sections within 1.0 mile, near Prairie Substation |
| Named Lakes | | |
| Yanktonai Lake | 1 | 780-foot-wide crossing at west side of lake; lake is approximately 30 acres in McLean Co. |
| Rosefield Slough | 1 | 430-foot-wide crossing at south side of slough in Eddy Co. |
| Round Lake | 1 | Crossing is 980 feet long at south side of lake in Eddy County |
| Lake Norway | 1 | Crossed north side of 115 acre lake in Griggs Co.; crossing width is 1,100 feet |

**Floodplains**

The Project Route will cross Federal Emergency Management Agency (FEMA) floodplains at the Missouri River, Goose River, Little Goose River, three English Coulee crossings, and a drainage channel along 14th Street NE in Grand Forks County. Flood elevation information for the Sheyenne River was provided by a Project-specific hydrology study conducted in January 2011 (**Appendix F**). FEMA data was not available for the James River crossings.

**Table 5.12-2** summarizes the surface waters with floodplain crossings by the Project ROW. Figure 9 depicts the floodplain areas associated with the surface water.

**Table 5.12-2. Surface Waters with Floodplains Crossed by the Project ROW**

| Surface Water | Floodplain Crossing Length (ft) |
|---|---|
| Missouri River | 4,546 |
| Sheyenne River | 3,469 |
| Goose River | 1,644 |
| Little Goose River | 1,155 |
| English Coulee Flood Retention Area | 4,780 |
| English Coulee | 1,130 |
| English Coulee | 182 |
| Unnamed Drainage Channel (along 14th ST NE in Grand Forks County) | 133 |

## 5.12.2 Impacts

**Rivers, Streams, and Lakes**

No direct short-term or long-term impacts to watercourses or lakes are expected as part of the construction and operation of the Project facilities. The Project Route is designed to span all rivers, streams, and lakes, including the Missouri River; therefore direct impacts will be avoided. Indirect impacts, such as erosion and sedimentation associated with clearing and construction or compaction, will be minimal and mitigated with BMPs.

Potential flooding associated with the Missouri River was considered during Project design. The Project's concrete foundation will typically be designed to beat least 2 feet above the highest flood stage level and rip-rap will be placed around and between structures; therefore no impacts to the Project are anticipated from Missouri River flooding or an increase in the flood stage are anticipated from the Project Route.

The Devils Lake basin, located in northeastern North Dakota, has experienced dramatic increases in lake water levels. The current water level has inundated much of the surrounding area, causing displacement of residents and impacting surface transportation. The Sheyenne River was the natural outlet to Devils Lake at one time. Currently, the capacity of the constructed Devils Lake outlet may have to be increased to control flooding effects within the basin; as a result, flows within the Sheyenne River may increase. Minnkota conducted a hydrology study that modeled the potential impact of the Devils Lake output into the Sheyenne River to determine a potential flood stage of the Sheyenne River and will place concrete foundations at least 2 feet above the calculated flood stage level. This will accommodate potential flood effects on the Sheyenne River due to proposed improvements to the outlet of Devils Lake. The Project Route will be designed to consider the potential for future increased flows in the Sheyenne River, therefore no impacts to the Sheyenne River or an increase in potential flooding are anticipated from the Project Route. BMPs will be utilized to prevent indirect impacts due to runoff, erosion and sedimentation, or blockage of drainageways.

Perennial water sources will be used to obtain water for dust suppression and the concrete batch plant. Water appropriation permits will be obtained, if necessary, prior to the activity. Water for construction purposes will not be taken from USFWS wetland easements.

**Floodplains**

Floodplains will be spanned by the Project Route wherever feasible. **Table 5.12-3** provides the temporary and permanent impacts to the floodplain areas crossed by the Project Route.

**Table 5.12-3. Temporary and Permanent Impacts to Surface Waters with Floodplains Crossed by the Project Route**

| Surface Water | Number of Structures within the Floodplain | Temporary Impacts (ac) | Permanent Impacts (sq ft) |
|---|---|---|---|
| Missouri River | 3 (1 mono-pole, 2 three-pole) | 4.6 | 4,078 |
| Sheyenne River | 3 | 2.5 | 236 |
| Goose River | 2 | 1.2 | 157 |
| Little Goose River | 1 | 0.8 | 78.5 |
| English Coulee Flood Retention Area | 5 | 3.4 | 393 |
| English Coulee | 3 (H-frame) | 1.5 | 231 |
| English Coulee | 0 | 0.1 | 0 |
| Unnamed Drainage Channel (along 14TH ST NE in Grand Forks County) | 0 | 0.1 | 0 |

### 5.12.3 Mitigation

**Rivers, Streams and Lakes**

The Project will require a number of water resource permits, including coverage under the Section 402 (Clean Water Act) NPDES General Permit for Storm Water Discharges Associated with Construction Activities and associated SWPPP, Permit to Cross North Dakota Sovereign Lands, Section 404 (Clean Water Act) Permit, Section 401 Water Quality Certification and Section 10 (Rivers and Harbors Act) Permit. The placement of transmission line structures, land clearing that involves soil disturbance, or placement of construction mats may be considered a discharge of fill material that will require a permit from U.S. Army Corps of Engineers (USACE) pursuant to Section 404 of the Clean Water Act. These permits will require Minnkota to develop and implement BMPs for sediment and erosion control during construction and operation of the Project to protect topsoil and adjacent surface and groundwater resources, and to minimize soil erosion. Additionally, the site contractor will be responsible for obtaining appropriate permits for construction related practices such as dewatering and wastewater discharge associated with concrete batch plants, as necessary. Typical BMPs may include:

- Locate structures and disturbed areas away from rivers and lakes, where practicable;
- Contain stockpiled material, fuel, and chemicals, away from stream banks and lake shorelines;
- Fuel construction vehicles outside of waterbodies, including wetlands, and use appropriate spill prevention and containment procedures;
- Install sediment and erosion control measures prior to construction, in accordance with sediment and erosion control plans and permits; maintain in good working order for the duration of construction;
- Use turbidity control methods prior to discharging wastewater from concrete batching or other construction operations to streams or other surface waters;
- Spread topsoil and seed in a timely manner; and
- Avoid use of fertilizers, pesticides, or herbicides in or near waterbodies, including wetlands.

If final Project structures cannot be sited such that impacts to jurisdictional water resources are avoided, compensatory mitigation under a USACE Section 404 Permit may be required to replace the loss of aquatic resource functions in the watershed. Compensatory mitigation could include the restoration, establishment, enhancement, or preservation of wetlands or other aquatic resources to off-set Project impacts.

Minnkota will place structures at least 2 feet above the 100-year flood stage of the Missouri River. This will accommodate potential flood effects from the river; therefore no mitigation is anticipated.

A hydrology study at the Sheyenne River has been completed to address concerns associated with the Devils Lake outflow. Based upon the hydrology study, Minnkota will place structures at least 2 feet above the calculated flood stage level. This will accommodate potential flood effects on the Sheyenne River due to proposed improvements to the outlet of Devils Lake; therefore no mitigation is anticipated.

Dust suppression measures will be conducted by the foundation contractor who will be responsible for maintaining the ROW during construction. Minnkota or the foundation

contractor will apply for a permit from the State Water Commission for water appropriations related to construction purposes.

Minnkota will work with local planning and zoning commissions to obtain any applicable permits and approvals for potential impacts within the floodplains.

## *5.13 Wetlands*

### 5.13.1 Description of Resources

The Project ROW encompasses an area that is generally described as part of the prairie pothole region. The prairie pothole region is characterized by numerous shallow freshwater lakes and wetlands that pockmark the landscape. This region, which extends from Canada south to South Dakota and Minnesota, provides waterfowl habitat that is estimated to produce 50 to 75 percent of North American waterfowl in any given year (Witsch et al. 2000).

The ecology of these wetlands is dictated by seasonal wet-dry cycles. Snowmelt and spring rains serve as the primary water sources, resulting in many seasonal wetlands that hold surface water early in the growing season and then dry out as the summer progresses. While some of these wetlands can be quite large (greater than 100 acres), the majority of pothole wetlands are less than 10 acres.

Some of these wetlands may have relatively high salinities that support plant communities that are tolerant of salty conditions. Saline wetlands, in some parts of North Dakota, also provide nesting habitat for the federally threatened piping plover.

Within the Project ROW, wetlands tend to be most dense west of eastern Steele County, which forms the boundary of the Lake Agassiz Plain. In general, wetlands in the west half of the Project ROW (from Wells County west) have been less disturbed by agricultural practices and, thus, retain a more natural state.

Wetlands are identified as shallow water systems that provide unique functions and values to the surrounding landscape, such as water quality protection, wildlife habitat, and flood storage. Wetlands connected to Waters of the U.S. (i.e., not isolated basins) are protected under Section 404 of the Clean Water Act and are regulated by USACE and the EPA. Some of the wetlands within the Project ROW are held in a USFWS wetland easement or grassland easement.

General wetland locations were obtained from the National Wetland Inventory (NWI) (**Figure 9**). NWI data represents general locations and acreages of wetlands within the Project ROW. Because the size of wetlands were determined by the use of aerial photography that is dependent on the year the photograph was taken and the level of water in the wetland at that time, the NWI data in North Dakota may not reflect the true size of wetlands. Minnkota began wetland delineations in the fall 2010 and anticipates field evaluations to be completed in spring 2012, which will indicate accurate wetland location size. The wetland delineation report will be filed with the Commission upon completion. Wetlands are located throughout the Project ROW; the various wetland types are shown in Table 5.13-1. All wetlands in the Project ROW have been desktop reviewed and about 94 percent of wetlands in the Project ROW have been field reviewed.

**Table 5.13-1. Desktop and Field Reviewed Wetlands Identified within Project ROW**

| Wetland Type | Wetland Acres of ROW | Percent of Wetlands within ROW |
|---|---|---|
| Freshwater Emergent Wetland | 492 | 90.6 |
| Freshwater Forested/Shrub Wetland | 6 | 1.1 |
| Freshwater Pond | 21 | 3.9 |
| Lake | 8 | 1.5 |
| Riverine | 16 | 2.9 |
| Total | 543 | 100.0 |

*Source: Minnkota desktop and field reviewed wetlands. All wetlands in ROW have been desktop reviewed and 94% of wetlands in ROW have been field reviewed.*

## 5.13.2 Impacts

Wetland impacts will be avoided or minimized through careful siting of the Project Route, to the extent practical. As noted previously, the USFWS manages wetlands on wetland and grassland easements. Some impacts are anticipated to wetlands and USFWS wetland easements. Minnkota continues to work with the USFWS to document wetland impacts and is applying for a Special Use Permit from the USFWS to cross easement lands.

Temporary construction impacts may occur in association with facility construction and an access road to a structure location. Permanent impacts are associated with installation of structures that result in "fill" being placed within a wetland. Conversion of a forested wetland to another wetland type is not identified as an impact. **Table 5.13-2** estimates wetland impacts for the Project Route based on desktop and field reviewed wetlands within the Project ROW.

**Table 5.13-2. Estimated Wetland Impacts for Project Route**

| Wetland Type | Estimated Wetland Impact | |
|---|---|---|
| | Temporary Impact (acres) | Permanent Impact (sq ft) |
| Freshwater Emergent Wetland | 100.5 | 2,019 |
| Freshwater Forested/Shrub Wetland | 1.4 | 78.5 |
| Freshwater Pond | 4.2 | 158 |
| Lake | 1.5 | 0 |
| Riverine | 2.2 | 0 |
| Total | 110 | 2,256 (0.03 acres) |

*Source: Minnkota desktop and field reviewed wetlands.*

## 5.13.3 Mitigation

Permanent impacts to wetlands will be avoided to the extent practicable through refinement of Project design. The majority of the wetlands within the Project ROW that may be permanently impacted by the Project Route appear to be isolated basins that likely do not fall under USACE jurisdiction. Surveys for USACE jurisdictional wetlands will be completed prior to construction.

