minnesota power
AN ALLETE COMPANY

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December 11, 2009

Darrell Nitschke
Executive Secretary
North Dakota Public Service Commission
600 E. Boulevard Ave., Dept. 408
Bismarck, North Dakota 58505-0480

Re: Amendment and Supplement Information to Application for
Certificate of Corridor Compatibility and Route Permit
Case Number PU-09-587

Dear Mr. Nitschke:

Enclosed are an original and ten copies of an Amendment and Supplemental Information to Minnesota Power's Certificate of Corridor Compatibility and Route Permit Application for the proposed Bison I Project Transmission Line in Oliver and Morton counties. Included in this document is an amendment to the corridor and proposed route in the vicinity of BNI's operations, an additional agency consultation letter from the State Historic Preservation Office and transmission structure plan and profile drawings.

Please do not hesitate to contact me at the number below should you have any questions.

Sincerely,

David R. Moeller

kl
Enc.

cc: Jim Atkinson, Minnesota Power
Ron Gullicks, Minnesota Power
Todd Mattson, HDR Engineering, Inc.
Lydia Nelson, HDR Engineering, Inc.

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AMENDMENT AND SUPPLEMENT INTRODUCTION

In October 2009, Minnesota Power (MP), an operating division of ALLETE, Inc., submitted an Application for a Certificate of Corridor Compatibility and a Route Permit (October 2009 Application) to construct a 230 kilovolt (kV) overhead electrical transmission line from the proposed 34.5/230 kV Bison Substation (Project Substation) in Morton County to the existing 230 kV Square Butte Substation in Oliver County near Center, ND (the Route). As described in the October 2009 Application, the Bison I Wind Project Transmission Line allows the Bison I Wind Project (Case No. PU-09-151) and the BNI Wind Project (Case No. PU-08-848) to transmit electricity to the existing 230 kV Square Butte Substation.

Since the October 2009 Application was filed, an approximate 3-mile route revision for the Bison I Wind Project Transmission Line occurred. The revised route segment is located in T142N R84W Sections 34, 35, 36; and T142N R83W Section 31. The revised route segment is necessary to ensure that the transmission line does not impede the safe and efficient movement of BNI Coal's largest dragline.

The revised route segment results in minor changes in the October 2009 Application. The intent of this filing is to both amend and supplement the October 2009 Application; amended because the transmission line length, location and impacts have slightly changed as a result of the revised route segment, and supplemented because this filing includes pole locations, which the previous filing did not include. MP asks that the North Dakota Public Service Commission (PSC) use both the October 2009 Application and this December 2009 Amendment (Amendment) in their review of the Bison I Wind Project Transmission Line.

This Amendment includes:

- A copy of the October 2009 Application text and figures that require changes due to the revised route segment. The revised text is **bolded and underlined.** This Amendment follows the same table of contents and section numbering as the October 2009 Application.
- Appendix A has been updated to reflect the revised route segment.MP requests that the PSC refer to the October 2009 Application for Appendix B and C.
- Appendix D (new) includes a copy of December 2009 State Historic Preservation Office (SHOP) correspondence.
- Appendix E (new) includes the Plan and Profile which shows pole locations for the Bison I Wind Project Transmission Line.

1.0 INTRODUCTION

Minnesota Power (MP), an operating division of ALLETE, Inc., submits this Application for a Certificate of Corridor Compatibility (Corridor Certificate) and a Route Permit to construct a 230 kilovolt (kV) overhead electrical transmission line from the proposed 34.5/230 kV Bison Substation (Project Substation) in Morton County to the existing 230 kV Square Butte Substation in Oliver County near Center, ND (the Route).

The Project Substation is included in Minnesota Power's application for a Certificate of Site Compatibility for the Bison I Wind Project Case No. PU-09-151. This 76 megawatt (MW) wind project is located on approximately 15 square miles in Morton and Oliver counties, North Dakota (Figure 1). The BNI Wind Project's Substation, which is included in MP's application for a Certificate of Site Compatibility for the BNI Wind Project Case No. PU-08-848, will also tie into the Route. **A 125 MW wind project, it is located on approximately 10 square miles of reclaimed land previously mined by BNI Coal, Ltd. in Oliver County near Center, ND. The BNI Wind Project site application will be filed with the North Dakota Public Service Commission (PSC) early in 2010.** The proposed Route allows the Bison I Wind Project and the BNI Wind Project to transmit electricity to the existing 230 kV Square Butte Substation. While this Application focuses on the Route, the Bison I and BNI wind projects and the Route are collectively referred to as the "Project" throughout this Application.

MP provides retail electric service to northeastern Minnesota and wholesale service to 16 municipal customers in Minnesota and two private utilities in Wisconsin. MP has historically maintained an energy resource portfolio of coal, hydro, and biomass. In an effort to meet Minnesota's Renewable Energy Standard (Minn. Stat. § 216B.1691) and diversify its energy resource portfolio, MP has been implementing a renewable development plan that began with 98.6 MW of purchased wind energy from the Oliver I and II Wind Energy Centers in Oliver County, North Dakota. MP's next major project was construction in 2007 and 2008 of the Taconite Ridge I Wind Energy Center (25 MW), located in northeastern Minnesota. Taconite Ridge I began commercial operation in June 2008. Over the past several years, MP engaged in extensive development efforts to identify technically and economically viable renewable projects. MP is committed to minimizing the environmental impact of its facilities.

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 requires an application for a Corridor Certificate and a Route Permit to meet the criteria set forth in North Dakota Century Code (NDCC) 49-22. The siting of a transmission facility is to be made in an orderly manner compatible with environmental preservation and the efficient use of resources (NDCC 49-22-02).

To the extent available, MP has presented information required by the North Dakota Energy Conversion and Transmission Facility Siting Act. MP has considered exclusion areas, avoidance areas, the selection criteria, and the policy criteria in the design of the Route. In addition, sufficient transmission line design and technical information has been provided for a thorough evaluation of the reasonableness of the Corridor studied and the proposed Route. MP's policy is to locate and design the proposed transmission line by minimizing environmental impacts and utilizing existing corridors.

Tables 1-1 and 1-2 outline the information required to fulfill the requirements for a Corridor Certificate and Route Permit with the PSC using the PSC Guidelines and identifying where these requirements are addressed in this document.

1.1.1 Waiver of Procedures and Time Schedules

MP submits this Application for a Waiver of Procedures and Time Schedules and consolidated applications for a Corridor Certificate and Route Permit (collectively, Application) for purposes of siting and constructing an approximately 22.1 mile 230 kV transmission facility. By this Application, MP requests that the PSC, pursuant to NDCC Section 49-22-07.2, waive the following requirements:

1. That the PSC hold a single consolidated hearing on this waiver request and the Consolidated Application for a Certificate of Corridor Compatibility and Route Permit, rather than separate hearings as may be required by NDCC Sections 49-22-08 & -08.1, 49-22-13, and North Dakota Administrative Code (NDAC) Section 69-06-01-02. MP also requests that the PSC shorten the three-month period specified in NDCC Section 49-22-08(5) and the six-month period specified in NDCC Section 49-22-08.1(5).
2. That the PSC waive the requirements of NDCC Section 49-22-08 and NDCC Section 49-22-08.1 insofar as these sections may require the separate filing of applications for a Corridor Certificate and a Route Permit, and insofar as they require the publication of notices of filing applications.
3. That the PSC waive requirements for Mylar maps and stereo-pair aerial photographs as set forth in the PSC's Application Guidelines for a Corridor Certificate and a Route Permit. Geographic Information System (GIS) maps are provided in the Application.

The PSC's Application Guidelines for Waiver of Procedures and Time Schedules require a facility description, need for, cost of, and justification for the request for waiver, together with evidence that the project will produce minimal adverse effects. As demonstrated in the Application, and as summarized below, MP's Waiver Request and the issuance of a Corridor Certificate and Route Permit is justified, as the proposed facility is of such design, location, and purpose that it will produce minimal adverse effects.

Description

MP proposes to construct, own, and operate an approximately 22.1 mile, 230,000 volt (230 kV), three-phase alternating current electric transmission line from the proposed 34.5/230 kV Bison Substation located in Section 4 of T140N, R86W, to the existing 230 kV Square Butte Substation in Section 33 of T142N, R83W. The purpose of the transmission line is to transmit the energy generated by the proposed Bison I and BNI wind projects to the transmission system. Electrical utilities such as MP are instrumental in meeting regional energy needs, stabilizing energy costs, and enhancing energy reliability. North Dakota has a unique opportunity to help meet these energy needs with clean, efficient, renewable energy. The Project offers North Dakota and the surrounding region the opportunity to add to capacity adequacy requirements, stabilize wholesale power prices, and provide electricity from a clean, cost-effective renewable energy generation facility. MP intends for the Project to be a significant source of energy for meeting the region's needs over the next 35 years.

A description of the Project is described in greater detail throughout the Application.

Need

The need for the transmission line and how it will further the public interest is described in greater detail in section 2.0 of the Application.

Cost

The transmission line is estimated to cost approximately $13,000,000.

Justification for Waiver

Waivers of timelines and procedures are needed in order to prevent potentially significant delays in this project. As set forth in section 1.3 of the Application, MP anticipates beginning construction of the transmission line in the 2nd quarter of 2010 and also needs to have the transmission line energized to allow the Bison I Wind Project to be in-service on schedule in late 2010. Section 49-22-07.2 of the Act provides that the PSC may waive procedures and time schedules upon a finding that "the proposed facility is of such length, design, location, or purpose that it will produce minimal adverse effects." Based upon the thorough investigation and analysis set forth in the Application, waivers are appropriate because the proposed facility will produce minimal adverse effects.

In determining whether the proposed facility will result in adverse impacts on the environment, MP evaluated the transmission line using the criteria set forth in the Act, the Rules, and the PSC's Guidelines for Energy Conversion and Transmission Facility Siting (Guidelines). MP evaluated the impacts of the transmission line considering the siting criteria laid out in NDAC 69-06-08 (section 3.0 of the Application) and the factors to be considered in NDCC Section 49-22-09 (section 8.0 of the Application). Impacts associated with the transmission line are summarized in section 5.17 of the Application. Based upon this evaluation and the factors set forth in the Energy Conversion and Transmission Facility Siting Act and PSC Guidelines, it is clear that the proposed facility will produce minimal adverse effects.

State and Federal agencies were consulted to provide input on potential impacts of the proposed Corridor and Route and, in general, concluded that the proposed facility would produce minimal adverse effects. Their findings are summarized in section 8.11 of the Application.

Also, MP's proposal takes into consideration all state and Federal agency concerns and thereby further mitigates any adverse effects associated with the proposed facilities. The designated state agencies and officers listed in NDAC 69-06-01-05 were notified about the proposed project in April of 2009 and MP will continue to work with the Agencies to implement any conditions that may be imposed.

In short, MP submits and believes the evidence demonstrates that it has taken all feasible and prudent actions to minimize and mitigate to the greatest extent possible all known or potential adverse impacts. As a result, the proposed facilities will produce minimal adverse effects. Accordingly, MP respectfully requests that the PSC grant the requested waivers and render an expeditious decision.

1.1.2 Certificate of Corridor Compatibility

Table 1-1 outlines the information required in the PSC Guidelines dated November 1979 for a Corridor Certificate.

Table 1-1
Corridor Certificate Completion Checklist

State Authority	Description	Section
Chapter 49-22	PSC Guidelines: Energy Conversion and Transmission Facility Siting	1.1.1
Section A	Description	1.2
1.	Type: Describe the type of transmission facility addressed in this application. The description shall include the purpose of the facility and the technology to be employed	1.0, 1.2.1
2.	Product: Describe the type, source, and final destination of the product to be transmitted by the proposed facility.	1.2.3
3.	Size and Design:	4.0
a.	Provide a description of the size and design of the ELECTRICAL facility including, but not limited to, the following:	4.1, 4.2.1, 4.2.4
1.	Width of right of way;	4.2.1
2.	Estimated span lengths;	4.2.1
3.	Anticipated type of structure;	4.2.1
4.	Approximate length of facility	Figures, 1.2, 4.1
5.	Voltage; and	4.2.1
6.	The requirement for a general location of any new associated facilities.	4.2.4
b.	Provide a description of the size and design of the pipeline facility including, but not limited to, the following:	N/A
4.	Time Schedule: Provide the anticipated time schedule for the accomplishment of the following events:	1.3
a.	Certificate of Corridor Compatibility;	1.3
b.	Route Application;	1.3
c.	Route Permit;	1.3
d.	Construction start date;	1.3
e.	Construction complete; and	1.3
f.	In-service date.	1.3
Section B	Studies	
	Provide a copy of any evaluative studies or assessments of the environmental impact of the proposed facility submitted to any federal, regional, state, or local agency.	Appendix B Bison I Wind Project-
Section C	Need for Facility	2.0
1.	An analysis of the need for the proposed facility based on present and projected demand for the product to be transmitted by the facility, including the most recent system studies supporting the analysis of the need.	2.1

State Authority	Description	Section
2.	A description of any feasible alternative methods of serving the need.	2.2
3.	A statement justifying any deviations from the most recent Ten-Year Plan which the proposed facility may present.	2.3
Section D	Location	1.0, 1.2
1.	Select a study area, which includes the proposed corridor, of sufficient width to enable the PSC to evaluate the factors addressed in Section 49-22-09, NDCC.	1.2.1, 6.0
2.	Identify and map the criteria that led to the proposed corridor location within the study area.	Figure 2, 1.2.1, 3.0
3.	Discuss the relative value of each criteria and how the proposed corridor location was selected giving consideration to all criteria.	1.2.1, 3.0
4.	The criteria to be evaluated shall include at a minimum all of the following which are within the study area:	3.0
a.	Exclusion areas;	3.1.1
b.	Avoidance areas;	3.1.2
c.	Selection criteria;	3.1.3
d.	Policy criteria;	3.1.4
e.	Design and construction limitations; and	3.1.5
f.	Economic considerations.	3.1.6
5.	Discuss the general mitigative measures that will be taken to minimize adverse impacts which result from a route location in the proposed corridor.	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
6.	List the qualifications of the people in the various disciplines that contributed to the corridor location study	9.0
7.	Maps	Figures
a.	Map the criteria within the study area showing the proposed corridor. 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 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 study area, but not the proposed facility location.	Figures
Chapter 49-22-09	Factors to be considered in evaluating applications and designation of sites, corridors, and routes.	8.0
1.	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.	8.1

State Authority	Description	Section
2.	The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.	8.2
3.	The potential for beneficial uses of waste energy from a proposed energy conversion facility	8.3
4.	Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designated.	8.4
5.	Alternatives to the proposed site, corridor, or route which are developed during the hearing process and which minimize adverse effects.	8.5
6.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.	8.6
7.	The direct and indirect economic impacts of the proposed facility	8.7
8.	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.	8.8
9.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	8.9
10.	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	8.10
11.	Problems raised by federal agencies, other state agencies, and local entities	8.11

1.1.3 Route Permit Application

Table 1-2 below outlines the information required in the PSC Guidelines dated November 1979 for a Route Permit. Information regarding easements for transmission lines per NDCC 49-22-08.1(f) is also included in the Application in section 3.1.5.