Permanent impacts to jurisdictional wetlands and waters will be mitigated according to the USACE regulatory requirements, as applicable. Permanent impacts to wetlands under USFWS easements will require a Special Use permit from the USFWS, and Minnkota will continue to coordinate with the USFWS throughout Project development.

Minnkota will use BMPs during construction and operation of the transmission line and associated facilities to protect topsoil and adjacent wetland resources and to minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, stabilizing restored material, and re-vegetating disturbed areas with native species.

# *5.14 Vegetation*

## 5.14.1 Description of Resources

GAP land cover data for North Dakota was used for this analysis (USGS 2004). Figure 10 depicts the land cover within the Project ROW and Table 5.14-1 presents the total acres of each land cover category that occurs within the Project ROW.

**Table 5.14-1. GAP Land Cover Types within the Project ROW**

| GAP Land Cover Category | Acres in ROW | Percent of ROW |
|---|---|---|
| Cropland | 2,460 | 54.1 |
| Pasture | 787 | 17.3 |
| Prairie | 670 | 14.8 |
| Wetland | 372 | 8.2 |
| Shrubland | 183 | 4.0 |
| Woodland | 47 | 1.0 |
| Developed | 18 | 0.4 |
| Barren/Sparse Vegetation | 7 | 0.1 |
| Total | 4,544 | 100 |

*Source: USGS 2004*

**Agricultural Vegetation (Cropland and Pasture)**

The general vegetative cover within the Project ROW consists primarily of cropland and pasture, consisting of about 71 percent of the Project ROW. Typically, areas used as cropland are established as monotypic communities; agricultural species used for grain and legume production such as wheat, corn, soybeans or sugar beets. Pasture land is also common and is typically dominated by native or planted grasses. Overgrazed pastures tend to be dominated by non-native grasses. Agricultural vegetative cover generally increases as the Project ROW extends east, with percent cover ranging from approximately 60 percent cropland in the western portion of the Project ROW to nearly 90 percent cropland in the eastern portion of the Project ROW.

**Prairie, Woodland/Shrubland and Wetland Vegetation**

In the western sections of the Project ROW, toward the Missouri River, prairie and wetland vegetation become more prevalent. Historically, North Dakota was mostly prairie land cover although much of the area has been modified for agricultural production. In the western portions of the Project ROW, prairie cover can be as high as 24 percent, decreasing to nearly 2 percent in the east toward the Red River Valley. A general review of the Project ROW indicated that the majority (approximately 90 percent) of field identified prairie occurs within the Northwestern Great Plains Ecoregion, which is locally known as the Missouri Plateau/Missouri Coteau (Wiken et. al. 2011 and USGS 2006). The Missouri Plateau is located along the Project ROW within Oliver, McLean, Sheridan, and the extreme western portion of Wells County. The ecoregion is described as having a mid-latitude steppe climate and has a dominate vegetation community of short and mixed grass prairie (Wiken et. al. 2011 and USGS 2006). Native prairie was noted to occur anywhere on the landscape where local soil conditions or topography did not allow for row cropping to occur. This was also true for the few areas outside of the Missouri Plateau identified as prairie. Typical species present in remnant prairie areas include bluestem

(*Andropogon* spp*, Schizachyrium* spp.), needlegrass (*Achnatherum*), Indian grass (*Sorghastrum nutans*), and sideoats (*Bouteloua curtipendula*). Healthy prairie habitats can also include a variety of forbs such as prairie smoke (*Geum triflorum*), pasque flower (*Pulsatilla vulgaris*), and coneflower (*Echinacea* spp*., Ratibida* spp.).

Common wetland vegetation includes reed canarygrass (*Phalaris arundinaceae*), prairie cordgrass (*Spartina pectinata*), and cattail (*Typha* spp.). Large wetland complexes are typically considered a constraint to transmission line development, as construction may require additional permitting, wetland specific BMPs, or structure placement that will cause permanent impacts. Furthermore, maintenance of new infrastructure and ROW could be more problematic in wet areas. Refer to Section 5.13.1 for a discussion of wetlands within the Project ROW.

Wooded and shrub areas are not prevalent in North Dakota, making up a small percentage of vegetative cover within the Project ROW (approximately 5 percent). Currently, the most common wooded and shrub areas are shelterbelts around residences and buildings. Some rivers and streams crossed by the Project Route may have a wooded or shrubby riparian fringe, such as the Missouri and Sheyenne Rivers. Species commonly found in these wooded areas include deciduous species such as green ash (*Fraxinus pennsylvanica*), aspen (*Populus tremuloides*), burr oak (*Quercus macrocarpa*) and eastern cottonwood (*Populus deltoides*). Common shrub species include sandbar willow (*Salix* spp.), chokecherry (*Prunus virginiana*), and hawthorn (round leaved) (*Crateagus rotundifolia*).

**Conservation Focus Areas**

The NDGF's Private Lands Initiative Program utilizes a State Wildlife Grant to provide assistance to landowners to develop and protect habitat for species of conservation priority that are located within conservation focus areas identified in the *North Dakota Comprehensive Wildlife Conservation Strategy Plan* (NDGF 2011). There are five conservation focus areas crossed by the Project ROW, including the Missouri River System Breaks, Missouri Coteau Breaks, Devil's Lake Basin, Sand Deltas and Beach Ridges, and Saline Area. For each conservation focus area, the NDGF identified a list of key species of conservation priority that includes birds, mammals, reptiles and amphibians, and fish. Figure 11 depicts the conservation focus areas crossed by the Project ROW. **Table 5.14-2** provides a description of each conservation focus area along with the key species of conservation priority identified by the NDGF.

**Table 5.14-2. Conservation Focus Areas Crossed by the Project ROW**

| NDGF Conservation Focus Area | Description of Area | Associated Landscape | Key Species of Conservation Priority | | | |
|---|---|---|---|---|---|---|
| | | | Birds | Mammals | Reptiles and Amphibians | Fish |
| Missouri River System Breaks | Steep, dissected topography with woody draws, riparian forest, and shortgrass prairie uplands | Rivers, Streams and Riparian | bald eagle, piping plover, least tern, red-headed woodpecker, golden eagle | river otter | smooth softshell, false map turtle | sturgeon chub, pearl dace, blue sucker, paddlefish, pallid sturgeon, flathead catfish, flathead chub, sicklefin chub, yellow bullhead |
| Missouri Coteau Breaks | Rolling, steep topography with intact native prairie remains amongst wheat and hay fields; cattle grazing; abundant wetlands | Mixed-grass Prairie (Missouri Coteau) | American bittern, Northern pintail, Northern harrier, Swainson's hawk, ferruginous hawk, sharp-tailed grouse, willet, upland sandpiper, marbled godwit, Wilson's phalarope, short-eared owl, loggerhead shrike, sedge wren, Sprague's pipit, lark bunting, grasshopper sparrow, Baird's sparrow, Le Conte's sparrow, Nelson's sharp-tailed sparrow, chestnut-collared longspur, dickcissel, bobolink | Richardson's ground squirrel | spadefoot toad, smooth green snake | none identified |
| Devil's Lake Basin | Extensive wetland drainage and intense farming is predominant due to the rich soil and relatively flat topography; high concentration of large wetlands and lakes; includes the James and Sheyenne rivers in the southern portion of the basin; adjacent non-wooded uplands intact in many areas | Eastern Mixed-grass Prairie (Drift Prairie) | American bittern, Northern pintail, Northern harrier, Swainson's hawk, sharp-tailed grouse, willet, upland sandpiper, marbled godwit, short-eared owl, bobolink | Richardson's ground squirrel | plains spadefoot | none identified |
| Sand Deltas and Beach Ridges | Thick sand deposits from river sediments with windblown sand dune formations; some agriculture and areas of overgrazing; includes the Sheyenne River and Sheyenne National Grasslands | Tallgrass Prairie (Red River Valley) | greater prairie-chicken, sharp-tailed grouse, short-eared owl, upland sandpiper, sedge wren, Le Conte's sparrow | plains pocket mouse | Northern prairie skink | Western hognose snake |
| Saline Area | Characterized by saline soil due to salty ground water flowing to the surface from underlying sandstone; land mostly unsuitable for crop farming; grazing occurs in uncultivated areas; supports salt-tolerant plants; many wetlands are brackish | Tallgrass Prairie (Red River Valley) | greater prairie chicken, upper sandpiper, sedge wren, Le Conte's sparrow | none identified | none identified | none identified |

*Source: NDGF 2005, North Dakota Comprehensive Wildlife Conservation Strategy Plan.*

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**Impaired and Vulnerable Terrestrial Communities**

NDPR maintains the North Dakota Natural Heritage Inventory (NHI) as a spatial reference to protected and sensitive species occurrences or sensitive natural communities. The database includes data pertaining to flora and fauna species. The NHI provides a system for identifying and prioritizing ecologically significant natural features in the state. The North Dakota Natural Heritage Program has used these ranks to help develop a list of plant and animal species considered to be Species of Concern in North Dakota (Dirk 2006a, 2006b). North Dakota Species of Concern do not receive legal protection under state and/or federal endangered species acts. While this inventory has not been completed throughout the entire Project ROW, data is available for the vicinity of the Missouri and Sheyenne Rivers.

This database has assigned each occurrence a state conservation ranking, standards developed in part by NatureServe (NatureServe 2010). These rankings range between S1 for species or communities which are critically imperiled (less than 5 occurrences regionally) to S5 for species or communities considered secure (common species). Some communities are not assigned a rank or are considered historical or extirpated (NatureServe 2010). Species of Concern in North Dakota typically have been assigned a natural heritage state rank of S1, S2, or S3, as outlined below:

- **S1 Critically Imperiled** – Critically imperiled in the state because of extreme rarity or because some factor of its biology makes it especially vulnerable to extirpation from the state. Typically 5 or fewer occurrences or very few remaining individuals (less than 1,000). [Critically endangered in state.]
- **S2 Imperiled** – Imperiled in the state because of rarity or because of other factors making it very vulnerable to extirpation from the state. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000). [Endangered in the state.]
- **S3 Vulnerable** – Vulnerable in the state either because of rarity, or because it is found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 to 10,000 individuals. [Threatened in the state.] (NDPR 2011)

These rankings are valuable to determine the extent of rare communities present in a given location.

Sensitive communities present in the vicinity of the Project ROW include areas of high quality prairie such as dry-mesic tallgrass prairies or needle-and-thread mixed grasses, high quality woodlands such as floodplain forests or burr oak upland woodlands and high quality shrublands and high quality wetlands. These communities likely harbor a greater diversity of plant species than the surrounding landscape. Impaired or vulnerable terrestrial communities along the associated state conservation rankings are presented in Table 5.14-3 for the Project ROW.

**Table 5.14-3. Impaired or Vulnerable Terrestrial Communities and Associated State Conservation Rankings in Project ROW**

| State Conservation Ranking | Common Community Names | Acres in ROW |
|---|---|---|
| S1 | Dry Mesic Tallgrass Prairie | 4.6 |
| | Water Sedge Rich Fen | 2.2 |
| S2 | Needle-and-thread Mixed Grass Prairie | 6.7 |
| | Needlegrass-wheatgrass Prairie | 3.6 |
| S2/S3 | Saltgrass Saline Meadow | 0.8 |
| S3 | Bur Oak Upland Woodland | 0.3 |
| | Cottonwood-Green Ash Floodplain Forest | 6.2 |
| | Green Ash Upland Woodland | 0.1 |
| S3/S4 | Western Wheatgrass Prairie | 6.7 |
| Total | | 31.2 |

*Source: NDPR 2011*

## 5.14.2 Impacts

Temporary and permanent impacts to land cover are provided in **Table 5.14-4**. Woodland cover impacts would result in a permanent vegetation conversion from woodland to shrubland or grassland within the Project ROW.

**Table 5.14-4. GAP Land Cover Impacts for the Project Route**

| GAP Land Cover Category | Temporary Impacts (acres) | Conversion/Permanent Impacts (acres) |
|---|---|---|
| Cropland[1] | 534.8 | 5.7 |
| Shrubland | 183 | 0.3 |
| Pasture | 180.6 | 0.8 |
| Prairie | 158.0 | 0.5 |
| Woodland | NA | 47.0 |
| Wetland | 78.0 | 0.2 |
| Developed | 19.5 | 0 |
| Barren/Sparse Vegetation | 1.1 | 0 |
| Total | 98.6 | 54.5 |

[1] *Cropland impacts include the Restricted Tillage Area.*

**Agricultural Vegetation (Cropland and Pasture)**

Land use in the Project ROW is dominated by agricultural cropland and pasture. A Restricted Tillage Area was added as a permanent impact to each structure location on tillable land. This area was added to the calculated impacts on tillable land as a farmer may not wish to farm the land any closer than five feet from the structure base. Extent of tillable land was determined using 2004 ND GAP Land Cover data (cropland).

**Prairie, Woodland/Shrubland, and Wetland Vegetation**

The most common type of prairie habitat along the Project Route is dominated by a mixture of non-native vegetation, bluestem, needlegrass, and wheatgrass. Many prairie areas are degraded due to overgrazing. Permanent impacts to prairie areas will be limited to structure and fiber optic regeneration footprints.

In some areas, wetlands may share similar characteristics as prairie areas, but in many cases are degraded or dominated by non-native vegetation. Permanent impacts to wetlands are defined in Section 5.13.2.

Woodlands and windbreaks will be permanently impacted within the 150-foot-wide Project ROW that is cleared of tall, woody vegetation (**Table 5.14-3**). Consideration was given to limiting woodland clearing to a narrower area, however, this would not meet the operation and safety standards under NERC for a 345 kV transmission line. Minnkota will request approval from the Commission for clearing the entire 150-foot-wide ROW. Woodlands that may be considered to have higher biological integrity include the cottonwood floodplains in the vicinity of the proposed Missouri River crossing.

Shrublands may be cleared for the 150-foot-wide Project ROW during construction, but then allowed to regrow to a height of 15 feet following construction. Therefore, in shrubland the temporary impact would be the clearing of the Project ROW. Permanent impacts would be limited to the structure locations (**Table 5.14-3**).

**Conservation Focus Areas**

Minnkota recognizes that each of the five conservation focus areas crossed by the Project ROW would be temporarily and permanently impacted by Project Route construction. However, no conservation projects have been identified in the areas that would be impacted by the Project Route.

**Impaired and Vulnerable Terrestrial Communities**

The most common types of sensitive community along the Project ROW are western wheatgrass and needle-and-thread mixed grass prairies (**Figure 12**). These communities are overlapping and present along the eastern bluffs of the Missouri River. Cottonwood-green ash floodplain forests are the next most frequent type of community present along the Project ROW (**Figure 12**). Known occurrences of this community along this Project ROW are adjacent to the Missouri River crossing (**Figure 12**). **Table 5.14-5** identifies impacts to impaired or vulnerable terrestrial communities for the Project Route.

**Table 5.14-5. Impaired or Vulnerable Terrestrial Communities for Project Route**

| State Conservation Ranking | Common Community Names | Temporary Impacts (acres) | Permanent Impacts (acres) |
|---|---|---|---|
| S1 | Dry Mesic Tallgrass Prairie | 1.1 | <0.01 |
| | Water Sedge Rich Fen | 0.4 | 0 |
| S2 | Needle-and-thread Mixed Grass Prairie | 1.4 | <0.01 |
| | Needlegrass-wheatgrass Prairie | 0.8 | <0.01 |
| S2/S3 | Saltgrass Saline Meadow | 0.2 | 0 |
| S3 | Bur Oak Upland Woodland | NA | 0.3 |

| State Conservation Ranking | Common Community Names | Temporary Impacts (acres) | Permanent Impacts (acres) |
|---|---|---|---|
| | Cottonwood-Green Ash Floodplain Forest | NA | 6.2 |
| | Green Ash Upland Woodland | NA | 0.1 |
| S3/S4 | Western Wheatgrass Prairie | 1.4 | <0.01 |
| Total | | 5.3 | 6.6 |

### 5.14.3 Mitigation

**Agriculture**

Mitigation of impacts to agricultural vegetation (cropland and pasture) is addressed in Section 5.2.3.

**Prairie, Woodland, and Wetland Vegetation**

Impacts to native vegetation will be minimized by spanning habitats of higher quality, to the extent practical. Where spanning is not feasible, impacts to native vegetation will be mitigated by re-establishing native species once construction is complete. Areas of non-native vegetation will be re-vegetated using native species appropriate for the local habitat, if approved by the landowner, to the extent practical.

Structure placement will be selected to avoid placement in wetland areas when possible. Mitigation, if required, will be completed in consultation with the USACE under Section 404 Permit requirements. Wetlands that do not require a Section 404 Permit will be restored to preconstruction conditions.

Impacts to woodland vegetation will occur within the Project ROW where these habitats are present. Minnkota will mitigate impacts to woodland areas using a 2:1 replacement ratio (based on the number of trees removed), per Commission requirements. Minnkota will monitor replacement vegetation, per Commission requirements. If feasible, the replacement areas will be located in the vicinity of the impacts. Where functional woodlands will be removed (such as shelterbelts), mitigation will be designed to replace the intended utility of the impacted woodland.

**Conservation Focus Areas**

Impacts to NDGF conservation focus areas will be minimized in a similar manner as discussed above; however, construction BMPs to minimize the spread of non-native species will be employed. In the conservation focus areas, BMPs may include but are not limited to, the following actions:

- Where soil will be disturbed, the topsoil will be excavated separately from subsoil and stored in separate stockpiles.
- Disturbed soils will not be transported to a different location on the Project.
- The time which areas of disturbed soils are left bare will be minimized.
- Disturbed areas will be revegetated using a native seed mix consistent with native communities present near the area of disturbance.

**Impaired and Vulnerable Terrestrial Communities**

Impacts to impaired and vulnerable terrestrial communities located within the ROW will be minimized in a similar manner as discussed above under Conservation Focus Areas. Minnkota will mitigate impacts to woodland areas using a 2:1 replacement ratio (based on the number of trees removed), per Commission requirements.

# *5.15 Wildlife*

## 5.15.1 Description of Resources

### General Wildlife

In general, wildlife species present within the Project ROW are typical of agricultural landscapes, pasture grasslands, and wetland habitat. Common mammals for these habitats include raccoon *(Procyon lotor)*, skunk *(Mephitis* spp.*)*, red fox *(Vulpes vulpes)*, rabbits *(Syvilagus* spp.*)*, bats (*Myotis* spp.), white-tailed deer *(Odocorleus virginianus)*, and coyote *(Canis latrans)*. The secondary ranges of pronghorn antelope (*Antilocapra americana*) and mule deer (*Odocoileus hemionus*) include the western part of the Project ROW. Typical birds include songbirds; waterfowl; raptors; and game birds, such as pheasant *(Phasianus colchinus),* gray partridge (*Perdix perdix*), and sharp-tailed grouse (*Tympanuchus phasianellus*). In general, birds nest in shelterbelts and fencerow trees, and on the ground in the grasslands associated with prairie remnants, conservation land, lightly grazed pasture, and riparian areas.

The Missouri and Sheyenne Rivers, in particular, provide corridors for migrating and foraging wildlife as well as ample cover for small mammals, raptors, waterfowl, upland game birds, and other common wildlife along the Project ROW. The area described as the Northwestern Great Plains Ecoregion, which includes the Project ROW from western Wells County west to the Missouri River, includes relatively large tracts of pasture land with scattered remnant native habitat. This area provides habitat for a variety of grassland species (USGS 2006).

### Species of Concern in North Dakota

Species of Concern include those plant and animal species that have populations considered at risk in the state of North Dakota; but North Dakota Species of Concern do not receive legal protection under state and/or federal endangered species acts. Federally listed species are discussed in Section 5.16. **Table 5.15-1** provides the Species of Concern documented in the NHI within 1 mile of the Project ROW.

Since areas within the Project ROW have been studied by the State of North Dakota to varying degrees of completeness, the species represented by the NHI data best serve as a snapshot of the potential presence of sensitive species, and do not necessarily represent a comprehensive list of all sensitive species located within the Project ROW. When assessing species records it may be important to consider the similarity of habitats when interpreting the available data.

The NHI Species of Concern within 1 mile of the Project ROW include sheathed pondweed, white lady's slipper, piping plover, least tern, bald eagle, and turkey vulture. In general, most Species of Concern are associated with high quality native or sensitive habitats and landscape features. In the Project ROW, most Species of Concern observations occur along the Missouri and Sheyenne Rivers (**Figure 12**). Other species observations not associated with a major river are associated with unique habitats, such as remnant native prairie, riparian woodlands, wetland complexes, or rock outcroppings.

**Table 5.15-1** summarizes known raptor nests, owl nests, and sharp-tailed grouse leks within the Project ROW and within 1 mile of the Project ROW. NDGF has recorded sharp-tailed grouse lek areas in Grand Forks County, in the vicinity of the English Coulee Retention Dam, and in Sheridan County near the Prophets Mountain area. The closest lek from the Project ROW edge is about 100 feet. On March 29 and 30, 2010, aerial surveys for raptor nests were conducted

within the Project ROW (refer to Appendix G in the Corridor Certificate Application). The data from this survey are summarized in **Table 5.15-2**.

**Table 5.15-1. Sensitive Species within Project ROW and 1 Mile of the Project ROW**

| Species | Number Within ROW | Number Within 1 mile of ROW |
|---|---|---|
| NHI Species of Concern | 0 | 10 |
| Raptor Nests* | 0 | 0 |
| Burrowing Owl Nests | 0 | 0 |
| Sharp-tail Grouse Leks | 0 | 14 |

**Raptor nests include bald eagle and ferruginous hawk. Does not include data from March 2010 raptor surveys.*

**Table 5.15-2. March 2010 Raptor Nest Survey Results within Project ROW**

| Feature Type | Number Within ROW | Number Within 1 mile of ROW |
|---|---|---|
| Raptor Nest | 2 | 18 |
| Raptor Observed | 0 | 2 |

*Source: Minnkota 2010b*

USFWS made recommendations regarding nesting birds in a response letter received by Minnkota on June 2, 2009, as stated in the subsections below. The bald eagle and raptor nest surveys were conducted in consideration of the recommendations quoted below.