Table 1-2
Route Permit Completion Checklist

State Authority	Description	Section
Chapter 49-22	PSC Guidelines: Energy Conversion and Transmission Facility Siting	1.1.2
Section A	Description	1.2
1.	Type: Describe the type of transmission facility proposed.	1.0, 1.2.2
2.	Product: Describe the product or products to be transmitted.	1.2.3

State Authority	Description	Section
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
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
h.	In-service date.	1.3
Section B	Studies	
	Provide a copy of any evaluative studies or assessments of the environmental impact of the proposed facility submitted to any federal, regional, state, or local agency.	Appendix B
Section C	Need for Facility	2.0
1.	An analysis of the need for the proposed facility based on present and projected demand for the product to be transmitted by the facility, including the most recent system studies supporting the analysis of the need.	2.1
2.	A description of any feasible alternative methods of serving the need.	2.2
3.	A statement justifying any deviations from the most recent Ten-Year Plan which the proposed facility may present.	2.3
Section D	Location	1.0, 1.2
1.	Discuss the utility's policies and commitments to limit the environmental impact of its facilities, including copies of board resolutions and management directives.	Appendix A
2.	Discuss the factors listed in Section 49-22-09, NDCC to aid the PSC's evaluation of the proposed route.	All 6.0
3.	Identify and map the criteria that led to the proposed route location within the designated corridor.	Figure 3, 1.2.2, 3.0
4.	Discuss in detail the relative value of each criteria and how the location, construction, and operation of the facility will affect each criteria.	3.0, 5.0-5.16
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;	3.1.1
b.	Avoidance areas;	3.1.2
c.	Selection criteria;	3.1.3

State Authority	Description	Section
d.	Policy criteria;	3.1.4
e.	Design and construction limitations; and	3.1.5
f.	Economic considerations.	3.1.6
6.	Discuss the mitigative measures that will be taken to minimize adverse impacts which result from the location, construction, and operation of the proposed 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
7.	List the qualifications of the people in the various disciplines that contributed to the facility route location study.	9.0
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
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
Chapter 49-22-09	Factors to be considered in evaluating applications and designation of sites, corridors, and routes.	8.0
1.	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.	8.1
2.	The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.	8.2
3.	The potential for beneficial uses of waste energy from a proposed energy conversion facility	8.3
4.	Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designated.	8.4

State Authority	Description	Section
5.	Alternatives to the proposed site, corridor, or route which are developed during the hearing process and which minimize adverse effects.	8.5
6.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.	8.6
7.	The direct and indirect economic impacts of the proposed facility	8.7
8.	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.	8.8
9.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	8.9
10.	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	8.10
11.	Problems raised by federal agencies, other state agencies, and local entities	8.11

1.2 PROJECT SUMMARY

MP proposes to construct a 230 kV transmission line on H-frame tangent structures within the Corridor identified in section 1.2.1. A description of the proposed facility is in section 4.2. The Route was selected after addressing the factors identified in NDCC 49-22-09 and evaluating the criteria in NDAC 69-06-08-02. Below is a description of the Study Area, Proposed Corridor, and Proposed Route for the new 230 kV transmission line. **The new line will be approximately 22.1 miles in length and will transmit electrical energy from the proposed 34.5/230 kV Bison Substation (Project Substation) to the existing 230 kV Square Butte Substation near Center, North Dakota.**

1.2.1 Study Area and Proposed Corridor

Figure 2 presents exclusion and avoidance areas in the Study Area that were analyzed to select the proposed Corridor. MP studied potential wind resource locations in North Dakota for siting a 76-MW wind generation facility and transmission line.

The Bison I Wind Project and BNI Wind Project locations were selected based on good land compatibility and accessibility, excellent wind resources, and proximity to a transmission grid interconnection point. South central North Dakota is well suited for wind development because it features large open terrain without trees. An additional key advantage to wind development in North Dakota is the land area available for wind turbine and transmission line siting. Within 20 miles of Center, there are hundreds of square miles that may be screened for wind development. MP has secured a sufficient amount of wind easement options to support several planned wind projects.

At the Project Substation, the power will be transformed to 230 kV and transmitted via overhead 230 kV transmission lines, interconnecting with the transmission grid at the existing Square Butte Substation. The BNI Project Substation will also tie into the 230 kV transmission line before the point of interconnection at the Square Butte Substation. Electrical energy is converted from AC to DC via a DC converter station within the Square Butte Substation. Electrical energy from the Bison I and BNI wind projects will be transmitted to customers via the existing Square Butte DC Line, which extends from the Square Butte Substation to MP's Arrowhead Substation located near Duluth, Minnesota. MP is in the process of obtaining all necessary regulatory approvals to acquire the Square Butte DC Line from Square Butte Electric Cooperative (see Case # PU-09-631).

In reviewing the Study Area vicinity, the area northwest and southeast of the Study Area is farther from the Project Substation and interconnection point, thus requiring a longer transmission line. The proposed Corridor was selected in the Study Area considering the exclusion and avoidance criteria outlined in NDAC 69-06-08-02.

The proposed Corridor is a 2.21-mile-wide Corridor for the proposed transmission line from the Project Substation to the point of interconnection, the Square Butte Substation. The Corridor consists of the sections, townships, and ranges in Table 1-3 and is represented on the Study Area map shown in Figures 2, 4, and 5. The Corridor chosen complies with NDCC 69-06-04-02, which states that the width of the Corridor must be 10 percent of the length of the line, not less than one mile and not more than six miles in width.

Table 1-3
Corridor Study Area

Township	Range	Sections
140N	86W	1- 5, 9
141N	86W	25 -27, 34-36
140N	85W	1-6
141N	85W	1, 12, 13, 21-36
141N	84W	1-10, 16-20, 29-32
142N	84W	23-28, 31-36
141N	83W	3-6
142N	83W	19-21, 27-34

Following an analysis of the transmission need for the Bison I and BNI wind projects, it was determined that a 230 kV transmission line was required. The factors addressed in NDCC 49-22-09 were considered in evaluating the Corridor for a 230 kV transmission line and are discussed in section 8.0. All exclusion and avoidance criteria within the Study Area were considered in selecting the proposed Corridor. MP avoided wildlife management areas (WMAs), residences, recreational areas, and irrigated land to the extent practicable. MP is interconnecting with existing infrastructure at the Square Butte Substation. This is consistent with NDAC Policy Criteria for transmission corridors and routes (§§69-06-08-02-2e; 69-06-08-02-4i; 69-06-08-02-4g) which encourages applicants to avoid places of residence, maximize benefits by utilizing existing and proposed Route corridors and coordinating facilities.

1.2.2 Proposed Route

Figure 3 identifies the proposed Route. The figure highlights an area 500 feet either side of the proposed Route centerline, which is wider than the right-of-way width discussed in section 4.2.1.2 of the Application. The townships, ranges, and sections comprising the route are shown in Table 1-4.

Table 1-4
Route Location

Township	Range	Sections
140N	86W	3, 4
141N	86W	36
141N	85W	31-36
141N	84W	3-5, 7, 8, 18, 19, 30, 31
142N	84W	34-36
142N	83W	29-33

The average span length of the new transmission line would be approximately 900 feet. The criteria identified in section 1.2.1 as the primary criteria in the decision-making for the location of the proposed Corridor also dictated the selection of the proposed Route within the proposed Corridor. In particular, the avoidance criteria for state designated lands (i.e. WMAs) and residences dictated the location of the line. Additionally, structure locations will be fine-tuned to more specifically avoid residences; wetlands and water bodies; and native vegetation to the extent practicable, as described within this document.

Modifications to the existing 230 kV Square Butte Substation will be required to allow interconnection of the 230 kV transmission line to the electric grid. These modifications are discussed in section 4.2.4.

1.2.3 Product

The transmission line will transmit the electrical energy generated by the Bison I and BNI wind projects from the Project Substation to the Square Butte Substation. The line is intended to carry 230 kV, three-phase, alternating current. The transmission line expected to operate at 629 MW. Electrical energy from the Bison I and BNI wind projects will be transmitted to customers via the existing Square Butte DC Line which extends from the Square Butte Substation to Minnesota Power's Arrowhead Substation located near Duluth, Minnesota and on the existing high voltage AC transmission system as capacity is available.

1.3 PROJECT SCHEDULE

As a result of the revised route segment, MP anticipates the PSC approval in February 2010. The updated schedule is outlined below. The in-service date is dependent upon permitting approvals and other development activities.

1. **Certificate of Corridor Compatibility: MP anticipates the Corridor Certificate will be approved in February or March 2010.**
2. Route Permit Application: The route permit application is included herein.

3. **Route Permit: MP anticipates the Route Permit will be approved concurrent with the Corridor Certificate in February or March 2010.** It is critical for MP to receive the Route Permit and Corridor Certificate as soon as possible, as completing this step will allow MP to move forward with other commitments associated with the Project, including ordering long-lead time materials. **A February or March 2010 issuance of a Route Permit and Certificate of Corridor Compatibility also will allow the Bison I Wind Project to be in-service as scheduled.**

4. Right-of-Way Acquisition: MP is responsible for all right-of-way acquisition and is in the process of obtaining the necessary easements from landowners. MP has secured options to purchase easements from all private landowners for the entire Route. MP is presently negotiating easements for the right-of-way on BNI Coal and MinnKota Electric Cooperative properties. **All landowners have agreed to sign easements for the revised route.**

5. Equipment Procurement, Manufacture, and Delivery: MP will order the transmission line components as soon as practicable. Once the components have been ordered, delivery is anticipated within six months.

6. Construction: MP anticipates construction could begin as early as February 2010 in areas that may require winter construction and in mid-May 2010 for the rest of the transmission line. The construction will take approximately four months to complete.

7. Test and Operations: MP expects that testing of the system will occur in August 2010.

8. In-Service Date: The expected in-service date for the transmission line will be September 2010.

No expansions or modifications to the Project are proposed at this time, though MP is planning on building additional wind facilities in North Dakota. The proposed transmission line and Project Substation will be designed for additional capacity to accommodate future wind generation development in the area. MP will submit applications for any future additional wind generation facilities using this substation.

2.0 NEED FOR FACILITY

2.1 NEEDS ANALYSIS

Several states have implemented Renewable Portfolio Standards (RPS) mandates that require the development of renewable energy projects. MP will be using the output from the Bison I and BNI wind projects to meet the state of Minnesota Renewable Energy Standard (RES) under Minn. Stat. § 216B.1691. Under the Minnesota RES, MP is required to generate or procure sufficient electricity generated by an eligible renewable energy technology (which includes wind energy). The following standard percentages of MP's total Minnesota retail electric sales must be generated by eligible energy technologies by the end of the year indicated: 12 percent by 2012, 17 percent by 2016, 20 percent by 2020, and 25 percent by 2025. Currently, approximately 11 percent of MP's total Minnesota retail electric sales are generated by eligible energy technologies. The Bison I and BNI wind projects are an integral part of MP's plans for obtaining 25 percent of its electricity for its retail customers from renewable energy sources by the year 2025.

Electrical utilities such as MP are instrumental in meeting regional energy needs and enhancing energy reliability. North Dakota has a unique opportunity to help meet these energy needs with clean, efficient, renewable energy. The Project offers North Dakota and surrounding region the opportunity to add transmission capacity and provide a transmission outlet for electricity from a clean, cost-effective, renewable energy generation facility. MP intends for the Project to be a significant source of energy for meeting the region's needs over the next 35 years.

While no expansions or additions are proposed at this time for the Bison I or BNI wind projects, the 230 kV transmission line will provide for development of additional wind energy in the vicinity without triggering the need to construct additional transmission line capacity. A 230 kV transmission line voltage was selected to be compatible with the point of interconnection to the transmission grid, the 230 kV Square Butte Substation.

2.2 ALTERNATIVES

The Project Substation is located in Section 4 of T140N, R86W. This point defines the western terminus of the proposed transmission line. The existing 230 kV Square Butte Substation, the point of interconnection to the high voltage electrical grid, defines the eastern terminus of the line. The Route was selected on the following basis:

- The Route is relatively direct minimizing costs of the transmission line facility and minimizing potential impacts to landowners and the environment.
- The Route utilizes the properties of landowners willing to provide options to purchase easements.
- The potential for wetlands and other environmental impacts are minimized to the extent practicable.
- The Route will provide for potential future development of additional wind resources.

2.3 TEN-YEAR PLAN

MP filed a Ten-Year Plan with the PSC in July 2009. This Project is consistent with the Ten-Year Plan on file with PSC.

3.0 TRANSMISSION FACILITY CORRIDOR AND ROUTE CRITERIA

MP evaluated a study area to determine the best locations for a 230 kV transmission line Corridor and Route. The proposed Corridor was identified as the optimal location from an environmental, wind resources and economic perspective (Figure 2). Since the purpose of the line is to transmit energy from the Bison I and BNI wind projects to the existing Square Butte Substation, the transmission line originates at the Project Substation and terminates at the 230 kV Square Butte Substation. **The 2.21 mile wide Corridor encompasses an area that has a width of 10 percent or more of the length of the transmission line, which must begin in Section 4 of T140N, R86W and end at the existing Square Butte Substation to the northeast. The proposed 22.1 mile Route described in this Application is the result of this Corridor study, which included easement discussions with landowners, identifying known environmentally sensitive areas, considering North Dakota's power plant siting exclusion and avoidance areas, reviewing Morton and Oliver county requirements, and communications with local, state, and federal agencies.**

MP has reviewed the criteria in Chapter 69-06-08 and has factored these criteria into the Corridor study and the Route design. None of the exclusion and avoidance criteria identified in the Corridor encompass greater than 50 percent of the Corridor width. The criteria listed in Chapter 69-06-08 are discussed in this section.

3.1 EXCLUSION AREAS

Per Section 69-06-08-02-1, the following geographical areas (Table 3-1) 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 Corridor and Route in Figures 2 and 3.

Table 3-1.
Exclusion Areas

Exclusion Area	Present within Project Vicinity?	Proposed Buffer		Section Addressed
		Corridor	Route	
Designated or registered national: parks; memorial parks; historic sites and landmarks; natural landmarks; monuments; and wilderness areas	None	None	None	5.7, 5.8, 5.14
Designated or registered state: parks; historic sites; monuments; historical markers; archaeological sites; and nature preserves	None	None	None	5.7, 5.8
County parks and recreational areas; municipal parks; and parks owned or administered by other governmental subdivisions	Present	The Square Butte Creek Golf Course is partially located within the Corridor	None proposed. Though partially located in the Corridor, the golf course is approximately 1 mile north of the Route at the northwest corner of Nelson Lake.	5.8

Exclusion Area	Present within Project Vicinity?	Proposed Buffer		Section Addressed
		Corridor	Route	
Areas critical to the life stages of threatened or endangered species	None	No areas critical to threatened and endangered species have been identified in the Corridor.	No areas critical to threatened and endangered species have been identified in the Route.	5.16
Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged	None	No unique or rare areas have been identified in the Corridor. MP is working with the U.S. Fish and Wildlife Service (USFWS) and North Dakota Game and Fish Department (NDGFD) to avoid potential impacts.	No unique or rare areas have been identified along the Route. MP is working with the USFWS and NDGFD to avoid potential impacts.	5.16

3.2 AVOIDANCE AREAS

Per Section 69-06-08-02-2, the following geographical areas (Table 3-2) 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 PSC 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 Corridor and Route in Figures 2 and 3.

Table 3-2.
Avoidance Areas

Avoidance Areas	Present within Project Vicinity?	Proposed Buffer		Section Addressed
		Corridor	Route	
Designated or registered national: historic districts; wildlife areas; wild, scenic or recreational rivers; wildlife refuges; and grasslands	None	None	None	5.7, 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	Present	The 158 acre Wilbur Boldt WMA is partially located within the eastern edge of the Corridor. North Dakota Land Department land, used for grazing, leasing, or school trusts, is located in the Corridor.	None	5.12, 5.14

Avoidance Areas	Present within Project Vicinity?	Proposed Buffer		Section Addressed
		Corridor	Route	
Historical resources which are not specifically designated as exclusion or avoidance areas	None identified to date	MP will review cultural resource information on file at the SHPO for the revised route segment and augment the Class I Literature Search (October 2009 Application Appendix B). MP plans to minimize impacts to identified resources and avoid, to the best of their ability, any newly identified resources documented during the Class III Resource Inventory. If avoidance is not possible, MP plans to work with the North Dakota SHPO to appropriately mitigate potential impacts.	MP will review cultural resources information on file at the SHPO for the revised route segment and augment the Class I Literature Search (October 2009 Application Appendix B). MP plans to minimize impacts to identified resources and avoid, to the best of their ability, any newly identified resources documented during the Class III Resource Inventory. If avoidance is not possible, MP plans to work with the North Dakota SHPO to appropriately mitigate potential impacts.	5.7
Areas that are geologically unstable	None	No areas that are geologically unstable are within the project Corridor.	No areas that are geologically unstable are along the Route.	5.11
Within 500 feet of a residence, school, or place of business	Present	A buffer of 500 feet from residences was considered in the evaluation of the Corridor. There are several occupied residences identified within the proposed Corridor.	No homes are located within 500 feet of the Route centerline.	5.9
Reservoirs and municipal water supplies	None	No municipal water supplies or reservoirs have been identified in the Corridor. There are likely several domestic wells in the Corridor. No impacts are anticipated	None	5.11
Water sources for organized rural water districts	None	None	None	5.11
Irrigated land. This criterion shall not apply to an underground transmission facility.	Present	The North Dakota State Water Commission's database reveals four irrigation permits were issued within the vicinity of the Route and may or may not be located within the Corridor. MP will avoid these parcels of land once final locations are determined. No buffer has been established and no conflicts are anticipated.	None	5.9

Avoidance Areas	Present within Project Vicinity?	Proposed Buffer		Section Addressed
		Corridor	Route	
Areas of recreational significance which are not designated as exclusion areas	Present	A tract of Private Land Open to Sportsmen (PLOTS) land is located within the Corridor near the western terminus.	None	5.8

3.3 SELECTION CRITERIA

Per Section 69-06-08-02-3, a corridor or route shall be designated (Table 3-3) only when it is demonstrated to the PSC 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. Figures 7 to 16 identify the selection criteria for the Project as well as other related resources.

Table 3-3.
Selection Criteria

Selection Criteria	Potential Adverse Effects		Section Addressed
	Corridor	Route	
The impact upon agriculture:			
Agricultural production	The structure type proposed will permanently impact approximately 100 ft² of land per structure. The placement of 131 structures would impact approximately 0.3 acres, which would result in an insignificant impact to agricultural production.	Approximately 0.3 acre (13,100 ft²) of land will be permanently impacted due to 131 transmission line structures placed along the Route. This would result in an insignificant impact to agricultural production.	5.9
Family farms and ranches	Land area lost to the construction of the transmission line structures will have a minimal adverse effect to family farms. No family farms will be displaced due to construction in the Corridor.	Land area lost to the construction of the transmission line structures will have a minimal adverse effect to family farms. No family farms will be displaced due to construction of the Route.	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	Where impacts are expected, no owner has expressed concerns related to economically suitable irrigation on their land.	Where impacts are expected, no owner has expressed concerns related to economically suitable irrigation on their land.	5.9
Surface drainage patterns and ground water flow patterns	No impacts to surface drainage patterns or groundwater flow patterns are anticipated.	No impacts to surface drainage patterns or groundwater flow patterns are anticipated.	5.11, 5.12

Selection Criteria	Potential Adverse Effects		Section Addressed
	Corridor	Route	
The impact upon:			
Noise sensitive land uses	The noise sensitive land uses within the Project are the residences near the transmission line. There are eight residences within the Corridor. No impacts to noise sensitive land uses are anticipated.	The noise level at 300 feet from the proposed transmission line is 33 dBA. Noise impacts are nominal. The nearest sensitive receptor to the proposed route is approximately 700 feet. No impacts to noise sensitive land uses are anticipated.	5.5
The visual effect on the adjacent area	The transmission line will be visible to landowners and residents who live near the line. MP will minimize visual impacts to the extent practicable.	Visual impacts will be most evident to landowners and residents in close proximity to the Route and drivers traveling along State Highway 31 and 25. MP will minimize impacts to the extent practicable. Structures will also avoid sensitive areas to the extent practicable.	5.6
Extractive and storage resources	No impacts are anticipated to extractive or storage resources.	No impacts are anticipated to extractive or storage resources.	5.11
Wetlands, woodlands, and wooded areas	Wetland resources will be avoided to the extent practicable. MP will utilize line designs to avoid and minimize impacts to wetlands in the Corridor. Woodlands are primarily associated with homes in the form of woodlots and windbreaks. 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.	An initial review of preliminary layout indicates that one wetland along the proposed Route cannot be spanned using the proposed transmission line design. Wetlands more than 1,450 feet across, which is the maximum span of the proposed transmission line design, may require that transmission structures be placed in wetlands. As stated above, MP intends to span all wetlands to the extent practicable. MP intends to mitigate these impacts as required by the U.S. Army Corps of Engineers (USACE) and North Dakota Department of Health (NDDH). It is anticipated that less than 2.8 acres of woodlands and windbreaks may be impacted. Trees and shrubs will be replaced at a ratio of 2:1 at the site and will be monitored for survival for three years.	5.9, 5.13

Selection Criteria	Potential Adverse Effects		Section Addressed
	Corridor	Route	
Radio and television reception and other communication or electronic control facilities	No impacts to radio and television reception or other communication or electronic control facilities are anticipated.	No impacts to radio and television reception or other communication or electronic control facilities are anticipated due to the construction of the line in the proposed location (microwave study).	5.3
Human health and safety	Mitigative measures will be implemented as discussed in section 5.4.3, and if maintenance schedules are met, no impacts to human health and safety are anticipated.	Mitigative measures will be implemented as discussed in section 5.4.3, and if maintenance schedules are met, no impacts to human health and safety are anticipated.	5.4
Animal health and safety	No impacts to livestock are anticipated from the operation of the transmission line. Raptors, waterfowl, and other bird species may be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission line. Waterfowl are typically more 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. Generally, the most difficult part of the structure for the bird to see is the shield wire. Mitigative measures will minimize these impacts.	No impacts to livestock are anticipated from the operation of the transmission line Raptors, waterfowl, and other bird species may be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission line. Waterfowl are typically more 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. Generally, the most difficult part of the structure for the bird to see is the shield wire. Mitigative measures, as outlined in section 5.15.3, will minimize these impacts.	5.9, 5.15
Plant life	The land is primarily agricultural in nature. Only the areas where the structures will be placed will permanently impact plant life. Other areas where temporary impacts may occur will be restored.	Approximately 0.3 acres (13,100 ft^2) of land will be permanently impacted from the transmission line structure placement for the Route. The land is primarily agricultural in nature. Temporary impacts will be restored.	5.9, 5.14

3.4 POLICY CRITERIA

Per Section 69-06-08-02-4, the PSC 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).

Table 3-4.
Policy Criteria

Policy Criteria	Suitable Policy or Practice of Applicant	Section Addressed
Location and design	MP's policy is to locate and design the proposed transmission line to minimize environmental impacts and utilizing existing corridors where practical.	1.1
Training and utilization of available labor in this state for the general and specialized skills required	MP will use local labor to the extent practicable. MP Project management will meet with local labor well in advance of construction to assure the necessary human resources are available.	5.1
Economies of construction and operation	MP will utilize local contractors to the extent practicable.	5.1
Use of citizen coordinating committees	MP has and will continue to work with landowners on the development of the Project.	7.0
A commitment of a portion of the transmitted product for use in this state	Due to the need to transmit and utilize this wind energy in MP's service territory to meet state of Minnesota renewable mandates, MP cannot make this commitment.	1.2, 4.2
Labor relations	No labor relations will be affected.	5.1
The coordination of facilities	Existing facilities and facility corridors were considered in the location of the transmission line and its associated facilities.	1.2.1, 1.2.2
Monitoring of impacts	MP and the construction contractor will employ Best Management Practices (BMPs) during construction to monitor soil impacts and segregate topsoil. MP will monitor tree and shrub replacement for three years, if needed.	5.10, 5.14, 5.15
Utilization of existing and proposed rights of way and corridors	The proposed 230 kV transmission line location was the best location when considering the factors identified by the PSC and MP's policies and project design.	1.2.1, 1.2.2, 3.1.5
Other existing or proposed transmission facilities	The Corridor does not include existing transmission facilities and the Route does not parallel existing transmission lines. The proposed 230 kV transmission line crosses existing transmission facilities and will be designed to provide the required electrical clearances to these existing facilities.	1.2.1, 1.2.2, 3.1.5

3.5 DESIGN AND CONSTRUCTION LIMITATIONS

Design and construction limitations associated with the Project are primarily associated with the proposed location of the transmission line. The points of termination largely dictate the location of the transmission line. The line must originate at the Project Substation and terminate at the existing Square Butte Substation near Center, North Dakota since the purpose of the proposed 230 kV transmission line is to transmit energy from proposed wind projects to the utility grid. The proposed Route is the most direct route while minimizing impacts to the criteria identified in Section 69-06-08-02.