**USFWS Bald Eagle Recommendations**

*The North Dakota Game and Fish (NDGF) bald eagle nest database indicated that bald eagle nests are located in the project area. We recommend conducting surveys to identify bald eagle nests along the proposed route in winter/early spring before trees have leaves that could screen possible nests. To avoid/minimize impacts to nesting bald eagles from transmission line construction activities, the Service recommends (1) keeping a distance between the activity and the nest (distance buffers: 660 feet if the activity will be visible from the nest; 330 feet if the activity will not be visible from the nest). Clearing, external construction, and landscaping between 330 feet and 660 feet should be done outside breeding season. (2) maintaining preferably forested (or natural) areas between the activity and around nest trees (landscape buffers), and (3) avoiding certain activities during breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or replacement nest trees. The Service's May 2007, National Bald Eagle Management Guidelines contain detailed information on protecting bald eagles from disturbance due to human activity. The guidelines can be accessed on the Service's website: (http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/NationalBaldEagleManagementGuidelines.pdf).*

**USFWS Migratory Bird Recommendation**

*Schedule constructions for late summer or fall/early winter so as not to disrupt waterfowl or other wildlife during the breeding season February 1 to July 15. If work is proposed to take place during the breeding season or at any other time which may result in the take of migratory birds or active nests, the Service recommends that the project proponent arrange to have a qualified biologist conduct a field survey of the affected habitats to determine the absence or presence of nesting migratory birds. If nesting migratory birds are found, we request you contact this*

*office, suspend construction, or take other measures, such as maintaining adequate buffers, to protect the birds until the young have fledged. The Service further recommends that field surveys from nesting birds, along with information regarding the qualifications of the biologist(s) performing surveys, and any avoidance measures implemented at the project site, be thoroughly documented and that such documentation be shared with the Service and maintained on file by the project proponent at least until such time as construction on the Project has been completed.*

### 5.15.2 Impacts

Both direct and indirect effects could occur to wildlife species as a result of the Project. Direct effects to wildlife are the result of construction activities that displace wildlife because of noise, ground disturbance or other disruptions. Indirect effects are those effects that may occur after construction is complete and the project is in place.

Direct effects could include:

- Direct habitat modification and reduction associated with construction clearing or grading;
- Disturbance to raptor nests (excluding bald and golden eagle nests) during the breeding season;
- Introduction of sediment and fugitive dust through erosion and runoff during construction;
- Potential for displacement during construction of ground nesting birds, such as sharp-tailed grouse, from lekking areas, particularly where the Project ROW crosses near Prophets Mountain in Sheridan County.
- Exposure to contaminants from fuels and chemicals that are used during construction and operation; and
- Injury or mortality associated with collisions with construction equipment and/or overhead transmission lines. Collisions are discussed in more detail below.

The two raptor nests occurring within the Project ROW would be impacted by ROW clearing activities. Preconstruction surveys would occur to determine if the nests are being actively used.

Raptors, waterfowl, and other bird species may be affected by the construction and placement of the Project facilities. Avian collisions are a possibility after the completion of the transmission line. Waterfowl may be susceptible to transmission line collision, especially if the line is placed between agricultural fields that serve as feeding areas, or between wetlands and open water, which serve as resting areas. The transmission line shield wire is the part of the structure that is most likely to be involved in an avian collision. Avian collisions are considered important for whooping crane migration, especially in the western half of the Project ROW. Whooping cranes are discussed in Section 5.16.

Indirect effects could include:

- Habitat disturbances that result in habitat fragmentation and/or species crowding in adjacent habitat, interfering with behavior and/or migration;
- Introduction of invasive vegetation that could change on-site habitat conditions; and
- Interference with behavior or migration from noise created by construction and human activity.

### 5.15.3 Mitigation

Minnkota will use the following methods to address avian and other wildlife issues associated with the transmission line:

- Will continue to work with the USFWS and RUS to identify areas where both of the transmission line shield wires should be marked. As noted in Section 5.16, both of the shield wires will be marked in an alternating pattern, as appropriate, to mitigate for sections of the Project Route near suitable whooping crane habitat within the whooping crane migration corridor.
- The transmission line will be designed following the Avian Power Line Interaction Committee's (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* and *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*.
- Preconstruction surveys of the ROW and associated facilities for wetlands and woodlands will be completed to minimize impacts to wildlife habitat.
- To discourage active nesting within temporary or permanent Project disturbance areas, tree removal, ground clearing, or mowing will occur in late fall or early spring to discourage tree and ground nesting.
- If areas are not cleared in early spring before the breeding season, a qualified biologist will survey the Project ROW for active nests of protected species and provide a construction buffer of the nest.
- Construction will occur after the lekking season or when birds are not present on the lekking grounds. Surveys of known lekking areas will be conducted to determine the presences or absences of birds.
- Minnkota will work with the NDGF on the two raptor nest locations that may be removed.
- In case of permanent jurisdictional wetland impacts, any unavoidable loss of jurisdictional wetland habitat will be replaced with functionally equivalent wetlands, as required by applicable permits.
- Appropriate erosion and sediment control measures will be installed and maintained to reduce sediment transport to adjacent wetlands, streams, and river channels.
- If impacted, per the Commission's requirements, trees will be replaced at a 2:1 ratio outside the Project ROW, subject to landowner approval.
- Avoid refueling vehicles within 100 feet of a waterway's edge to minimize the potential for hazardous-materials spills reaching the waterway.
- Prompt restoration and re-vegetation of disturbed areas.
- Use native plant seed stock for re-vegetation.

The Project is not expected to result in the listing of or jeopardizing the continued existence of any wildlife species, and will not violate any wildlife protection law, including the Migratory Bird Treaty Act.

# *5.16 Rare and Unique Natural Resources*

## 5.16.1 Description of Resources

The Endangered Species Act (ESA) of 1973, as amended, provides for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend. Section 7 of the ESA requires federal agencies to insure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species, or to modify their critical habitat. The RUS has developed a draft Biological Assessment (BA) to support their efforts to meet their responsibilities under Section 7(a) of the ESA. Through review of the BA, the RUS will make a determination of whether the Project will or will not affect a listed species or adversely modify critical habitat. Minnkota continues to consult with USFWS and RUS.

Federally threatened species are those species likely to become endangered within the foreseeable future throughout all or a significant portion of their range. Federally endangered species are those species already in danger of extinction throughout all, or a significant portion of, their range. Designated critical habitat is a specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection. **Table 5.16-1** summarizes federally listed species and critical habitat that may occur within the Project ROW (USFWS 2009 and 2011).

**Table 5.16-1. Federally Listed Species and Critical Habitat by Counties that are Crossed by Project ROW**

| Species | Type | County Occurrences | Preferred Habitat | Habitat Present in Project ROW |
|---|---|---|---|---|
| Endangered | | | | |
| Interior least tern (*Sterna antillarum*): | Bird | Burleigh, McLean, Oliver | Nests along midstream sandbars of the Missouri and Yellowstone rivers. | Yes, Missouri River |
| Whooping crane (*Grus americana*) | Bird | All | Migrates through North Dakota during spring and fall. Prefers to roost in wetlands and stock dams with good visibility (i.e., no or minimal woody debris within wetland or on wetland fringe). | Yes |
| Pallid sturgeon (*Scaphirhynchus albus*) | Fish | Burleigh, McLean, Oliver | Known only in the Missouri and Yellowstone rivers. No reproduction has been documented in 15 years. | Yes, Missouri River |
| Gray wolf (*Canis lupus*) | Mammal | McLean, Oliver | Occasional visitor in North Dakota. Most frequently observed in the Turtle Mountains area of northern North Dakota. | No, Project greater than 75 miles from Turtle Mountains |
| Black-footed ferret (*Mustela nigripes*) | Mammal | Oliver | Exclusively associated with prairie dog towns. No records of occurrence in recent years, although there is potential for reintroduction in the future. | No, large prairie dog towns capable of sustaining a ferret population are not present within the Project ROW |
| Threatened | | | | |
| Piping plover (*Charadrius melodus*) | Bird | Burleigh, Eddy, Foster, McLean, Oliver, Sheridan, Wells | Nests on midstream sandbars of the Missouri and Yellowstone rivers and along shorelines of saline wetlands. | Yes, Missouri River |

| Species | Type | County Occurrences | Preferred Habitat | Habitat Present in Project ROW |
|---|---|---|---|---|
| Designated Critical Habitat | | | | |
| Piping plover (*Charadrius melodus*) | Bird | Burleigh, Eddy, McLean, Oliver, Sheridan | Missouri River - Critical habitat includes sparsely vegetated channel sandbars, sand and gravel beaches on islands, temporary pools on sandbars and islands, and the interface with the river. Alkali Lakes and Wetlands – Critical Habitat includes: (1) shallow, seasonally to permanently flooded, mixosaline to hypersaline wetlands with sandy to gravelly, sparsely vegetated beaches, salt-encrusted mud flats, and/or gravelly salt flats; (2) springs and fens along edges of alkali lakes and wetlands; and (3) adjacent uplands 200 feet above the high water mark of the alkali lake or wetland. | Yes, at Missouri River crossing; Crossing a nesting sandbar; No designated alkali lake or wetlands within Project ROW |
| Delisted | | | | |
| Bald eagle (*Haliaeetus leucocephalus*) | Bird | Possible in all counties crossed by Project ROW | The bald eagle has been recently delisted from the ESA. However, the bald eagle is still protected by other federal laws including: the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Lacey Act. | Possible; aerial surveys conducted on March 2010 documented one eagle nest in Eddy County about 1,200 feet south of Project ROW (Minnkota 2010b) |

*Source: NDPR 2011 and USFWS Endangered Species Program 5/3/10*

**Table 5.16-2** provides the number of occurrences of federally listed species within and near the Project ROW. The species occurrences within 1 mile of the ROW represent past observations of piping plover and interior least tern along the Missouri River. USFWS has indicated that the ROW crosses one historic nesting sandbar in the Missouri River of piping plover and interior least tern. Confirmed whooping crane migration sightings are scattered throughout the west half of the Project ROW, from about the City of Carrington westward.

**Table 5.16-2. Number of Federally Listed Species Occurrences within and near the Project ROW**

| Species Occurrences | Number Within ROW | Number Within 1 Mile of ROW |
|---|---|---|
| NDPR T&E Occurrences | 0 | 4 |
| Whooping Crane Sightings | 0 | 2 |
| Total T&E Species Observations | 0 | 6 |

*Source: NDPR 2011 and USFWS Endangered Species Program 5/3/10*

**Table 5.16-3** summarizes the number of bald eagles that were observed within or near the Project ROW during aerial surveys conducted from March 29-30, 2010.

**Table 5.16-3. Number of Bald Eagle Nests and Observations within or near the Project ROW**

| Observations | Number Within ROW | Number Within 1 Mile of ROW |
|---|---|---|
| Bald Eagles (Soaring) | 0 | 0 |
| Bald Eagles (Perched) | 0 | 10 |
| Total Bald Eagles Observed | 0 | 10 |

*Source: Minnkota 2010b.*

An active bald eagle nest was observed approximately 1,200 feet south of the Project ROW in Eddy County. Most of the bald eagle observations occurred near the central portion of the Project ROW, within Foster, Eddy, and Wells counties (Minnkota 2010b).

## 5.16.2 Impacts

Due to the linear nature of the Project Route, potential impacts to terrestrial species habitat will be limited to the area within the Project ROW. Long-term permanent habitat impacts will occur at structure locations, Center 345 kV Substation, and fiber optic station locations. Where tree clearing is required, short-term impacts would occur within the Project ROW. Existing, adjacent habitat will be left undisturbed.

**Table 5.16-4** summarizes potential impacts to federally listed species and critical habitat. Species with potential impacts are discussed in more detail in this section.