For this particular project, MP will attempt to span all wetlands along the Route. **Wetlands more than 1,450 feet across may require that transmission structures be placed in wetlands.** As stated above, MP intends to span all wetlands to the extent practicable MP intends to mitigate unavoidable impacts as required by the USACE and NDDH.

The existing 230 kV Square Butte Substation layout largely dictates where new lines may enter. The configuration of the existing substation equipment and high voltage overhead transmission lines restrict where the new transmission line may enter the substation. The proposed 230 kV transmission line will enter the north side of the 230 kV Square Butte Substation in order to be compatible with the existing configuration. MP will use wood two pole H-frames for tangent structures, steel monopoles for angles in cultivated fields, and either guyed wood multiple pole or steel monopole structures in pasture or grazing land. The use of wood H-frame structures has design limitations. Following geotechnical exploration it may become necessary to utilize special structures or materials to avoid sensitive environmental features or to accommodate poor soil conditions or other design limitations.

3.6 ECONOMIC CONSIDERATIONS

There many economic considerations in the design and routing of a transmission line. The initial cost of a transmission line increases as the voltage of the line increases. This higher initial cost is offset by a reduction in energy losses for higher voltage lines when compared with lower voltage lines. A 230 kV transmission line was selected for this facility in order to be compatible with the point of interconnection at the 230 kV Square Butte Substation.

In general, minimizing the length of the route and minimizing the number of angle structures decreases the cost of the transmission line by minimizing the material, construction and right-of-way costs. The Route effectively balances the economic considerations of overall length of the line and the number of angle structures required with impacts on the environment, agricultural lands, and landowners.

The selection of materials and structure types also affects the cost of a transmission line. MP proposes to use wood H-frame tangent structures to minimize the cost of the transmission facility. Although steel monopole angle structures are more expensive than guyed multiple wood pole angle structures, MP has committed to the use of steel angle structures in cultivated lands in order to minimize disruption of farming activities.

4.0 ENGINEERING AND OPERATIONAL DESIGN

4.1 PREFERRED ROUTE DESCRIPTION

The transmission line will originate at the Project Substation located within the Bison I Wind Project Site. The Project Substation will be located in Section 4 of T140N, R86W. From this location, the Route will head east for approximately 4.6 miles, where it will turn north for approximately 1.0 miles and turn east again for 3.4 miles. **The Route then proceeds in a slightly northeast direction for 4.5 miles before heading east 1.5 miles, northeast for approximately 2.4 miles, and east for 2.0 miles. In Section 31 of T142N R83W, the Route turns slightly northeast for approximately 0.2 miles and proceeds easterly for 0.8 miles, and then veers southeast for approximately 1.7 miles, ending at the Square Butte Substation.** The Route is presented in Figures 4 and 5.

4.2 DESCRIPTION OF PROPOSED FACILITY

The purpose of the proposed facility is to transmit the energy generated by the Bison I and BNI wind projects to the Square Butte Substation. Electrical energy from the Bison I and BNI wind projects will be transmitted to customers via the existing AC transmission system as available, and on the existing Square Butte DC Line which extends from the Square Butte Substation to Minnesota Power's Arrowhead Substation located near Duluth, Minnesota.

4.2.1 Transmission Structures and Right-of-Way Design

A design data report is attached as Appendix A.

4.2.1.1 Transmission Structures

The proposed transmission line is intended to carry 230 kV, alternating current. It is expected to operate at 629 MW.

MP is proposing to use predominantly single circuit H-frame wood structures for the transmission line. However, final design, corner pole locations, and geotechnical investigations may warrant the use of steel pole or special structures to avoid sensitive areas or accommodate special engineering circumstances. A 0.5 mile portion of the Route in the immediate vicinity of the existing Square Butte Substation may required the use of double circuit structures to accommodate existing and future line entrances to the Square Butte Substation. The double circuit structures are likely to be steel monopoles set on reinforced concrete foundations.

Figure 6 depicts the typical structures that will be used for the transmission line. The structures will be erected and will be directly embedded into the ground. **The wood structures will be up to 110 feet in height (steel structures will be up to 150 feet in height) with an average span between each structure of 900 feet.** The proposed conductor will be 1,780 kcmil Aluminum Conductor, Steel Supported (ACSS). The actual size of the conductor will be confirmed once the final design is complete. One 7/16 in. EHS (7-strand) shield wire will be used in conjunction with one 64mm2/528 optical ground wire (OPGW) to provide lightning protection and communication capability on the transmission line. Locations of each structure will be submitted to the PSC once the plan and profiles have been completed, at least seven days prior to the Public Hearing anticipated for this project.

The proposed transmission line will be designed, constructed, operated, and maintained to meet or surpass all relevant state codes, National Electric Safety Code (NESC), Avian Power Line Interaction Committee (APLIC) raptor-safe design standards, and MP company standards. Appropriate safety standards will be met for construction, operation, and maintenance of the facility.

4.2.1.2 Right-of-Way Design

A 130-foot right-of-way will be acquired for the approximately 22.1-mile 230 kV transmission line (Figure 7). This includes 65 feet of right-of-way on each side of the structure centerline for the proposed facility. An additional 100-foot width will accommodate a future 230 kV transmission line. Right-of-way impacts and calculations for this Application are based upon a 130-foot right-of-way and do not include the additional 100-foot width. Development within the additional 100-foot width would require a separate Corridor Certificate and Route Permit.

4.2.2 Right-of-Way Preparation, Construction, Restoration and Maintenance

4.2.2.1 Right-of-Way Preparation

The proposed Route crosses areas that are primarily agricultural land. There are various locations where tree and shrub growth may require right-of-way clearing. Where safety requirements permit, trees and low growing shrubs will remain (generally less than 15 feet). **A 130-foot-wide portion of the corridor will be cleared of tall woody vegetation for the 22.1 mile length of the transmission line. It is anticipated that less than 2.8 acres of trees and shrubs may be affected.** Significant amounts of grading are not anticipated for preparation of the transmission right-of-way.

4.2.2.2 Transmission Construction Procedures

Construction of the transmission line will begin once all approvals are obtained and easement acquisition is complete. A detailed construction schedule will be developed based upon availability of materials, equipment, and construction labor. The schedule will consider anticipated weather conditions.

Construction of the transmission line will require minimal preparation of the right of way and minimal grading or leveling. Transmission structures will be placed at existing grade elevations. Limited grading may be required to provide level and stable access paths and working surfaces for construction crews at selected structure and wire stringing locations. Once construction is completed, the graded areas will be restored and blended with the original contours to the extent practicable.

Structure components will be delivered to either the staked structure location or to a project storage yard. If the structures are delivered to the location where they will be installed, they will be placed on the right-of-way out of the clear zone of any adjacent roadways or designated pathways. Insulators and other hardware are normally attached while the structure is on the ground. Structures will be assembled and erected at the structure site using mobile cranes or similar heavy-duty equipment. Each pole will be directly embedded and will require a hole dug 10 to 12 feet deep and approximately 3 feet in diameter. The pole will be set within the excavated hole and backfilled with native soils or crushed rock. Structures in poor or wet soil conditions may require specially engineered foundations such as a steel culverts or cast in place reinforced concrete foundations.

Most of the construction activity would be limited to the area immediately around each structure. Little additional ground disturbance is necessary at the structure sites. The total disturbed area in the vicinity of each structure is expected to be confined to an area of 100 ft^2. Temporary impacts due to construction around each structure are estimated at approximately 4,000 ft^2. Access paths will be approximately 10-12 feet wide; however, this impact will be temporary and would require minimal grading or excavation.

Once the structures have been erected, conductors will be installed by establishing stringing setup areas within or adjacent to the right-of-way. Stringing equipment generally consists of sheaves or stringing blocks, wire pullers, tensioners, rope and wire trailers, and a bulldozer used for sagging. Stringing operations involve pulling ropes through the stringing sheaves located at every structure site. The rope is then used to pull a steel cable (hard line). The hard line is then used to pull the conductors through the sheaves under sufficient tension to keep the conductor from coming into contact with the ground. Temporary guard structures 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. The guard structures ensure that conductors will not obstruct traffic or contact existing energized conductors or other cables. After pulling the conductor, shield wire, and OPGW to the proper tensions, construction crews access each structure to secure or "clip" the conductors to the insulators and clamp the shield wire and OPGW to the supporting hardware.

Modifications to the existing 230 kV Square Butte Substation will be required to allow interconnection of the 230 kV transmission line to the electric grid. These modifications will include the addition of new circuit breakers, switches, instrument transformers and other electrical equipment, power wiring, underground cable, reinforced concrete foundations, structural steel terminal structure and equipment supports and an electrical equipment enclosure (control house). These modifications will generally be implemented within the existing fenced substation area.

4.2.2.3 Restoration Procedures

During construction, crews will attempt to limit ground disturbance wherever possible and will employ appropriate erosion control measures. Upon completion of construction activities, landowners will be contacted to determine if any additional restoration due to construction is necessary. Disturbed areas will be restored to their original condition to the maximum extent practicable and as negotiated with the landowner. Post-construction reclamation activities include removing and disposing of debris, dismantling all temporary facilities (including staging and lay down areas), leveling or filling tire ruts, and reseeding areas disturbed by construction activities with vegetation similar to that which was removed.

Erosion control measures will be implemented 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 fence, rock checks, flow diverters, mulching, seeding, or mesh fabric overlay would 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 exercise caution when equipment is within 50 feet of streams and rivers and will not drive equipment through streams or rivers that the transmission line crosses.

Temporary timber mat bridges may be utilized to facilitate crossing of small streams and rivers with construction equipment. These crossing points will be restored and revegetated to their original condition to the maximum extent practicable.

4.2.2.4 Maintenance Procedures

MP will periodically use the right-of-way to perform inspections, to maintain equipment and to make repairs over the life of the transmission line. MP will also conduct routine maintenance to remove undesired vegetation that may interfere with the safe and reliable operation of the proposed line.

4.2.3 Easement/Right-of-Way Acquisition

MP has secured options to purchase easements from all private landowners and is currently in the process of securing easements from BNI Coal and MinnKota Power Cooperative. **All landowners have agreed to sign easements for the revised route.** During the acquisition phase, individual property owners have been advised of construction schedules, needed access to the site, and vegetation clearing required for the transmission line. The right-of-way will be cleared of the amount of vegetation necessary to construct, operate, and maintain the proposed transmission line.

MP will notify the landowners prior to conducting the necessary engineering surveys and soil investigations. Where possible, staging and lay down areas will be located within the right-of-way and limited to previously disturbed or developed areas. When additional property is temporarily required for construction, temporary easements may be obtained from landowners for the duration of construction. These temporary easements will be limited to special construction access needs or additional staging or lay down areas required outside of the proposed right-of-way.

4.2.4 Associated Facilities

There are several facilities associated with the transmission line construction. The Bison I Wind Project, associated operations and maintenance (O&M) facility, electrical collector system, and the Project Substation are included in the application to the PSC for a Certificate for Site Compatibility submitted in May 2009 (Case No. PU-09-151). The new Project Substation will be located in Section 4 of T140N, R86W. The substation will be a 230/34.5kV substation and will facilitate the relaying of the wind-generated energy to the Square Butte Substation along the new 230 kV transmission line. The new Project Substation footprint and O&M building for the Bison I Wind Project will occupy approximately six acres. The BNI Wind Project (Case No. PU-08-848) will tie into the transmission line near the eastern terminus. The attached design data report identifies the general specifications of the new project substation (Appendix A). The existing Square Butte Substation will require upgrades. Modifications to the existing 230 kV Square Butte Substation will be required to allow interconnection of the 230 kV transmission line to the electric grid. These modifications will include the addition of new circuit breakers, switches, instrument transformers and other electrical equipment, power wiring, underground cable, reinforced concrete foundations, structural steel terminal structure and equipment supports and an electrical equipment enclosure (control house). These modifications will generally be implemented within the existing fenced substation area.

5.0 ENVIRONMENTAL ANALYSIS

This section provides a description of the environmental conditions that exist in the Corridor and Route. Conservative impact estimates associated with the proposed Route assumed that the line will be approximately 22.1 miles in length with 900-foot average spans. The number of structures for a line of this length, based on the average spans, is 131 (see Appendix E). The proposed structure is an H-frame and there are two poles per structure. Each structure will permanently impact approximately 100 ft^2, or 50 ft^2 per pole. The temporary impacts are estimated to include an area of approximately 4,000 ft^2 around each structure and a 10- to 12-foot-wide temporary access road that would extend the length of the Route and would require only limited grading.

General information on land use and vegetation within the Corridor were estimated using the National Land Cover Dataset. Percentages of land use within the Corridor were estimated using the Corridor limits, whereas the land use percentages for the Route were estimated using the proposed right-of-way. The cleared width of the right-of-way for the 230 kV transmission line is 65 feet on either side of the structure centerline.

Consistent with MP's policy that people and conservation of the environment come first in the conduct of their operations, the Project has been designed to limit the environmental impact of the proposed facility.

5.1 DEMOGRAPHICS

5.1.1 Description of Resources

The Project is located within a lightly populated rural area in south-central North Dakota. There is no indication of any new residential construction within the Corridor or Route. Information on demographics and housing for this section was taken from the 2000 U.S. Census.

The population of Morton County is 25,303. The population of Oliver County is 2,065. The county seat of Oliver County is Center, which is the closest town to the Corridor and has a population of 678. Table 5-1 summarizes the population and economic characteristics within the Corridor. The data for the townships is at the Census Tract level, which includes data from surrounding townships and accounts for the ranges given.

According to the 2000 U.S. Census, the largest industry employing residents of Morton County is educational, health, and social services, while the second largest industry is retail trade. The largest industry employing residents of Oliver County is agriculture, with the second largest industry being educational, heath, and social services.

According to the 2000 U.S. Census, the largest industries employing residents of Morton and Oliver counties are agriculture and services.

Table 5-1.
Population and Economic Characteristics

Location	Population	Per Capita Income (dollars)	Percentage of Population Below Poverty Level
Morton County	25,303	17,202	9.6
T140N, R86W	3,580-5,638	10,802-15,839	8-13
T140N, R85W	3,580-5,638	10,802-15,839	8-13
Oliver County	2,065	16,271	14.9
T141N, R86W	889-2,258	15,840-18,893	14-22
T141N, R85W	889-2,258	15,840-18,893	14-22
T141N, R84W	889-2,258	15,840-18,893	14-22
T141N, R83W	889-2,258	15,840-18,893	14-22
T142N, R84W	889-2,258	15,840-18,893	14-22
T142N, R83W	889-2,258	15,840-18,893	14-22

5.1.2 Impacts

5.1.2.1 Corridor

Short-term impacts to socioeconomic resources will be relatively minor. Permanent agricultural land conversion associated with the transmission line structure placement will constitute a small socioeconomic impact to those landowners with structures on their land. There is no indication that any minority or low-income population is concentrated in any one area of the Corridor, or that the transmission line will be placed in an area occupied primarily by any minority group.

The construction of the transmission line and associated substation improvements will provide temporary increases to the total personal income of the area if local contractors are used. Additional personal income will also be generated by circulation and recirculation of dollars paid out by MP 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.

5.1.2.2 Proposed Route

Approximately 44 acres of agricultural land will be temporarily removed from production during transmission line construction. The agricultural land impact increased by approximately 5 acres, as compared to the October 2009 Application. This change was primarily due to a revision in the anticipated impacts per structure rather than due to the revised route segment.

Permanent agricultural land conversion associated with the transmission line structures will be approximately 0.3 acres for the entire Route. Landowner compensation will be established by individual easement agreements. As stated above, agricultural areas surrounding transmission line structures can be returned to production following construction of the line. The transmission line will not cause additional impacts to leading industries along the Route. There is no indication that any minority or low-income

population is concentrated in any one area of the Route, or that the transmission line will be placed in an area occupied primarily by any minority group.

5.1.3 Mitigation

5.1.3.1 Corridor

Socioeconomic impacts associated with the transmission line will be primarily positive, with an influx of wages and expenditures made at local businesses during the Project construction and an increase in the county's tax base from the construction of the transmission line. MP will use local labor and contractors to the extent practicable.

Impacts to landowners will be minimized to the extent practicable.

5.1.3.2 Proposed Route

See section 5.1.3.1 above for mitigation associated with the proposed Route.

5.2 LAND USE

5.2.1 Description of Resources

The proposed transmission line would be located in northern Morton County and southern Oliver County, originating approximately eight miles northwest of the city of New Salem. The proposed transmission line will connect the Project Substation for the proposed Bison I Wind Project to the existing Square Butte Substation near Center. The current land use within the Corridor is rural agricultural land used for crops and grazing cattle. The proposed Corridor is not within Center city limits or within an area of military installation.

The development of the proposed transmission line will not displace any residences or existing or planned industrial facilities.

Based on a review of aerial photographs, land use database information, database information, and visits to the Corridor and Route, it was determined that the majority of the land area at the site is agricultural (Figure 8). Table 5-2 identifies current land use in the Corridor and Route.

Table 5-2.
Major Habitats and Their Relative Abundance

Habitat	Transmission Corridor		Transmission Route	
	Acreage	Percent of Corridor	Acreage	Percent of Route
Open Water	1,069.9	3.3	84.7	3.1
Developed	1,530.7	4.7	193.3	7.2
Barren Land (Rock/Sand/Clay)	176.4	0.5	15.6	0.6
Forest (Deciduous/Evergreen/Mixed)	338.3	1.0	7.4	0.3
Shrub/Scrub	72.3	0.2	1.8	0.07
Grassland/Herbaceous	13,470.4	40.9	1,284.4	47.7
Pasture/Hay	3,373.9	10.3	444.8	16.5
Cultivated Crops	11,883.8	36.1	619.1	23.0
Woody Wetlands	557.3	1.7	22.6	0.8
Emergent Herbaceous Wetland	441.7	1.3	16.3	0.6
Total	32,914.7	100	2,690.0	100

Eighty-seven percent of the Corridor is used for agricultural purposes. Agricultural land use includes approximately 36 percent cropland, 10 percent hayland, and 41 percent grasslands. **Approximately 6 percent of the Corridor is wetland, lake, open water, or riparian area.**

Eighty-seven percent of the Route is used for agricultural purposes. Agricultural land use includes approximately 23 percent cropland, approximately 17 percent hayland, and 48 percent herbaceous cover. Five percent of the Route is wetland, lake, or open water.

5.2.2 Impacts

5.2.2.1 Corridor

Land use in the Corridor is not expected to change as a result of construction of the proposed transmission line. Transmission lines (115 kV, 230 kV, 250 kV, and 345 kV) are already present within the Corridor (Figure 5). Land used for crops is abundant in the Corridor. Ranching activity is also not expected to be impacted by the proposed transmission line located within the Corridor studied. The majority of the area under or adjacent to the transmission line can still be used for agricultural practices following construction of the line.

5.2.2.2 Proposed Route

The majority of the land impacted by the construction of the transmission line is used for agriculture. This land use is abundant along the Route. Ranching activity is also not expected to be impacted by the proposed transmission line. The majority of this area will remain in agricultural use since the land under or adjacent to the line can still be used by the landowner. During construction of the Route, additional areas may be temporarily disturbed for laydown areas.

The proposed land use would not involve any ongoing industrial use of non-renewable resources or emissions into the environment.

5.2.3 Mitigation

5.2.3.1 Corridor

MP will work closely with landowners and agencies in finalizing transmission structure locations and access to the site to minimize land use disruptions and impacts to environmentally sensitive areas to the extent possible. These areas will be graded to original contours and if necessary reseeded with vegetation recommended by the Natural Resources Conservation Service (NRCS). Construction of the transmission line will not change the land use in the Corridor.

5.2.3.2 Proposed Route

See section 5.2.3.1 above.

5.3 PUBLIC SERVICES

5.3.1 Description of Resources

Local Services

The Route is located in a lightly populated, rural area in south-central North Dakota. There is an established transportation and utility network that provides access and necessary services to the light industry, small cities, homesteads, and farms existing in and near the Corridor. The closest town to the Corridor is Center, located approximately one mile north of the northeastern portion of the transmission Corridor. The city provides recreation and parks, a golf course, community pool, and a school library. Additionally, the city's local services include emergency services, a fire department, ambulance service, and a police department. There are also local retail service facilities and institutions.

Electrical Service

There are multiple transmission lines running through the Corridor. Two 115 kV lines intersect the middle portion of the Corridor. Great River Energy owns a 230 kV transmission line that runs north through the northeastern end of the Corridor from the Square Butte Substation. Three 345 kV lines are located near the Square Butte Substation. A 250 kV DC Line currently belonging to Square Butte heads east out of the Corridor from the Square Butte Substation towards Duluth, MN. MP is in the process of obtaining all necessary regulatory approvals to acquire the Square Butte DC Line from Square Butte Electric Cooperative (see Case # PU-09-631).

Roads

County and township (section line) roads characterize the existing roadway infrastructure in and around the Corridor. Approximately 6.5 miles of the Route would be west of State Highway 31 and approximately 15.6 miles of the Route would be east of State Highway 31. Interstate 94 is approximately six miles south of the southern most section of the Route.

Traffic

The existing traffic volumes on the area's county highways are documented in Table 5-3 and Figure 9. 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, or Average Daily Traffic (ADT). In general, the state highways in and near the Corridor and Route carry higher levels of traffic than what is average for rural North Dakota, but represent only a fraction of the capacity of the roadway.

Table 5-3.
Existing Daily Traffic Levels

Roadway Segment	Existing Average Daily Traffic (ADT)
State Highway 31 south of Highway 25	575
State Highway 25 west of Highway 48	750

Source: 2002 Traffic Volumes from NDDOT, Bismarck

Additional county and township roads run through the Corridor, but have no count data available. In general, the North Dakota Department of Transportation (NDDOT) indicated that roads under 100 ADT are rarely counted. As indicated in Table 11, all non-state routes are less than 100 ADT. As per NDDOT, the routes with no counts are likely lower than those with count data.

The Route will cross Highway 31.

Water Supply

The townships have limited public infrastructure services, which is typical of most townships. Homes typically utilize septic systems and water wells for their household needs.

Telephone, Fiber Optic, Microwave, Television and Radio Communications

The potential for impacts on radio and television reception, and other communication or electronic control facilities were evaluated. No radio or television signal interference directly from the transmission of electricity is anticipated because of the differences in frequency of the signals. It is possible that localized interference could occur as a result of electric discharges across small gaps in the transmission system hardware or from the development of partial electric discharges from the line itself (generally referred to as "corona"). While it is unlikely that either of these situations would occur, in the event that radio and television signals are impacted, the use of corona-free hardware and routine transmission line maintenance would eliminate the problem.

Several private land mobile communication sites and microwave towers are present within the Corridor. Two microwave beam paths intersect the Route, one Federal and one non-Federal, running in a northwest-southeast direction through the northeastern edge of the Route in T142N R84W. A summary of the microwave beam path and worst case Fresnel Zone calculations from Comsearch are attached in Appendix B.

5.3.2 Impacts

5.3.2.1 Corridor

Local Services

No negative impacts to local services are anticipated.

Electrical Service

No impact is anticipated to the transmission system; the new transmission line and substation improvements may increase overall service reliability.

Roads

Constructing the transmission line will require temporary access along the Route, which is approximately 22.1 miles in length. The access path will be approximately 10-12 feet wide; no major grading or filling is anticipated since the access road will only be needed during construction.

Traffic

The maximum transmission line construction workforce is expected to generate approximately an average of 20-30 additional vehicle trips per day. Using any combination of state and county highways and other township roads throughout the Project site, the traffic impacts are considered negligible. Since many of the area roadways have minimal ADT currently, the addition of 20-30 vehicle trips represents a large percentage increase (and likely would be perceptible), but would still be less than seasonal variations such as autumn harvest. The capacity of any route and Level-of-Service to the traveling public would not be impacted.

Truck access to the Corridor is served by Interstate 94 and State Highway 31. From Center, Highway 25 to Highway 31 will serve as the primary truck access into the Corridor. Specific additional truck routes will be dictated by the location required for delivery. Additional operating permits will be issued by the state, county, and/or township for over-sized truck movements.

Water Supply

Construction and operation of the transmission line will not significantly impact the water supply. MP anticipates that it may be necessary to abandon one private well located along the Route, located in Section 30 of T141N and R84W. The well is presently not in use. The affected landowner will be compensated for abandonment of the well. During excavation of foundations for the steel monopole structures in unstable soil conditions, it may be necessary to pump water in the excavation to stabilize the soils. Potable water would be utilized for this purpose.

Telephone, Fiber Optic, Microwave, Television and Radio Communications

No impacts to these communication resources are anticipated.

5.3.2.2 Proposed Route

See above, section 5.3.2.1.

5.3.3 Mitigation

5.3.3.1 Corridor

Construction and operation of the Project will be in accordance with all associated Federal and state permits and laws, as well as industry construction and operation standards. Due to the minor impacts expected on the existing infrastructure during project construction and operation, extensive mitigation measures are not anticipated.

Local Services

Construction, operation, and maintenance of the transmission line will not impact local services, and no mitigation is required.

Electrical Service

The construction of the transmission line, including proposed upgrades to the Square Butte Substation, will not negatively impact existing electrical service.

Roads

Impacts from transmission line construction are expected to primarily consist of compaction of agricultural soils. Where necessary, the soil will be disked following construction.

Traffic

No impacts are anticipated, and no mitigation is necessary.

Water Supply

In the event wells are abandoned, they will be sealed as required by North Dakota law. If temporary dewatering of groundwater is required during construction activities, dewatering water discharge will be conducted under the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and Storm Water Pollution Prevention Plan (SWPPP).

Telephone, Fiber Optic, Microwave, Television and Radio Communications

North Dakota One Call will be contacted prior to construction to locate and avoid underground facilities. To the extent project facilities cross or otherwise affect existing telephone or fiber optic lines or equipment, MP will comply with all regulations required to avoid interference with these existing facilities.

Since no impacts to microwave or land based telecom systems are anticipated, no mitigation should be required.

5.3.3.2 Proposed Route

See above, section 5.3.3.1.

5.4 HUMAN HEALTH AND SAFETY

5.4.1 Description of Resources

5.4.1.1 Human Health

The term electromagnetic field (EMF) refers to electric and magnetic fields that are present around any energized electrical device. Electric fields arise from the voltage or electrical charges, and magnetic fields arise from the flow of electricity or current that travels along transmission lines, distribution (feeder) lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors.

Considerable research has been conducted throughout the past three decades to examine whether exposure to power-frequency (60 Hz) EMF cause biological responses and health effects. Toxicological studies have shown no statistically significant association or weak associations between EMF exposure and health risks. Some epidemiological studies have indicated an association between power frequency EMF and health effects, while many others have not. The most recent and exhaustive reviews of the health effects from power-frequency fields conclude that the evidence of health risk is weak.