**Table 5.16-4. Adverse Impacts to Federally Listed Species and Critical Habitat**

| Species | Type | Direct Impact Anticipated | Indirect Impact Anticipated | Comment |
|---|---|---|---|---|
| Endangered | | | | |
| Interior least tern (*Sterna antillarum*): | Bird | No | No | Route spans historic nesting sandbars; line will be marked with bird flight diverters where suitable habitat is present |
| Whooping crane (*Grus americana*) | Bird | Possible | Possible | Route runs perpendicular to the migration corridor and includes potential whooping crane stopover habitat; line will be marked with bird flight diverters where suitable habitat is present |
| Pallid sturgeon *(Scaphirhynchus albus*) | Fish | No | No | No impacts to the Missouri River are expected |
| Gray wolf (*Canis lupus*) | Mammal | No | No | Greater than 75 miles from Turtle Mountains, an area that is occasionally used by gray wolf |
| Black-footed ferret (*Mustela nigripes*) | Mammal | No | No | No known populations in North Dakota; Route does not cross any known potential habitat (prairie dog towns) |
| Threatened | | | | |
| Piping plover (*Charadrius melodus*) | Bird | No | No | Route spans historic nesting sandbars; line will be marked with bird flight diverters where suitable habitat is present |

| Species | Type | Direct Impact Anticipated | Indirect Impact Anticipated | Comment |
|---|---|---|---|---|
| Designated Critical Habitat | | | | |
| Piping plover (*Charadrius melodus*) | Bird | No | No | The Missouri River sandbars, which is designated critical habitat, will be spanned by the transmission line; line will be marked with bird flight diverters where suitable habitat is present |
| Delisted | | | | |
| Bald eagle (*Haliaeetus leucocephalus*) | Bird | No | No | No eagle nests will be impacted by the Project; transmission line will meet APLIC guidelines |

**Interior Least Tern**

The Project Route spans the Missouri River across an historic nesting grounds sandbar. Aerial photography from 2009 indicates that sandbars are still present at these locations.

A direct impact to interior least tern could occur in the event of a collision with the transmission line. While typical flight height information is not readily available, it is documented that, when searching for prey, interior least terns hover about 3 to 33 feet above water, which is lower than the expected height of the transmission line (Thompson et al. 1997). As such, direct impacts due to collision with the transmission line during feeding forays would be unlikely. Little information is available that establishes flight heights during local movements or migration for the least tern. However, several generalizations about avian migration flight characteristics can be inferred from published literature and may aid in assessing collision risk for migratory least terns.

Most birds migrate during periods of good weather and geographic features such as rivers or mountain ranges are used by birds to orient themselves during migration. Flight heights tend to be higher for migrating birds at night or with tailwinds than during daylight hours or with a headwind (Curry and Kerlinger 2004, Scanlon et al. 2010, Dolbeer 2006). Given these generalizations about avian migration, there may be an increased risk to least terns during the spring migration when the prevailing winds are from the north/northwest and during daytime hours. Static wires on the new transmission line would be marked with avian flight diverters in an alternating pattern near suitable habitat. Transmission conductor wires that will be used at the Missouri River crossing have an outside diameter of 1.38 inches, which is a thicker diameter than normal conductor wires and will be easier for birds to see during daylight movements. Helicopters will be employed to string transmission lines across the Missouri River after breeding season (construction anticipated from November and March), therefore no construction activity will occur within the Missouri River.

Structure locations would be designed to avoid direct impacts to nesting habitat and are designed to be 150 feet back from the river's bank. Minnkota proposes to cross the Missouri River in one span. Therefore, no structures would be placed within the Missouri River or its sandbars. In addition, Minnkota proposes to cross the Missouri River near the existing HVDC transmission line. During construction, no equipment will be located within the Missouri River. The Project would not cause a loss, fragmentation, or modification of sandbar habitat.

Fiber optic and regeneration stations will be located in upland habitats away from the Missouri River and will not impact or modify sandbar habitat.

The timing of construction at the Missouri River would be restricted such that construction activities would not be allowed during the nesting season from April 1 through August 15. To avoid potential impacts related to construction activities, construction at the Missouri River is anticipated to occur between November and March. Because construction at the Missouri River will occur after August 15, no direct effects due to construction are anticipated.

**Whooping Crane**

This region of North Dakota crossed by the Project ROW has seen conversion of native prairie and wetlands into agricultural land use beginning with 19th-century settlement, negatively impacting the quality and quantity of migration stopover habitat for numerous migratory birds. Construction of roads, increased urban and industrial developments, and utility lines, which are all associated with human disturbance, have negatively affected whooping cranes and migration habitat.

Potential direct effects to whooping cranes include mortality associated with collisions and permanent loss of habitat. According to the USFWS, collisions with power lines are the greatest known source of mortality for fledged whooping cranes. Specifically Stehn and Wassenich (2007) stated that shield wires are the wires most often struck by birds in flight. During discussions, the USFWS has commented that a new transmission line has the potential to affect whooping cranes during their annual spring and fall migration through North Dakota (Ellsworth, pers. comm. 2010). According to Stehn and Wassenich (2007), whooping cranes are susceptible to collisions because of their large body size and wing span, slower wing beat, and relative lack of maneuverability with juveniles being more vulnerable to collisions than adults. The Project ROW crosses perpendicularly to the east half of the whooping crane migration corridor (refer to **Figure 12**). The western terminus of the transmission line is located within the center (50th percentile band) of the whooping crane migration corridor. Migrating cranes are most vulnerable to collisions in the early morning or late evening when light levels are diminished, as they fly at very low altitudes between roost and foraging sites, or when flying at low altitude when starting or ending a migration flight, especially when thermal currents are minimal. Stehn and Wassenich (2007) thought that power lines dividing roosting wetlands from feeding areas caused the most collisions for cranes because these circumstances encouraged crossing the lines at low altitude several times each day.

Short-term direct impacts could occur in the event that a whooping crane is displaced from available stopover habitat during Project construction. Long-term direct impact could occur in the event that installation of a new transmission line causes displacement from local stopover habitat.

Stehn and Wassenich (2007) stated that whooping cranes responded to marked lines and tried to avoid the lines. Minnkota proposes to mark both transmission line shield wires in an alternating pattern with bird-flight-diverter-type visual marking devices, as follows:

- Bird-flight-diverters will be installed at locations where the Project Route is within 1.0 mile of suitable habitat. A survey for suitable habitat has been completed.
- Both shield wires will be marked with swan type diverters.
- Diverters will be spaced 100 feet apart on each wire, marking will be staggered such that they appear to be 50 feet apart. The mid 70% of the span will be marked.

- Minnkota will provide the USFWS with a written confirmation that the shield wires were marked as well as the location of markers.

The primary indirect effect is the potential for complete avoidance by whooping cranes of the stopover habitat located near the proposed transmission line. Loss of migration habitat is a growing concern regarding the Aransas-Wood Buffalo whooping crane population. Searching for suitable stopover habitat may cause increased exposure to hazards as birds are required to fly low for longer distances. The increased disturbance could also place the cranes at greater risk of exposure to other hazards encountered during migration such as structures, incidental hunting, disease, and predation.

**Piping Plover**

The Project Route spans the Missouri River over an historic nesting grounds sandbar. Aerial photography from 2009 indicates that sandbar is still present at these locations. The Project Route that crosses the Missouri River is located within the Missouri River critical habitat (**Figure 12**).

A direct impact to piping plover could occur in the event of a collision with the transmission line. While typical flight height information is not readily available, at times piping plovers walk or run rather than fly, because their inconspicuous sand-colored plumage makes them more difficult to see on the ground than if they flew and exposed their bright white underbody (Elliott-Smith et al. 2004). However, trading flights between nesting and foraging locations along the Missouri River do occur.

Little information is available that establishes flight heights during local movements or migration for the piping plover. Generalized information on flight heights of shorebirds during migration suggest that the piping plover would migrate between 1,000 and 13,000 feet in elevation (Smithsonian 1998), which is well above the transmission line height. Flight heights tend to be higher for migrating birds at night or with tailwinds than during daylight hours or with a headwind (Curry and Kerlinger 2004, Scanlon et al. 2010, Dolbeer 2006). Given these generalizations about avian migration, there may be an increased risk to piping plovers during spring migration when the prevailing winds are from the north/northwest and during daytime hours.

Potential impacts for piping plover are the same as those identified for the interior least turn and include potential collision, potential for impacts to nesting habitat, and potential disruption during nesting. The Project Route will not place structures within known nesting habit or designated critical habitat. The timing of construction at the Missouri River would be restricted such that construction activities would not be allowed during the nesting season from April 1 through August 15. To avoid potential impacts related to construction activities, construction at the Missouri River is anticipated to occur between November and March. Since piping plovers may use alkali wetland habitats for nesting, Minnkota proposes to conduct pre-construction surveys for active nesting piping plovers within the ROW. If active nesting areas are identified during the surveys, Minnkota proposes to maintain a 0.5-mile buffer from active piping plover nesting areas. These areas may be identified outside of the Missouri River channel, in isolated waterbodies, or in designated critical habitat. Because construction at the Missouri River will occur after August 15; Minnkota proposes a 0.5-mile buffer of active nesting areas within the Project ROW. Therefore, no indirect effects due to construction are anticipated.

**Pallid Sturgeon**

The Project Route crosses the Missouri River, which is habitat for the pallid sturgeon. The Project Route would span the Missouri River and no construction will occur within the Missouri River.. Minnkota proposes to place structures about 150 feet away from the river's existing bank to account for river flows that have the potential to erode the river's bank. No structures will be placed within the river channel. Helicopters will be employed to string transmission line wires across the Missouri River. No barges or boats will be used during construction, therefore propeller strikes to the pallid sturgeon are not anticipated and disturbance and displacement of the sturgeon during construction is anticipated to be minimal. No direct impacts are anticipated to the pallid sturgeon due to construction or operation of the transmission line.

The Project would utilize BMPs that would limit indirect impacts from sedimentation and erosion during construction, such as silt fence, straw bales, and revegetation. The Project would not change water temperature of the river. Minnkota would not refuel vehicles within 100 feet of the river's edge to minimize the potential for hazardous-materials spills reaching the river. No indirect impacts are anticipated to the pallid sturgeon due to construction or operation of the transmission line.

**Gray Wolf**

While the gray wolf may pass through the Project ROW, but viable gray wolf habitat does not occur in the Project ROW. It is unlikely that gray wolves would be present during construction and operation, with the possible exception of an occasional transient animal. If gray wolves enter the Project ROW during construction they could be struck by vehicles, but the chance of collisions is considered negligible, particularly since posted speed limits would be very low.

The Project Route would not have indirect effects on the gray wolf. In general, the Project vicinity and North Dakota do not provide suitable habitat for establishment of a viable wolf population. Any wolves that have occurred or may occur in the Project vicinity are rare, dispersing individuals from the core population in Minnesota, well to the east of the Project Route.

**Black-Footed Ferret**

Generally, the black-footed ferret population is susceptible to permanent loss of habitat, eradication of prairie dog towns (food source) and predation from raptors. Potential black-footed ferret reintroduction habitat may occur in portions of Oliver County. No records of black-footed ferret occurrences within the Project ROW have been documented in recent years and there are no reintroduced populations near the Project Route. The Project ROW does not cross any known prairie dog town that may be a potential food source for the black-footed ferret. In addition, Minnkota will design their structures per APLIC guidelines that will reduce the ability of raptors to perch on the structures. This may reduce the opportunities for raptors to perch on the structures to prey on the black-footed ferret, if a population was reintroduced to the Project ROW. No direct or indirect impacts are anticipated to the black-footed ferret due to construction or operation of a transmission line within the Project ROW.

**Piping Plover Critical Habitat**

The Project Route crosses the Missouri River, which is designated piping plover critical habitat. No direct or indirect impacts to critical habitat (sandbars) are expected as the transmission line will span the Missouri River. Line marking devices will be installed at this location to minimize the potential for collision with the transmission line.

### 5.16.3 Mitigation

Mitigation and minimization measures are expected to include:

- Designing and siting the Project Route according to APLIC guidelines for minimization of electrocution and collision.
- Marking both shield wires of the transmission line in an alternating pattern with bird-flight-diverters within 1 mile of suitable whooping crane habitat.
- Avoiding designated piping plover critical habitat at the Lake Williams area.
- Constructing the Missouri River crossing outside of the breeding and fledgling season for the interior least tern and piping plover. The USFWS reports that the breeding season for both species lasts from about April 1 through August 15.
- Conducting pre-construction surveys for active piping plover nesting areas within the ROW. If active nesting areas are identified during the surveys that are outside the Missouri River and designated critical habitat, Minnkota proposes to maintain a 0.5-mile buffer of the active piping plover nesting areas.
- Utilizing a three pole structure for the Missouri River span, which reduces the number of wire planes. The proposed structure will have two planes of wires – one (top) plane for the shield wires and a second (lower) plane for the conductors.
- Using a helicopter to string wires across the Missouri River, so that no construction equipment will be within the Missouri River.
- Avoiding placing structures within the Missouri River channel or on sandbars of the Missouri River where interior least tern and piping plover nesting could occur.
- Maintaining a distance of at least 330 feet from active eagle nests, or 660 feet if the activity will be visible from the nest.
- Avoiding direct impacts to wetlands, prairie, wooded draws or other sensitive habitat areas whenever feasible.
- Conducting tree and shrub clearing in the fall and winter prior to the nesting season. If clearing is not completed in the fall or winter before the breeding season, a qualified biologist would conduct surveys for active nesting birds prior to construction and provide a construction buffer.
- Replacing trees at a 2:1 mitigation ratio outside the Project ROW, per the Commission's requirements and subject to landowner approval.
- Avoid refueling vehicles within 100 feet of a waterway's edge to minimize the potential for hazardous materials spills reaching the waterway.
- Throughout the Project, Minnkota will utilize BMPs that will limit indirect impacts from sedimentation and erosion during construction, such as silt fence, straw bales, and revegetation.

## *5.17 Summary of Route Impacts*

**Table 5.17-1** summarizes temporary and permanent impacts to the resources discussed in Chapter 5. **Table 5.17-2** summarizes the appropriate mitigation for resources that will be impacted as a result Project construction.

**Table 5.17-1. Summary of Project ROW**

| Resource | | ROW | |
|---|---|---|---|
| Project Facility | Total Length (miles) | 250 | |
| | Total ROW Acres | 4,544 | |
| | Number of Structures | 1,335 | |
| Impact Acres | Acres of Temporary Impact | 1,021 | |
| | Acres of Permanent Impact | 3.4 | |
| | Acres of Woodland Conversion | 47 | |
| Homes | Count within 500 ft of the Transmission Facility | 10 – Occupied<br>1 – Vacant, no habitable | |
| Wetlands | Acres of Desktop and Field Reviewed Wetlands in the Project ROW | 543 | |
| | Wetland Impact | Temporary | Permanent |
| | | 110 ac | 2,256 sq ft |
| Land Cover | Impact Acres | Temporary | Permanent |
| | Cropland | 534.8 | 5.7 |
| | Shrubland | 183.0 | 0.3 |
| | Pasture | 180.6 | 0.8 |
| | Prairie | 158.0 | 0.5 |
| | Woodland | 0 | 47.0 |
| | Wetland | 78.0 | 0.2 |
| | Developed | 19.5 | 0.0 |
| | Barren/Sparse Vegetation | 1.1 | 0.0 |
| Resource Areas | Managed Resource Areas affected by the Project | Two<br>- Wilbur Boldt WMA<br>- Chain of Lakes Recreation Area | |
| Cultural | Archaeological Resources in ROW | - 21 sites in ROW<br>- 9 structures within 4 sites<br>- No impacts anticipated | |

| Resource | | ROW |
|---|---|---|
| | Architectural Properties in Architectural APE | - 36 architectural resources identified within the Architectural APE<br>- 10 eligible structures within the Architectural APE<br>- 1 structure will be visually impacted, but the impact will be mitigated through screening |
| Species | Federally Listed Species within ROW | 0 |
| | Federally Listed Species within 1 mile | 6 |
| | Sensitive Species within ROW (nests) | 2 |
| | Sensitive Species within 1 mile (including NHI, leks, nests, and bald eagles) | 54 |
| Infrastructure | Center Pivot Irrigation within ROW | 0 |
| | Communication Tower within ROW | 0 |
| | Airports within 1 Mile of Route Centerline | 1 |

**Table 5.17-2. Mitigation Summary**

| Resource | Impact | Mitigation |
|---|---|---|
| Demographics | Socioeconomic impacts are primarily positive due to increased expenditures during construction and the long term benefits of an increased tax base of the county due to transmission line tax. A nominal amount of land would be permanently removed from production due to the construction of the Project. The Project is not anticipated to result in an economic or social hardship to minority or low-income populations. A concern of residents living near existing or proposed transmission lines is how proximity to the line could affect the value of their property. | The Project is not expected to have negative economic impacts on local and regional economies. As such, no mitigation measures are proposed to address the socioeconomic impacts. The payments of taxes to the state, then allocated to the counties in which the transmission line and associated infrastructure are located, will have a positive impact. Easement payments to landowners will compensate landowners for the utility easement on their property. |
| Land Use | Approximately 5.7 acres of agricultural cropland (includes 4.2 acres of Restricted Tillage Area) will be permanently impacted due to the construction of the transmission line. The existing land use is primarily agricultural and would remain in agricultural use since the land under or adjacent to the line can still be used by the landowner.<br>10 occupied homes and 1 vacant, not habitable home within 500 of transmission facility.<br>One cemetery will be spanned by the Project Route and Minnkota has obtained | Minnkota is working with landowners and regulatory agencies to minimize impacts of the Project. To minimize impacts to landowners, Minnkota has agreed to the following mitigation measures:<br>-The exact location of structure sites, the Route, and other disturbed areas will be determined with landowner input, to the extent practicable.<br>-The minimum area necessary will be disturbed.<br>-Construction activities will be limited to the ROW, unless permission to access adjacent |

| Resource | Impact | Mitigation |
|---|---|---|
| | an overhang easement. | property is obtained from the landowner(s).<br>-Landowner compensation will be established by individual easements.<br>-Landowners will be compensated for crop damage caused by construction or operation and maintenance activities.<br>-Minnkota will obtain a waiver of the 500 ft setback |
| Public Services | No impacts are anticipated. | Proper safeguards will be implemented for construction and operation of the facility. The Project will have a positive effect on public services by providing improved reliability and capacity to meet the growing demands for electrical service in the Project Vicinity. |
| Human Health and Safety | At levels associated with high-voltage transmission lines, the Project will not have regular, temporary interference with implantable medical devices. No other EMF-related impacts to humans or animals are anticipated. There are no anticipated induced voltage or stray voltage impacts expected as a result of the construction or operation of the Project. No impacts to air quality due to the operation of the transmission line are anticipated. | Minnkota does not anticipate any affects to human health or safety; thus it is not anticipated that any mitigation will be necessary. Following construction, BMPs will be used to control fugitive dust during construction, including operating vehicles at reduced speeds and use of water and dust abatement methods. |
| Noise | Homes near the Project Route may experience short-term elevated noise levels and increased vehicle traffic during construction. However, no noise impacts are anticipated during Project operation. The closest home to the Project Route (49 feet) is Minnkota owned. The closest occupied structure to the Center Substation is about 5,380 feet away; the closest occupied structure to the Prairie Substation is about 2,880 feet away. No impacts to noise sensitive land uses are anticipated. | No long-term noise impacts are anticipated, thus, no mitigation will be necessary. Construction activities will generate noise that is short-term and intermittent. Noise impacts associated with construction will be mitigated in noise sensitive areas by limiting the hours of work to daytime hours. Heavy equipment used in construction will be equipped with sound attenuation devices, such as mufflers, to minimize the daytime noise levels. |
| Visual | The transmission line would be evident to individuals traveling on adjacent roads as well as residences and landowners that live in close proximity to the transmission line and substations. | The Project Route minimizes the number of residences potentially impacted by the line. Minnkota routed the Project along field lines away from residences to the extent practicable. The Project utilizes single pole, self weathering structures. |
| Cultural and Archaeological | No impacts to archaeological sites are anticipated. One architectural property will be visually impacted. | Cultural and archaeological surveys will be completed prior to construction, Minnkota will follow steps outlined in a PA to determine eligibility and mitigation of adverse effects. The architectural property will be mitigated through screening as documented in a Treatment Plan that is under review. |

| Resource | Impact | Mitigation |
|---|---|---|
| Recreation Resources | Impacts to recreational resources are primarily visual, and limited to individuals using the resources. The Wilbur Boldt WMA will be spanned by the Project. One structure will be located within the Chain of Lakes Recreation Area (McClusky Canal). The Project Route will span three trails. PLOTS parcels and USFWS easements will be crossed by the Project Route. | Minnkota will route the transmission line along field breaks and section lines to avoid state and federal managed lands. Visual impacts will be minimized by placement of structures away from these features to the extent possible. Access to trails, PLOTS, and USFWS easements will be maintained and recreational activity may continue. Minnkota will obtain appropriate approvals and permits. |
| Land Based Economies | The permanent agricultural cropland that will be converted due to the Project will be approximately 5.7 acres (includes Restricted Tillage Area). | Minnkota will work with landowners to minimize impacts to all farming and grazing operations along the Project Route. In the event that Minnkota encounters drain tile not previously identified by the landowner, Minnkota will work with landowner to repair the tile so that its function is restored. |
| Soils | Approximately 1,021 acres of temporary impacts and about 3 acres of permanent impacts are anticipated. | BMPs for erosion and sediment control will be utilized to minimize wind and water erosion along the route. Only land needed for the transmission line structures will be permanently impacted. Temporarily disturbed areas that are not cultivated will be revegetated. |
| Geologic and Groundwater Resources | No impacts to geologic and groundwater resources are anticipated. | No mitigation measures are necessary. |
| Surface Water and Floodplain Resources | No direct impacts are anticipated to rivers, streams, or drainageways. About 0.1 acres (5,174 sq ft) of floodplain will be permanently impacted. | To minimize indirect impacts during construction an NPDES permit and SWPPP will be prepared and submitted to the North Dakota Department of Health. Minnkota will span all rivers and streams to the extent practicable. Minnkota will apply for the appropriate approvals for floodplain impacts. No structures will be placed within a regulatory floodway. |
| Wetlands | Preliminary structure locations indicate 2,256 square feet (0.03 ac) of permanent wetland impacts. | Minnkota will work with the USACE and USFWS to initiate the permitting process and to identify appropriate mitigation, if necessary. |
| Vegetation | A total of approximately 5.7 acres (including Restricted Tillage Area) of cropland will be permanently impacted by the transmission line construction and up to 47 acres of woodland will be converted to shrubland or grassland. A total of about 6.6 acres of impaired or vulnerable terrestrial communities will be permanently impacted by the Project Route. | Minnkota will use BMPs during construction and operation to minimize impacts. Impacts to individual trees or shrubs would be replaced at a ratio of 2:1 outside the Project ROW. Temporarily disturbed areas will be reseeded. |

| Resource | Impact | Mitigation |
|---|---|---|
| Wildlife | Impacts to wildlife populations are expected to be minimal. The potential for avian collisions with the Project Route exists. | A variety of mitigation measures would be implemented, as discussed in Section 5.15.3. Some examples of wildlife mitigation measures include continued consultation with USFWS, designing the transmission line following APLIC standards, conducting preconstruction wetland and woodland surveys, and implementing erosion control measures. |
| Rare and Unique Natural Resources | Impacts to rare and unique natural resources are not anticipated. | Minnkota has committed to marking of both shield wires in an alternating pattern in select areas, designed the Project per APLIC guidelines, and will schedule construction in specific areas in accordance with USFWS recommendations. |

# 6.0 Identification of Permits/Approvals

Minnkota is required to obtain approvals from a variety of federal, state, and local agencies prior to constructing the Project. Agencies with primary approval/permitting authority include RUS and the Commission. **Table 6.0-1** identifies permits, approvals, and other project coordination that may be needed with federal agencies, tribal governments, State of North Dakota, counties, and townships. This listing of regulatory requirements is subject to change as Project development continues. In addition, Minnkota's continued public and agency coordination is outlined in Appendix G.