Recent reviews of potential human health effects from transmission line EMF were completed in California (California EMF Program 383) as part of the state of California EMF Program and in Wisconsin for the Arrowhead-Weston Environmental Impact Statement (Arrowhead-Weston 5-21). Both studies have similar conclusions of no discernible health impacts from power lines. Both of these studies recommend the general precaution of minimizing unnecessary contact and advise prudent avoidance to EMF exposure.

5.4.1.2 Human Safety

Proper safeguards will be implemented during construction and operation of the facility. The transmission line and associated facilities will be designed to meet local, state, NESC, and MP safety standards. Construction crews will comply with local, state, NESC, and MP standards regarding the installation of facilities.

The proposed transmission line will be equipped with protective devices such as breakers and relays at the substation to safeguard the public from the transmission line if an accident occurs or if a structure or conductor falls to the ground. The protective equipment at the substation will de-energize the line in the event of an electrical fault. In addition, the Bison I Wind Project Substation will be fenced and access limited to authorized personnel.

5.4.2 Impacts

5.4.2.1 Corridor

Human Health

Decades of research have to date failed to demonstrate that exposure to electric and magnetic fields can cause biological responses or adverse health effects in humans; though research has yet to resolve the

issue conclusively. Lacking conclusive findings, some epidemiological agencies recommend reasonable and prudent avoidance to exposure. Based on the long separation distances from occupied residences and other sensitive receptors, the project will not significantly add to public exposure to EMF and therefore have little effect on public health and safety.

5.4.2.2 Proposed Route

Electric Forces and Magnetic Fields from 230 kV Line

The nearest sensitive receptor to the proposed Route is approximately 700 feet, where EMF from the transmission line is predicted to be significantly below background levels.

5.4.2.3 Human Safety

No impacts are anticipated.

5.4.3 Mitigation

5.4.3.1 Corridor

Human Health

In selecting a route that avoids impacts to residences and other occupied structures, MP has limited human exposure to EMF to the extent practicable. No additional mitigation should be needed.

Human Safety

If the proper safeguards and protective measures are implemented as described above, no additional mitigation is required.

5.4.3.2 Proposed Route

See above, section 5.4.3.1.

5.5 NOISE

5.5.1 Description of Resources

Noise is composed of a variety of sounds of different intensities, across the entire frequency spectrum. Humans perceive sound when sound pressure waves encounter the auditory components in the ear. These components convert these pressure waves into perceivable sound. Transmission conductors and transformers at substations produce noise under certain conditions. The level of noise or its loudness depends on conductor conditions, voltage level, and weather conditions. Noise emissions from a transmission line are greatest during heavy rain and wet conductor conditions. In foggy, damp, or rainy weather conditions, power lines can create a subtle crackling sound due to the small amount of the electricity ionizing the moist air near the wires. During heavy rain the general background noise level is usually greater than the noise from a transmission line. In addition, very few people are out near the transmission line. For these reasons audible noise is not noticeable during heavy rain. During light rain, dense fog, snow, and other times when there is moisture in the air, the proposed transmission lines will

produce audible noise higher than rural background levels but similar to household background levels. During dry weather, audible noise from transmission lines is a slight, sporadic crackling sound.

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 (dBA) scale corresponds to the sensitivity range for human hearing. A noise level change of 3-dBA is imperceptible to 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 of noise loudness. Table 5-4 shows noise levels associated with common, everyday sources, and places the magnitude of noise levels discussed here in context. Low to mid-30 dBA are relatively low background levels and are generally representative of the Corridor. Higher levels exist near roads and other areas of human activity. The windy conditions in this region tend to increase ambient noise levels compared to other rural areas.

Table 5-4.
Common Noise Sources and Levels

Sound Pressure Level (dB)	Typical Sources
120	Jet aircraft takeoff at 100 feet
110	Same aircraft at 400 feet
90	Motorcycle at 25 feet
80	Garbage disposal
70	City street corner
60	Conversational Speech
50	Typical office
40	Living room (without TV)
30	Quiet bedroom at night

Source: Environmental Impact Analysis Handbook, ed. By Rau and Wooten, 1980

5.5.2 Impacts

5.5.2.1 Corridor

The 230 kV transmission line route was modeled using the Bonneville Power Administration Corona and Fields Interactive 1989 Experimental (CFI8X) model to evaluate audible noise from high voltage transmission lines. Where possible, the CFIX8 model was executed in a worst-case manner, to ensure that audible noise was not under-predicted. This involved adjusting the orientation of phase angles used in the CFIX8 model and assuming a wet environment.

5.5.2.2 Proposed Route

Audible noise was modeled from the proposed single circuit 230 kV transmission lines on an H-frame configuration for the Route. This analysis relied on the following assumptions:

- The three conductors were assumed to be approximately 26 feet above the ground, and spaced 19.5 feet apart.

- The conductor diameter was assumed to be 1.445 inches, as defined by the simulation software.
- The line to neutral voltage was calculated to be 132.79 kV.
- Phase angles were modeled as 240, 120, and 0 degrees, respectively.

Table 5-5 presents modeling results for the proposed line in dBA on an L_{50} basis. These levels are predicted to occur at a point five feet above the ground and during wet conditions. The attenuation rate is approximately -3 dB per distance doubled. This rate is typical of noise sources that are characterized as line sources.

Table 5-5.
Predicted Audible Noise from 230 kV lines for Route

Distance from Center of transmission line corridor (feet)											
	-300	-200	-100	-50	-30	0	30	50	100	200	300
Audible Noise, L_{50} (dBA) from Proposed 230 kV line	33	35	38	41	43	45	43	41	38	35	33

5.5.3 Mitigation

5.5.3.1 Corridor

The nearest sensitive receptor to the proposed route is approximately 700 feet, where noise from the transmission line is predicted to be below rural background levels. No mitigative measures are necessary since there will be nominal noise impacts from the Project.

5.5.3.2 Proposed Route

See above, section 5.5.3.1.

5.6 VISUAL IMPACTS

5.6.1 Description of Resources

The topography of the Study Area and Corridor is a mixture of open plains with rolling fields broken by large hills and shallow drainages. **Elevations in the Corridor range between 1,919 and 2,352 feet above sea level.** A topographic map of the Project area is shown in Figure 5.

Within the project area the dominant land use is pasture. Wetland areas are dominated by cattails, sedges, and reed canary grass. A mix of deciduous and coniferous trees planted for windbreaks typically surrounds farmsteads. Generally, these forested areas are isolated groves or windrows established by the landowner/farmers to prevent wind erosion and shelter dwellings. Typical tree species include box elder, bur oak, and cottonwood.

The Project Substation site near the western terminus of the transmission line is located in the Sweet Briar Creek watershed, which empties into the Heart River. Most of the site consists of isolated basins

associated with wetlands or lakes. The few small intermittent creeks that exit the site flow to the west-southwest. Figure 10 shows the typical landscape in the area. The existing Square Butte Substation, which is the eastern terminus of the transmission line, is located in the Square Butte Creek watershed.

5.6.2 Impacts

5.6.2.1 Corridor

The proposed transmission line will be visible to landowners and community residents who live near the proposed line within the Corridor. The predominant structure design will be single circuit wooden H-frame tangent structures which minimize visual impacts.

5.6.2.2 Proposed Route

The visual impact of the new transmission line will have an effect on the visual quality within the vicinity of the Route. The impact to aesthetics will be minimal, due to the existing transmission lines. Figure 10 shows a photo of the existing structures along the Route as well as a photo simulation of the proposed structures.

MP is proposing to use multiple structure types for the Project. The majority will be H-frame, wood structures. Steel monopoles will be used for angles in cultivated fields and either guyed wood multiple pole or steel monopoles structures will be used in pasture or grazing land. Figure 6 depicts the structures that will be used for the transmission line. The structures will be erected and will be directly imbedded into the ground. **The wood structures will be up to 110 feet in height (steel structures will be up to 150 feet in height) with an average span between each structure of 900 feet.**

The Route will be located a 2.0 miles to the south of Center; therefore, it will have minimal visual impacts to the city. The majority of the proposed 230 kV line will be crossing agricultural land and will result in minimal visual impacts to residences. Visual impacts will be most evident to landowners and residents in close proximity to the Route and drivers traveling along State Highway 31 and 25. The line will have a visual impact on landowners and residents that live in close proximity to the proposed Route.

5.6.3 Mitigation

5.6.3.1 Corridor

The proposed Corridor contains an existing 41.6 kV, 115 kV, 230 kV, 250 kV, and 345 kV lines.

5.6.3.2 Proposed Route

Although the transmission line will contrast with the surrounding land uses, these areas have already been impacted visually by the existing 41.6 kV, 115 kV, 230 kV, 250 kV, and 345 kV lines. The proposed Route will minimize the number of residences impacted by the line. Care will also be taken to avoid structure placement, as much as possible, in biologically sensitive areas such as wetlands and high quality native prairies. Placing structures in front of picture windows will also be avoided.

5.7 CULTURAL RESOURCES

5.7.1 Description of Resources

MP contacted the North Dakota State Historic Preservation Office (SHPO) in August 2009 to request a review of potential impacts of the proposed facilities on known or suspected cultural resources (Appendix C). MP has reviewed cultural resources information on file at the SHPO for the data gathering area. The data gathering area is defined as the Route, plus a half-mile buffer area (Study Area). MP has prepared a Class I Literature Search (Appendix B) based on the information gathered for the data gathering area. A review of previous cultural resources studies and cultural resource recordation forms at the SHPO identified 16 previously recorded archaeological resources and nine archaeological site leads within the Study Area (Table 5-6).

Table 5-6.
Previously Identified Archaeological Sites and Leads within the Project Study Area

County	Site Number	Site Type	Location			NRHP Status
			T	R	S	
Oliver	32OL283	Lithic scatter	141	84	8	Not evaluated
Oliver	32OLX179	Lithic scatter	141	84	6	Not evaluated
Oliver	32OL358	Archaeological scatter	141	84	6	Not evaluated
Oliver	32OLX161	Lithic debitage	141	84	5	Not evaluated
Oliver	32OLX163	Lithic debitage	141	84	9	Not evaluated
Oliver	32OL290	Archaeological scatter	141	84	4	Not evaluated
Oliver	32OL289	Rock cairn	141	84	4	Not evaluated
Oliver	32OLX159	Lithic debitage	141	84	4	Not evaluated
Oliver	32OLX160	Lithic debitage	141	84	4	Not evaluated
Oliver	32OLX123	Quarry/mine	141	84	1, 30, 31, 24, 25,36	Not evaluated
Oliver	32OL116	Stone circle	142	84	35	Not evaluated
Oliver	32OL311	Archaeological ruins	142	84	34	Not evaluated
Oliver	32OL307	Lithic debitage	142	84	34	Not evaluated
Oliver	32OL288	Archaeological ruins	142	84	34	Not evaluated
Oliver	32OL298	Stone circles	141	84	3	Not evaluated
Oliver	32OL338	Stone circles/lithic debitage	141	84	5	Not evaluated
Oliver	32OL284	Archaeological ruins	141	84	5	Not evaluated
Oliver	32OL118	Stone circle	142	84	25	Not evaluated
Oliver	32OL287	Lithic scatter	142	84	34	Not evaluated
Oliver	32OLX185	Site form not found at SHPO during time of search	141	84	4	N/A
Oliver	32OLX180	Structure	141	84	7	Not evaluated
Oliver	32OLX0085	Structure/Hendershield Farmstead	141	84	4	Not evaluated

County	Site Number	Site Type	Location			NRHP Status
			T	R	S	
Oliver	32OL346	Structure/Mooseburcker Farm	141	84	5	Not evaluated
Oliver	32OL112	Historic CM Scatter, Depression	142	83	32	Not eligible
Oliver	32OL446	Stone circle, rock cairn	142	83	28, 33	Not evaluated

MP will continue to consult with the SHPO in anticipation of the Class III inventory. MP plans to conduct archeological field investigations of the proposed impact areas throughout the Project study area. These investigations will be conducted by a professional archeologist permitted by the state of North Dakota per NDCC 55-03-01.

MP contacted the North Dakota State Historic Preservation Office (SHPO) in December 2009 to request a review of potential impacts of the revised route segment on known or suspected cultural resources (Appendix D). MP plans to review cultural resources information on file at the SHPO. The data gathering area includes the revised route segment plus a half-mile buffer area. MP will augment the Class I Literature Search (October 2009 Application - Appendix B) based on the information gathered for the data gathering area.

MP will continue to consult with the SHPO in anticipation of the Class III inventory. MP plans to conduct archeological field investigations of the revised route segment area (Table X). This investigation will be conducted by a professional archeologist permitted by the state of North Dakota per NDCC 55-03-01.

- **Revised Route Segment Location**

County	Township	Range	Section
Oliver	142N	84W	35
Oliver	142N	84W	36
Oliver	142N	83W	31

5.7.2 Impacts

5.7.2.1 5.7.2.1 Corridor and Proposed Route

The total number of poles and pole placement along the revised route segment will determine the potential impacts to cultural resources. Regardless of pole numbers, the placement of poles in moderate to high potential areas along the revised route segment may increase the chance of impacts to archaeological resources.

MP intends to avoid previously identified archaeological resources within the revised route segment. MP intends to avoid known archaeological resources and any resources identified during the Class III Resource Inventory to the best of their ability.

5.7.3 Mitigation

5.7.3.1 5.7.3.1 Corridor and Proposed Route

MP plans to complete a Class III Resource Inventory of the revised route segment as soon as possible, weather permitting. MP will amend the existing documentation with any new data gathered for the revised route segment or revised route segment data gathering area. PSC has indicated they do not need SHPO concurrence on this revised route segment prior to project submittal or the project hearing. MP understands that construction can not begin at the revised route segment location until the SHPO has reviewed the Class III Resource Inventory. .

MP intends to avoid impacts to identified archaeological resources within the revised route to the best of their ability. In the event that an impact would occur, MP would determine the nature of the impact and consult with the SHPO on whether or not the resource was eligible for listing in the National Register of Historic Places (NRHP). Mitigation for Project-related impacts on NRHP-eligible archaeological resources may include an effort to minimize Project impacts on the resource and/or additional documentation through data recovery.

MP will develop and put in place an unanticipated discovery plan before construction in the Project area begins. The plan will detail how to deal with previously unknown archaeological resources or human remains should they be encountered during construction. The plan would outline a communication framework for reporting on such discoveries in an efficient and legally compliant manner. The discovery plan may include the following topics: construction contractor training, identification of resources in the field, contact information for MP-designated professionals to address a discovery, procedures for avoidance, and associated tasks in the event of work stoppage in a construction area. With regard to a discovery of human remains, procedures would be followed to ensure that the appropriate authorities would become involved quickly and in accordance with local and state guidelines.

5.8 RECREATIONAL RESOURCES

5.8.1 Description of Resources

Recreational opportunities in Morton and Oliver counties include camping, hiking, biking, swimming, golfing, hunting, fishing and nature observation. Review of state and federal databases indicates that no registered national wildlife refuges, state game refuges, game management areas, nature preserves, or county parks are present within the Corridor. **The Square Butte Creek Golf Course lies just inside the Corridor, at the northwestern end of Nelson Lake.** Nelson Lake, which has fishing and public boat access, is located within the Corridor. The 158-acre Wilbur Boldt WMA is partially within the eastern edge of the Corridor. A tract of PLOTS land is located within the Corridor near the western terminus of the transmission line. These areas are depicted in Figure 15.

5.8.2 Impacts

5.8.2.1 Corridor

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. See section 5.6 for detailed

discussion of anticipated visual impacts and proposed mitigative measures. No other significant impacts to recreational resources are anticipated

5.8.2.2 Proposed Route

Recreational impacts will be visual in nature and limited to individuals using public or private property in the Corridor for hiking, hunting, or nature observation. No additional impacts are anticipated.

5.8.3 Mitigation

5.8.3.1 Corridor

Since it is not anticipated that any recreational resources will be removed from service by implementation of the proposed Project, no adjacent land will be converted or dedicated to recreational use or wildlife management. Secondary recreational uses of proposed Project property may be allowable depending on security requirements. No other mitigation is anticipated to be necessary.

5.8.3.2 Proposed Route

The Route will avoid impacts to recreational areas.

5.9 EFFECTS ON LAND BASED ECONOMIES

5.9.1 Description of Resources

Agriculture/Farming

The majority of the Corridor is cultivated farmland, pasture, and herbaceous cover as shown on Figure 11. Cultivated land comprises approximately 11,884 acres of the Corridor and 619 acres of the Route. There may be areas of cultivated land currently enrolled in the Conservation Reserve Program (CRP). Approximately 87 percent of the land in the Corridor and 87 percent of the land in the Route is utilized for agricultural purposes.

According to the 2007 Census of Agriculture, Oliver County is ranked 46th overall in agricultural products sold in North Dakota, and Morton County is ranked 22nd . Combined, Morton and Oliver counties contain 1,109 farms (273 in Oliver County and 836 in Morton County), of which the primary commodity is crops, primarily wheat. Cattle are the primary livestock in the counties. According to the 2007 Census of Agriculture, the amount of land in farms decreased 9 percent in Morton County and decreased 6 percent in Oliver County. The market value of production in Oliver County in 2007 was approximately $53,389,000. Crop sales account for approximately 46 percent of the total value. The market value of production in Morton County in 2007 was approximately $117,251,000. Crop sales account for approximately 52 percent of the total value.

Crops are a large percentage of the value and the land type, such as prime farmland, is important in production. Prime farmland is the land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The National Resource Conservation Service (NRCS) has two classifications for prime farmland. The first is where all areas of the soil series are classified prime farmland. The second is where only the drained areas of the soil series are prime farmland. The NRCS also identifies farmland of statewide and local importance, which is land

that is important for the production of food, feed, fiber, forage, and oilseed crops. Generally, additional farmlands of statewide or local importance include those that are nearly prime and that produce high yields of crops in an economic manner when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmland soils if conditions are favorable. Table 5-7 lists the soils considered prime farmland and soils of statewide or local importance within the Corridor and along the Route. Figure 12 shows the prime farmland soil distribution in the Corridor and along the Route.

The North Dakota State Water Commission's database reveals four irrigation permits were issued within the vicinity of the Route and may or may not be located within the Corridor. MP will avoid these parcels of land once final locations are determined. It is unlikely the Route will adversely impact any irrigation permits since it is primarily located adjacent to roads or property boundaries and will therefore not affect mechanical irrigation.

There are eight residences within the Corridor. These residences are identified on Figure 2. There are no residences within 500 feet of the proposed Route (Figure 3). The closest residence is approximately 700 feet from the proposed Route.

Table 5-7.
Prime Farmlands - Morton and Oliver Counties

Corridor Soil Units	All Areas Are Prime Farmland	Soil of Statewide/Local Importance	Prime Farmland Only When Drained
Amor-Arnegard loams, 0 to 3 percent slopes		X	
Amor-Cabba loams, 6 to 9 percent slopes		X	
Amor-Cabba loams, 9 to 15 percent slopes		X	
Amor-Shambo loams, 3 to 6 percent slopes		X	
Arnegard loam, 0 to 2 percent slopes	X		
Arnegard loam, 2 to 6 percent slopes	X		
Arnegard loam, 6 to 9 percent slopes		X	
Beisigl-Flasher loamy fine sands, 6 to 15 percent slopes		X	
Belfield-Daglum silt loams, 0 to 2 percent slopes		X	
Belfield-Daglum silt loams, 2 to 6 percent slopes		X	
Belfield-Grail silty clay loams, 0 to 2 percent slopes		X	
Belfield-Morton silt loams, 0 to 2 percent slopes		X	
Belfield-Morton silt loams, 2 to 6 percent slopes		X	
Belfield-Morton silt loams, 6 to 9 percent slopes		X	
Belfield-Straw loams, 0 to 2 percent slopes		X	
Bowbells loam, 0 to 3 percent slopes	X		
Brandenburg-Cabba-Savage complex, 6 to 70 percent slopes		X	
Cabba-Chama-Arnegard complex, 15 to 70 percent slopes		X	
Cabba-Chama-Sen silt loams, 9 to 15 percent slopes		X	

Corridor Soil Units	All Areas Are Prime Farmland	Soil of Statewide/Local Importance	Prime Farmland Only When Drained
Chama-Cabba-Sen silt loams, 6 to 9 percent slopes		X	
Daglum-Rhoades complex, 0 to 6 percent slopes		X	
Daglum-Rhoades complex, 6 to 9 percent slopes		X	
Dogtooth-Janesburg silt loams, 0 to 6 percent slopes		X	
Dogtooth-Janesburg-Cabba complex, 6 to 30 percent slopes		X	
Farland silt loam, 0 to 2 percent slopes		X	
Farland silt loam, 2 to 6 percent slopes		X	
Flasher-Vebar-Parshall complex, 9 to 35 percent slopes		X	
Flaxton and Williams soils, 3 to 6 percent slopes		X	
Flaxton-Livona fine sandy loams, 3 to 6 percent slopes		X	
Flaxton-Williams loams, 0 to 3 percent slopes		X	
Flaxton-Williams loams, 3 to 6 percent slopes		X	
Grail silt loam, 0 to 2 percent slopes	X		
Grail silt loam, 2 to 6 percent slopes	X		
Grail silty clay loam, 0 to 2 percent slopes	X		
Grail silty clay loam, 2 to 6 percent slopes	X		
Grail-Belfield silty clay loams, 2 to 6 percent slopes		X	
Grassna silt loam, 0 to 2 percent slopes	X		
Harriet silt loam, 0 to 2 percent slopes		X	
Lawther silty clay, 0 to 2 percent slopes		X	
Lawther silty clay, 2 to 6 percent slopes		X	
Lihen fine sandy loam, 0 to 6 percent slopes		X	
Linton-Mandan silt loams, 3 to 6 percent slopes		X	
Moreau silty clay, 0 to 6 percent slopes		X	
Morton silt loam, 0 to 3 percent slopes		X	
Morton silt loam, 3 to 6 percent slopes		X	
Morton silt loam, 6 to 9 percent slopes		X	
Morton-Cabba silt loams, 3 to 9 percent slopes		X	
Morton-Farland silt loams, 3 to 6 percent slopes		X	
Parshall fine sandy loam, 0 to 6 percent slopes		X	
Parshall loam, 0 to 2 percent slopes		X	
Reeder-Farnuf loams, 3 to 6 percent slopes		X	
Regent silty clay loam, 0 to 3 percent slopes		X	
Regent silty clay loam, 3 to 6 percent slopes		X	
Regent silty clay loam, 6 to 9 percent slopes		X	
Regent-Janesburg complex, 0 to 6 percent slopes		X	

Corridor Soil Units	All Areas Are Prime Farmland	Soil of Statewide/Local Importance	Prime Farmland Only When Drained
Regent-savage silty clay loams, 6 to 9 percent slopes		X	
Rhoades-Slickspots-Daglum complex, 0 to 9 percent slopes		X	
Savage silty clay loam, 2 to 6 percent slopes		X	
Sen and Amor loams, 0 to 3 percent slopes		X	
Sen and Amor loams, 3 to 6 percent slopes		X	
Sen and Amor loams, 6 to 9 percent slopes		X	
Sen-Chama silt loams, 3 to 6 percent slopes		X	
Shambo loam, 0 to 2 percent slopes		X	
Stady loam, 0 to 2 percent slopes		X	
Straw and Velva soils, channeled, 0 to 2 percent slopes		X	
Straw loam, 0 to 2 percent slopes	X		
Tally-Parshall fine sandy loams, 0 to 6 percent slopes		X	
Temvik silt loam, 0 to 3 percent slopes		X	
Temvik-Williams silt loams, 3 to 6 percent slopes		X	
Tonka and Parnell silt loams, 0 to 1 percent slopes			X
Vebar-Flasher complex, 6 to 9 percent slopes		X	
Vebar-Flasher-Tally complex, 9 to 15 percent slopes		X	
Vebar-Parshall fine sandy loams, 0 to 6 percent slopes		X	
Vebar-Tally fine sandy loams, 3 to 6 percent slopes		X	
Vebar-Tally loams, 3 to 6 percent slopes		X	
Velva-Straw fine sandy loams, 0 to 2 percent slopes		X	
Wabek-Cabba-Shambo complex, 6 to 35 percent slopes		X	
Williams loam, 0 to 3 percent slopes		X	
Williams loam, 3 to 6 percent slopes		X	
Williams loam, 6 to 9 percent slopes		X	
Williams-Bowbells loams, 0 to 3 percent slopes		X	
Williams-Bowbells loams, 3 to 6 percent slopes		X	
Williams-Reeder loams, 3 to 6 percent slopes		X	
Williams-Zahl loams, 6 to 9 percent slopes		X	

Woodlands

Economically important forestry resources are not found in the Corridor. Woodlands are primarily associated with homes in the form of woodlots and windbreaks within the Corridor.

5.9.2 Impacts

5.9.2.1 Corridor

Agriculture/Farming

Impacts to agriculture will be nominal. Permanent impacts will be the areas surrounding the transmission line structures. All areas underneath and surrounding the proposed transmission line will be available for agricultural use following construction. Temporary impacts typically include soil disturbance, possible compaction around each pole and crop damage, if construction is during the growing season.

Woodlands

Since a majority of the woodlands are associated with homesteads and windbreaks, few impacts to woodlands are anticipated.

5.9.2.2 Proposed Route

Agriculture/Farming

No impacts are anticipated to animal health and safety due to the construction or operation of the transmission line. Except for the physical locations of the transmission line structures, all the land surrounding the transmission line will be available for grazing.

Actual impacts to agriculture production will be determined once the transmission line alignment is finalized. Each transmission line pole will permanently impact approximately 50 ft^2 of land. Each H-frame structure has two poles. **Approximately 0.3 acres (13,100 ft^2) of land will be permanently impacted due to transmission line structure placement. Temporary impacts from transmission line construction include the staging area at each structure and an approximate 10- to 12-foot-wide construction access road that will extend along the transmission line (approximately 22.1 miles). Total temporary impacts from construction staging and the construction access road are approximately 44 acres.**

The effect of heavy equipment on agricultural soils was considered. Compaction of soil is a concern where construction equipment is used intensively, even during a relatively short duration such as the construction season needed for transmission line installation.

Even if all the structures were placed within prime farmland areas, only approximately 0.3 acres of prime farmland would be impacted, or 0.04 percent of prime farmland within the Route, which totals 741 acres. Prime farmland within the 130-foot right-of-way totals 92 acres, of which 0.3 acres would be permanently impacted (equals 0.3 percent of prime farmland within the right-of-way).

Family farms will be impacted due to the loss of land associated with the construction of the transmission line; permanent impacts are anticipated to be minor as noted above.

Woodlands

It is anticipated that less than 2.8 acres of woodlands and windbreaks will be impacted within the 130-foot corridor along the Route that is cleared of tall, woody vegetation.