**Table 6.0-1. Potential Required Permits and Approvals**

| Agency | Type of Permit, Regulatory Compliance, or Coordination | Need |
|---|---|---|
| Federal | | |
| Rural Utilities Service | Approval of Financial Assistance | Approval of Financial Assistance |
| | NEPA Compliance, Finding of No Significant Impact | Provide final decision for Environmental Assessment |
| | Section 7 of the Endangered Species Act | Finalize consultation with USFWS |
| | Section 106 of the National Historic Preservation Act Coordination | Implement Programmatic Agreement |
| | Native American Consultation | Implement Programmatic Agreement |
| U.S. Fish and Wildlife Service | Section 7 of the Endangered Species Act, Migratory Bird Treaty Act of 1918, and Bald and Golden Eagle Protection Act of 1972 | Section 7 Consultation under NEPA for Special Use Permit |
| | Special Use Permit (SUP) and Compatibility Determination | If construction in wetlands within wetland easements or in grassland easements, then compatibility analysis is required. Special Use Permit needed if temporary disturbance to land subject to a grassland easement or wetland subject to a wetland easement. |
| U.S. Army Corps of Engineers | Section 404 of the Clean Water Act | Nationwide Permit 12 required for dredging or fill in jurisdictional waters of the United States for utility line projects. |
| | Section 10 of the Rivers and Harbors Act of 1899 | Section 10 Permit - Letter of Permission required for the Missouri River crossing. |
| | Pre-Construction Notification | Pre-Construction Notification need for the Nationwide Permit 12 and Section 10 Letter of Permission |
| Federal Aviation Administration | FAA Form 7460-1, Notice of Proposed Construction or Alteration | The FAA must confirm that construction of the Project does not constitute a hazard to air navigation. |
| | FAA Form 7460-2 - Notice of Actual Construction or Alteration | Notifies FAA of actual constructed or altered structures. |

| Agency | Type of Permit, Regulatory Compliance, or Coordination | Need |
|---|---|---|
| | FAA Form 7461-1, Notice of Proposed Construction Hazard Determination | Notifies FAA of structures that might affect navigable airspace. Form requires proposed markings and lighting. FAA must review possible impacts to air safety and navigation, as well as the potential for adverse effects on radar systems. |
| Department of Agriculture – Natural Resources Conservation Service | Farmland Conversion Form - Form AD-1006 | Farmland conversion impact rating. |
| Environmental Protection Agency | Spill Prevention Control and Countermeasure (SPCC) Plan | Required if the substation facility has greater than 1,320 gallons of oil. Current SPCC Plans will be revised as necessary. A copy of the plan will be maintained on file with the substation's owner/operator and will be reviewed by the certifying engineer every five years. |
| U.S. Department of the Interior - Bureau of Reclamation | Special Use Permit (SUP) | Needed for structures located within the Chain of Lakes Recreation Area and McClusky Canal lands in Sheridan County. |
| State | | |
| Public Service Commission | Certificate of Corridor Compatibility | Required prior to construction of a transmission facility; designates corridor within which a route may be located. |
| | Route Permit | Required prior to construction of a transmission facility; designates route location within approved corridor. |
| Department of Health | Section 401 Water Quality Certification | Required for fill in jurisdictional waters of the United States. |
| | NPDES Permit: General Construction Storm Water | Required for disturbance of over 1 acre of land. Must prepare a SWPPP. |
| Division of Emergency Management | Emergency Planning and Community Right-to-Know Act (EPCRA) Tier II report | Required for owner/operators of facilities containing hazardous materials. A copy of the report must be filed annually by March 1st. |
| Parks and Recreation | Natural Heritage Inventory | Compliance with NDCC § 20.1-02-05 – Management programs have been established for protection of threatened and endangered species in North Dakota. North Dakota does not have a list of threatened and endangered species. |

| Agency | Type of Permit, Regulatory Compliance, or Coordination | Need |
|---|---|---|
| State Water Commission – Office of State Engineer | State Sovereign Lands Permit | If a project's proposed construction activities could impact an island or bed of a navigable water or stream, a Sovereign Lands Permit must be obtained from the North Dakota State Water Commission, Office of the State Engineer. |
| | Conditional Water Permit | Water appropriation. |
| State Historical Society | Section 106 of the National Historic Preservation Act Coordination | Compliance with NDCC §§ 55-03-01 and 55-03-01.1 and consultation under Section 106 of the NHPA is required for projects considered a federal undertaking (i.e., federal funding, USACE). |
| | Permit to Investigate Effects on Cultural Resources | Compliance with NDCC Ch 55-03 to assess the potential project effects to cultural resources. |
| North Dakota Highway Patrol | Overheight/Overweight Permit | Permit required for hauling construction equipment and materials on state highways. Contractors will obtain as necessary. |
| State Land Department | Right-of-Way Permit | Permit to obtain an easement on a state surface tract. |
| Department of Transportation | Road Approach/Access Permit | Permit required for construction of access roads from state highways. |
| | Utility Permit/Risk Management Documents | Permit required for utility crossings on state highway ROW. |
| Local | | |
| Counties – Burleigh, Eddy (some townships also require permits), Foster (one township requires permit), Griggs, McLean, Oliver, Sheridan (one township requires permit), Steele, Nelson | Conditional Use Permits (See Appendix G) | Permit may be required for project construction depending on zoning regulations. |
| | Building Permit | Permit may be required for substation construction and generation outlet line. |
| | Haul Road Agreement | Permit may be required for hauling construction equipment and materials on county roads. |
| | Utility Permit | Permit required for utility crossings on county road ROW. |
| Grand Forks County | Floodplain approval | Elevation certificates are required for any building in the floodplain |

| Agency | Type of Permit, Regulatory Compliance, or Coordination | Need |
|---|---|---|
| Townships – Painted Woods Twp and Wilson Twp – Burleigh Co. Addie Twp – Griggs Co. Sharon Twp and Franklin Twp. – Steele Co. Fairfield Twp, Logan Twp and Loretta Twp – Grand Forks Co. | Conditional Use Permits (See Appendix G) | Permit may be required for project construction depending on zoning regulations. |
| Cities | Building Permit | Permit required if construction within municipal boundary. |
| Miscellaneous | | |
| Railway Companies | Temporary Occupancy Permit | Required for any work within railroad ROW. |
| | Wire Line Crossing or Longitudinal Communication and Electric Permit | Required for locations where Project crosses or is within railroad ROW. |
| Pipeline Companies | Utility Crossing Permit | Permit required to cross existing pipeline facilities. |
| Transmission Line Utility Companies | Utility Crossing Permission | Permit required to cross existing transmission facilities. |

# 7.0 Factors Considered

Section 49-22-09 of the North Dakota Century Code (within the North Dakota Energy Conversion and Transmission Facility Siting Act) lists 11 factors to guide the Commission in evaluation of a route. In addition, Minnkota's continued public and agency coordination is outlined in Appendix G.

## *7.1 Public Health and Welfare, Natural Resources, and the Environment*

Section 5.0 discusses the research and investigations relating to the effects of the proposed facility on public health and welfare, natural resources, and the environment. The effects and mitigation in relation to the Project Route are discussed under the impacts and mitigation subheadings within Section 5.0. Minnkota took into consideration public, agency, and tribal input and concerns when selecting the Project Route. Minnkota will minimize impacts to landowners, agricultural practices, the Missouri River crossing, cultural resources, wildlife, and environmental features.

## *7.2 Technologies to Minimize Adverse Environmental Effects*

Minnkota will utilize the most current technologies that minimize impacts to the environment. The structures proposed for the Project are the most appropriate technologies to minimize adverse environmental effects. In addition, utilizing existing substation minimizes adverse environmental effects.

## *7.3 Potential for Beneficial Uses of Waste Energy*

This factor is not applicable to this Project.

## *7.4 Unavoidable Adverse Environmental Effects*

Unavoidable adverse environmental effects include the visual impacts and physical impacts to the land (primarily agricultural land) associated with the Project. Minnkota will implement measures as described in Section 5.0 and as identified by regulatory agencies to minimize these unavoidable adverse environmental effects.

## *7.5 Alternatives to the Proposed Route*

As previously discussed, several alternatives to the Project were identified by Minnkota and reviewed during the federal scoping process carried out by RUS. The AES discussed system and project alternatives. Appendix A of the Corridor Certificate Application provides a copy of the AES. The MCS and EA analyzed routing alternatives. Appendix B of the Corridor Certificate Application provides a copy of the MCS. Appendix D of the Corridor Certificate Application provides a copy of the EA. The Project Route presented in this Route Permit Application depicts the best location from an economic, landowner, environmental, and PSC route criteria standpoint for a 345 kV line from Center to Grand Forks, North Dakota.

## *7.6 Irreversible and Irretrievable Commitment of Natural Resources for the Route*

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of

an affected resource that cannot be restored as a result of the action. There are few commitments of resources associated with this Project that are irreversible and irretrievable, but include those resources primarily related to construction. Construction resources that will be used include aggregate resources, concrete, steel, and hydrocarbon fuel.

## *7.7 Direct and Indirect Economic Impacts of the Proposed Facility*

Direct economic impacts include the impacts associated with removing agricultural land from production due to the construction and operation of the Project. In general, agricultural areas surrounding each structure can still be farmed, and landowners will be compensated for the land occupied by the Project.

The remaining direct and indirect economic impacts are primarily positive. To the extent that local sub-contractors are used for portions of the construction, total wages and salaries paid to contractors and workers will contribute to the total personal income of the region. Additional personal income will be generated for residents in the county and the state by circulation and recirculation of dollars paid out by Minnkota as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies, and other products and services benefit businesses in the counties and the state.

## *7.8 Existing Development Plans of the State, Local Government, and Private Entities at or in the Vicinity of the Route*

No conflicts are anticipated with existing state and local government and private entities' development plans. Minnkota is working with the Grand Forks International Airport, UND Aerospace, and the FAA to minimize and avoid impacts associated with the airport expansion. Minnkota will obtain the necessary permits from local governmental units for the Project. Minnkota is working with three wind development companies to avoid substantive impacts to their potential wind energy projects.

## *7.9 Effect on Cultural Resources*

No impacts to identified archaeological resources are anticipated. One architectural property will have visual affects, which will be mitigated through screening. The mitigation is detailed in a Treatment Plan that is being reviewed by the SHPO and RUS. Minnkota will file the Treatment Plan with the Commission following agency concurrence. Minnkota has completed a Class I Literature Search for the Project Route. With consultation from SHPO and RUS, Minnkota developed a model that identified areas that may have a high, moderate, or low probability of containing cultural resource sites. Minnkota is in the process of conducting a Class III cultural resources inventory of the high probability areas along the route. The construction contractor will be required to comply with environmental, cultural, archaeological, or historical guidelines as will be set forth through Section 106 requirements and the PA, which are currently in negotiations. It is anticipated that the route will avoid all archaeological sites and archaeological and architectural sites will be treated in accordance with the PA. Action will include notification and working with the appropriate authorities.

## *7.10 Effect on Biological Resources*

Minnkota has implemented measures to avoid and minimize effects to biological resources in the vicinity of the Project Route. The impact of the Project on vegetation, wildlife and sensitive species is expected to be minimal. The Project will include measures to minimize impacts to avian species.

## *7.11 Problems Raised by Agencies*

At the Commission's request, Minnkota will provide electronic copies of agency mailings. Appendix H of the Corridor Certificate Application included a list of the federal agencies, tribes, state agencies, and county commissioners that have been notified about the Project. For those agencies that responded, their concerns are summarized below and a copy of their response letter was included in Appendix I of the Corridor Certificate Application.

**Federal Aviation Administration**

In addition to outlining permitting requirements, the FAA recommended in their June 4, 2009 response letter that the design, construction, operation, and any wetland and/or wildlife mitigation associated with the Project not create a hazardous wildlife attractant to surrounding airports.

The Project will not create hazardous wildlife attractants for nearby airports. Minnkota will obtain the appropriate permits from the FAA (see Sections 5.2, 5.3 and 6.0).

**North Dakota Game and Fish Department**

On May 26, 2009, NDGF commented that its primary concern is the possible disturbance of native prairie and wetland areas during construction. They asked that wetlands be avoided to the extent possible, above-ground appurtenances not be placed in wetland areas, and disturbed areas be reclaimed to pre-project conditions. NDGF also recommended that overhead lines be marked when placed over perennial streams or sited in proximity to large wetland complexes to minimize possible avian impacts. NDGF noted that a Special Use Permit will be required to cross WMA land.

Minnkota will not impact WMA land so a permit from NDGF will not be necessary. Minnkota is discussing an overhang easement with the NDGF for the Wilbur Boldt WMA. Minnkota will minimize native prairie impacts and span wetlands to the extent possible and reclaim disturbed areas. As described in Section 5.16.3, the shield wires will be marked, as proposed in the Biological Assessment submitted to the USFWS, for sections of the Project near suitable whooping crane habitat.

**North Dakota Department of Transportation**

North Dakota Department of Transportation (DOT) noted on May 13, 2009 that if construction work is necessary in highway ROWs, appropriate permits and risk management documents will need to be obtained from DOT. Minnkota will obtain the appropriate permits and risk management documents from DOT (see Section 5.3).

**Office of the State Engineer**

On May 1, 2009, the Office of the State Engineer noted several bodies of water spanned by the Project contain Sovereign Lands of the State. Any construction work that crosses or is below the Ordinary High Water Mark for the Missouri River, Sheyenne River, and the James River will require a Sovereign Lands Permit. Ordinary High Water Mark is defined as "that line below which the action of the water is frequent enough either to prevent the growth of vegetation or to restrict its growth to predominantly wetland species. Islands in navigable waters are considered to be below the ordinary high watermark in their entirety" (NDAC Ch. 89-10-01). Minnkota will obtain Sovereign Lands Permits from the Office of the State Engineer, as addressed in Section 6.0.

**North Dakota Parks and Recreation Department**

NDPR noted on May 26, 2009 that the Project through Oliver and McLean counties includes properties containing significant natural, historic, scenic, and cultural resources. NDPR recommended selecting the southern corridor identified on the preliminary corridor map, avoiding Cross Ranch Nature Preserve, and obtaining appropriate permits to cross any federal Land and Water Conservation Fund properties. NDPR also stated its North Dakota Natural Heritage Inventory biological conservation database information is not based on a comprehensive inventory so there may be species of concern or otherwise significant ecological communities in the area that are not represented in the database, the Project should be accomplished with minimal impacts and efforts will be made to ensure critical habitats are not disturbed in order to help secure rare species conservation in North Dakota, and any disturbed areas will be reclaimed using native species.

Minnkota did utilize the southern corridor identified on the preliminary corridor map, the Project Route does not cross the Cross Ranch Nature Preserve, and all federal Land and Water Conservation Fund properties have been avoided. Sections 5.15.3 and 5.16.3 discuss numerous mitigation measures for wildlife and habitat conservation. Minnkota will reseed non-cultivated areas disturbed by construction activities with vegetation similar to that which was removed.

**Natural Resources Conservation Service**

NRCS noted on May 5, 2009 that the Project may be subject to the FPPA. Minnkota will file a Farmland Conversion Form (Form AD-1006) with NRCS.

NRCS recommended that impacts to wetlands be avoided. Minnkota will span wetlands to the extent possible and obtain permits from appropriate agencies for wetland impacts (see Sections 5.10 and 5.13).

**U.S. Army Corps of Engineers**

USACE responded on May 11, 2009, that permits should be requested if work will be done in navigable waters (under Section 10 of the Rivers and Harbors Act) or Waters of the United States (under Section 404 of the Clean Water Act). Minnkota will span wetlands to the extent possible and obtain permits from appropriate agencies for wetland impacts and crossings of navigable waters (see Section 5.13).

**U.S. Fish and Wildlife Service**

USFWS concerns were expressed in its June 2, 2009 letter and at agency meetings with Minnkota. The letter (Appendix I of Corridor Certificate Application) noted USFWS concerns related to potential impacts to USFWS trust resources, including migratory birds, federally listed threatened and endangered species of plants and animals and their habitats, bald and golden eagles, and units of the National Wildlife Refuge system. USFWS also recommended numerous conservation measures.

Minnkota continues to work with the USFWS to develop suitable mitigation measures for impacts to wetland and grassland easements and to work with the RUS to meet USFWS minimization guidelines. Sections 5.15.3 and 5.16.3 discuss Minnkota's mitigation measures for wildlife and habitat conservation.

# 8.0 Qualifications of Contributors

| Name/Project Role | Education and Professional Experience |
|---|---|
| Michelle Bissonnette<br>Energy Environmental Practice Leader<br>HDR Engineering, Inc. | Michelle Bissonnette is a Senior Project Manager, Vice President of the Environmental Power and Energy Practice and on HDR's National Power and Energy leadership team.<br><br>The majority of Michelle's consulting career has been spent in the power and energy field. Her experience includes environmental assessment, public involvement, siting, and permitting work on a variety of utility projects from power generation to transmission and distribution as well as wind, pipeline and combustion turbine projects. In her current position, she manages teams that conduct environmental assessments and permitting for transmission line, wind power, and energy projects. She also coordinates national power and energy projects for HDR's environmental groups.<br><br>B.S., Landscape Architecture, University of Minnesota, 1982<br>Foreign Studies/French Minor, University of Grenoble, France, 1977 |
| Brian Hunker<br>Project Manager/Environmental Scientist<br>HDR Engineering, Inc. | Brian Hunker is an Environmental Scientist with a diverse project background in environmental documentation and permitting. He has been involved in the preparation of Environmental Assessments, Environmental Impact Statements, and other NEPA-related and environmental permitting documents for local, state, and federal power and energy projects across the United States.<br><br>B.S., Environmental Sciences/Studies (Zoology and Biological Aspects of Conservation), University of Wisconsin-Madison, 1999 |
| Lydia Nelson<br>Senior Environmental Scientist<br>HDR Engineering, Inc. | Lydia Nelson has more that 25 years of experience as an environmental project manager and project scientist. Ms. Nelson has managed or helped to develop NEPA documents for numerous federal agencies, including the RUS, NPS, USFS, FTA and FHWA. She routinely works with federal, state, and local agencies in the development of permit applications such as Section 404, Section 10, Section 7, state route and siting applications, NPDES, and local conditional use permits. Ms. Nelson has extensive experience in wetland delineation, functional assessment, wetland mitigation design, water resource evaluation, prime farmlands, hydric soils, wildlife habitat, and endangered species. Ms. Nelson performs quality control/quality assurance review for large NEPA documents and permit applications.<br><br>B.S., Environmental Sciences/Studies (Soil Science), Oregon State University, 1983<br>B.S., Biology, Central Michigan University, 1981 |
| Patricia Terhaar, PG, CPG<br>Senior Project Manager<br>HDR Engineering, Inc. | Ms. Terhaar has 24 years of environmental consulting and project management experience. She has managed or worked as part of multi-disciplinary teams in the preparation of documents supporting NEPA compliance for energy projects across the United States. Ms. Terhaar has also managed and performed phase I/II site assessments, hydrogeologic investigations, and remedial investigations/feasibility studies associated with landfills, hazardous waste sites, chemical and petroleum spills, asbestos, and brownfields.<br><br>M.S., Geology, Texas A&M University, 1985<br>B.S., Earth Science, Montana State University, 1983 |

| Name/Project Role | Education and Professional Experience |
|---|---|
| Emily Siedschlag<br>Environmental Scientist/Public Involvement Specialist<br>HDR Engineering, Inc. | Ms. Siedschlag has four years of experience in environmental consulting including wetland delineations, biological surveys, and data analysis. She has experience developing survey protocols, coordinating field surveys and discussing mitigation and monitoring prior to project construction. Ms. Siedschlag has experience working with federal, state, and local agencies in the development of NEPA documents and permit applications.<br><br>B.A., Environmental Studies (Geography), Gustavus Adolphus College, 2006 |
| Ann Fossum<br>GIS Specialist<br>HDR Engineering, Inc. | Ms. Fossum has eight years of experience with GIS and more than five years of experience as a GIS specialist, including experience with spatial analysis, editing, data creation, conversion, map production, modeling, and GPS data collection and processing. For the last two years, she has applied her GIS knowledge to assist in the development of power transmission and wind farm projects throughout the United States, including NEPA and permit application document support. She has experience with ArcGIS, MapInfo, MicroStation and various other GIS software and utilities.<br><br>B.A., Geography, Gustavus Adolphus College, 2004 |
| Kelly Garvey<br>Environmental Project Manager<br>HDR Engineering, Inc. | Ms. Garvey has 25 years of experience in Environmental Permitting and Environmental Review. She has been involved in preparation of Environmental Impact Statements, Environmental Assessments and Environmental permits for a wide variety industrial and municipal projects. Ms Garvey has been involved with state, federal and local governments in developing environmental documents.<br><br>Associates in Applied Science in Water Quality, Vermilion Community College, Ely Minnesota, 1982 |
| Mollie M. Smith<br>Attorney<br>Fredrikson & Byron, P.A. | Ms. Smith is a shareholder in Fredrikson & Byron's Litigation, Oil & Gas, Transmission, Renewable Energy and Condemnation & Eminent Domain Groups. Ms. Smith assists clients with oil and gas litigation matters; wind farm, transmission line and pipeline permitting matters; and condemnation/eminent domain matters.<br><br>University of Minnesota Law School, J.D., 2004<br>Colorado State University, M.A., 2000<br>Northern State University, B.A., 1997 |
| Mike Hennes<br>System Projects Manager<br>Minnkota Power Cooperative, Inc. | Mr. Hennes has more than twenty years of utility engineering and project management experience. Mr. Hennes has also served as an electrical engineer, project engineer and Substation Engineering Manager while working for Minnkota.<br><br>B.S., Electrical Engineering. University of North Dakota, 1993<br>B.S., Engineering Management. University of North Dakota, 1993<br>A.A.S., Electronics Technology, North Dakota College of Science, 1975 |

| Name/Project Role | Education and Professional Experience |
|---|---|
| John T. Graves, P.E.<br>Environmental Manager<br>Minnkota Power Cooperative, Inc. | Mr. Graves is a registered Professional Engineer with over 30 years experience in the environmental area for the utility and government sectors. Mr. Graves has served on multi-company permitting teams for projects while employed with Minnkota Power Cooperative Inc. as the Environmental Manager.<br><br>B.S. Mechanical Engineering, University of North Dakota, 1972 |

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