5.9.3 Mitigation

5.9.3.1 Corridor

Agriculture/Farming

The transmission line structures will be located so that the most productive farmland (prime farmland) will be avoided as much as possible. Only land used for structures will be unavailable for crop production. MP will work with landowners to minimize impacts to their land. Once the transmission line is constructed, all land surrounding the structures can still be farmed or grazed. Construction staging areas and temporary transmission line access roads will be disked as necessary to relieve excessive compaction caused by construction. Landowners will be compensated for any damage that occurs to crops due to the construction of the transmission line.

Woodlands

Impacts to woodlands will be restricted to those areas necessary for the safe and reliable operation of the line. MP will replace impacted trees and shrubs at a ratio of 2:1 and will monitor replacement vegetation for three years.

5.9.3.2 Proposed Route

See above, section 5.9.3.1.

5.10 SOILS

5.10.1 Description of Resources

The soils in the Corridor are largely composed of four soils associations; Cabba-Williams-Zahl, Regent-Savage-Cabba, Williams-Zahl-Bowbells, Williams-Sen-Cabba, and Amor-Daglum-Regent. A soil association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on a map (NRCSa 2009).The soil associations are mapped in Figure 13.

Cabba-Williams-Zahl soils are well drained, commonly found on hills, escarpments, and sedimentary plains. These soils support rangeland, pasture, and small grain crops. Regent-Savage-Cabba soils are well drained, commonly found on uplands, alluvial fans, stream terraces, drainageways, sedimentary plains, till plains, hills, escarpments and sedimentary plains. A majority of the Corridor and Route is made up of the Regent-Savage-Cabba soils. These soils support small grains, dryland crops, irrigated crops, and rangeland. Williams-Zahl-Bowbells soils are well drained, commonly found on glacial till plains, moraines, and valley side slopes. Common uses for these soils include small grain crops, range, and pasture. Williams-Sen-Cabba soils are well drained, commonly found on glacial till plains, moraines, upland plains, hills, escarpments, and sedimentary plains. Common uses for these soils include growing small grains, pasture, and rangeland. Amor-Daglum-Regent soils are well drained, commonly found on uplands. Common uses include small grains, range, pasture, flax, and hay (NRCSb 2009).

5.10.2 Impacts

5.10.2.1 Corridor

The permanent impact to soils in the area will be limited to areas removed from agricultural production at transmission line structure locations. Temporary impacts to soils are anticipated during construction in the areas immediately surrounding the transmission line structures.

5.10.2.2 Proposed Route

The permanent impact to soils in the area will be limited to areas removed from agricultural production at transmission line structure locations. **These impacts will be relatively minor, totaling approximately 0.3 acres (13,100 ft^2) for the approximately 22.1 mile transmission line. During transmission line construction, approximately 44 acres may be impacted temporarily for access roads and staging areas.** In isolated cases, grading may be required for access roadway construction. Generally, soil removed in these cases will be on steep slopes and not agriculturally productive. A discussion of impacts to prime farmland soils is in section 5.9.

The potential for wind and water erosion exists in the soil types found within the Corridor. Construction practices will minimize soil erosion during and after transmission line construction and impacts are not expected to be significant.

5.10.3 Mitigation

5.10.3.1 Corridor

Wind and water erosion are potential hazards for the soils found within the Corridor. To minimize erosion during and after construction, BMPs for erosion and sediment control (SN 19389 9/99) will be utilized. Only non-structural practices should be required. These practices include: temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, grassed waterways, and sod stabilization. Top soil will be segregated if cuts are made during construction and reapplied after final contours have been graded.

5.10.3.2 Proposed Route

See above, section 5.10.3.1.

5.11 GEOLOGIC AND GROUNDWATER RESOURCES

5.11.1 Description of Resources

Within the vicinity of the Corridor, the area is underlain by soft, calcareous shales, siltstones, and sandstones of the Fort Union Group, Fox Hills, and Hell Creek Formations (MLRA 2009). The principal sources of ground water in the area are found in these units. Impermeable Cretaceous shales from the Colorado and Montana Groups underlie the aquifers. Morton County is characterized by generally low relief with gentle slopes interrupted by low buttes and ridges (Carlson 1983). The near-surface sediment is of Recent, Pleistocene, Tertiary, or Cretaceous age (Carlson 1983). Some areas have glacially modified bedrock topography that has been covered by thin layers of glacial drift.

Mineral resources in Morton County include mainly gravel deposits. In the past, numerous lignite mines were also present. Oliver County has large lignite reserves, some of which are utilized by BNI Coal, Ltd. in its mine near Center, North Dakota,

No areas of geologic instability (e.g., fault zones, karst topography) were identified within the Corridor or along the Route. Geologic-related mineral resources in the Corridor include minor sand and gravel deposits. Review of the Corridor and Route identified seven gravel pits within the Corridor. The Route will avoid these sites.

Regional groundwater resources are obtained from both glacial drift and bedrock aquifers with most of the water obtained from the latter (Carlson 1973). Groundwater likely occurs at shallow depths locally, as evidenced by the presence of multiple isolated wetlands in the Corridor and along the Route. Groundwater flow direction of the water table aquifer varies greatly and generally follows local topography.

Review of the North Dakota State Water Commission database indicates that depths of wells within the Corridor range from approximately 70 to 440 feet. The State Water Commission database only identified observation wells, monitoring wells, and test borings within the Corridor and along the Route. No municipal water supplies, reservoirs, or private wells have been identified in the Corridor. Given the presence of residences in the Corridor, it appears that the majority of the existing wells are not recorded in the State Water Commission database. This indicates that more domestic wells are in the area than have been documented; it is assumed that each residence has at least one water supply well. Domestic groundwater supply appears to be fairly accessible in the Corridor and along the Route, and is dependent on the occurrences of sand and gravel aquifers at any given area.

5.11.2 Impacts

5.11.2.1 Corridor

Impacts to groundwater resources are not anticipated as water supply needs will be limited to minor construction related activities. The only extractive or storage resources identified within the proposed Corridor are two inactive gravel pits.

5.11.2.2 Proposed Route

As noted in section 5.11.2.1, gravel resource areas are present in the proposed Corridor. The proposed Route avoids known gravel resource sites. No active gravel or sand pits will be impacted by the Route.

5.11.3 Mitigation

5.11.3.1 Corridor

At the Corridor level, there is potential for sand and gravel resources to be made unavailable for future development. If this does occur, mitigation in the form of compensation could be required. No other mitigation is anticipated to be necessary.

5.11.3.2 Proposed Route

Transmission line structure locations will not impact the use of existing domestic wells because the structures will not be sited on or adjacent to occupied structures (where domestic wells are typically located). Transmission line structures will be sited so as to avoid sand and gravel resources identified along the Route. Where sand and gravel resources cannot be avoided, MP will coordinate with landowners regarding impacts and any necessary mitigation. No other mitigation is anticipated to be necessary.

5.12 SURFACE WATER AND FLOODPLAIN RESOURCES

5.12.1 Description of Resources

Surface water and floodplain resources for the Corridor and Route were identified by reviewing U.S. Geological Survey topographic maps, Flood Insurance Rate Maps (FIRM) produced by the Federal Emergency Management Agency (FEMA) and USFWS National Wetlands Inventory (NWI) data. The major surface waters located within the Corridor include Nelson Lake, multiple wetlands (discussed in detail in section 5.13), and intermittent streams. These water resources are shown in Figure 14.

The Corridor lies within the Lower Heart River and Painted Woods-Square Butte Creek watersheds. Review of FEMA floodplain maps indicates the Corridor and its surroundings are not within 100-year or 500-year floodplains. However, parts of the Corridor are within an area of possible but undetermined flood hazards. No flood hazard analysis has been conducted for these areas.

5.12.2 Impacts

5.12.2.1 Corridor

Construction of the transmission line will disturb land along the Route. In general, the transmission line structures will be built on uplands; this will avoid intermittent streams and wetlands located in the lower positions in the landscape. The transmission line construction access road will be built to avoid temporary impacts to surface waters.

5.12.2.2 Proposed Route

Impacts to the intermittent streams along the Route are not anticipated. Impacts to wetlands are addressed below in section 5.13.

5.12.3 Mitigation

5.12.3.1 Corridor

The Route minimizes impacts to waters of the United States to the extent practicable. Permits through the USACE are possible due to the presence of large wetlands in the Corridor. Permits for crossing Nelson Lake will be obtained from the North Dakota State Water Commission. No poles will be placed within Nelson Lake.

Construction access roads adjacent to wetlands or intermittent streams and drainageways will be designed in a manner so runoff from the upper portions of the watershed can flow unrestricted to the lower portion of the watershed. A NPDES permit application and Storm Water Pollution Prevention Plan (SWPPP),

will be prepared by MP and submitted to the NDDH prior to the initiation of transmission line construction.

5.12.3.2 Proposed Route

No impacts to intermittent streams and drainageways are anticipated, therefore no mitigation is necessary. Mitigation for surface water impacts will meet or exceed regulatory requirements.

5.13 WETLANDS

5.13.1 Description of Resources

Wetlands within the Corridor and along the Route were initially identified by reviewing NWI Maps (Figure 14). The USFWS uses aerial photographs as a basis for NWI maps. The NWI map provides guidance in determining areas to be evaluated for wetland characteristics, but should not be used as the sole basis for wetland determinations.

A formal wetland delineation of the Route will be completed in September or October 2009. Wetlands range in size from isolated basins less than a few hundred square feet to large lakes covering 500 acres. The vast majority of wetlands in the Corridor are emergent. The NWI wetland types and their acreages within the Corridor are presented in Table 5-8. **The NWI Map in Figure 14 identifies NWI wetlands in the Corridor.**

The Route avoids many of the wetlands identified in the Corridor. The NWI wetlands along the Route are predominantly freshwater emergent wetlands or lakes (Table 5-9). No riverine wetlands were identified along the Route. **MP completed wetland delineation in fall 2009 to verify the presence and type of wetlands along the Route and will do additional wetland delineations for the revised route segment in the spring/summer 2010.** Some wetlands in farmed areas may have been drained for agriculture

Table 5-8.
NWI Wetland Types and Acreages in Corridor

Cowardin Classification	Acres[1]
Freshwater Emergent Wetland (PEMA, PEMAh, PEMC, PEMCh, PEMCx, PEMFh)	216.9
Freshwater Forested/Shrub Wetland	4.1
Freshwater Pond (PABF, PABFh, PABFx, PUBFx)	121.1
Lake (L1UBGH, L2ABGH, L2USCH)	622.1
Other (PUSCH, PUSCx)	6.2
Riverine (R2UBGx, R4USF)	2.5
Total	972.9

[1] *Wetland acreage is calculated using USFWS NWI data.*

Table 5-9.
NWI Wetland Types and Acreages Along Route

Cowardin Classification	Acres[1]

Freshwater Emergent Wetland (PEMA, PEMC, PEMCh, PEMFh)	23.1
Freshwater Pond (PABFh, PABFx, PUBFx)	14.4
Lake (L1UBGH)	51.8
Total	89.3

[1] *Wetland acreage is calculated using USFWS NWI data.*

5.13.2 Impacts

5.13.2.1 Corridor

In general, the transmission line will be designed to span, and thus avoid, wetland areas. **Wetlands more than 1,450 feet across may require that transmission structures be placed in wetlands.** Each structure would result in 100 ft^2 of permanent impact.

During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading, and construction traffic. Once the Project is completed, it will have no impact on surface water quality.

5.13.2.2 Proposed Route

MP will conduct a wetland delineation to assure impacts to wetlands are avoided to the extent practicable. Wetlands more than 1,450 feet across, which is the maximum span of the proposed transmission line design, may require that transmission structures be placed in wetlands. MP intends to span all wetlands to the extent practicable. Should wetland delineations determine impacts are unavoidable, MP will mitigate those impacts as required by the USACE.

5.13.3 Mitigation

5.13.3.1 Corridor

Wetlands will be avoided to the extent practicable during the construction phase of the Project. If USACE jurisdictional wetland impacts are unavoidable, then a Section 404 and 401 permit application will be submitted to the USACE and state of North Dakota, respectively. Permanent impacts to wetlands and waters will be mitigated according to regulatory requirements.

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

5.13.3.2 Proposed Route

As stated above, any impacts to wetlands will be mitigated according to regulatory requirements. Impacts to the wetland in Section 33 will be mitigated in accordance with USACE Section 404 requirements.

5.14 VEGETATION

5.14.1 Description of Resources

The Project is located in the Northern Great Plains Spring Wheat Land Resource Region and the Rolling Soft Shale Plain Major Land Resource Area (MLRA 2009). Native grasslands are largely replaced by spring wheat, alfalfa, and rangeland areas. This area supports natural prairie vegetation characterized by western wheatgrass (*Pascopyrum smithii*), needle-and-thread (*Hesperostipa comata*), green needlegrass (*Stipa viridula*), and blue grama (*Bouteloua gracilis*). Little bluestem (*Schizachyrium scoparium*), prairie sandreed (*Calamovilfa longifolia*), and sideoats grama (*Bouteloua curtipendula*) are important species on shallow soils. There are numerous temporary and seasonal wetlands with vegetation that includes cattails, cordgrass, rushes, and sedges. Native tree cover in the Corridor and along the Route would have been limited to lake margins and would have been dominated by cottonwoods, willows, green ash, box elder, American elm, and bur oaks. As a result of settlement in the 1800s, the area was converted into farmland and rangeland. Settlement and farming activities were dependent on slope, presence of rocks in soil and wetlands. During this process, the wetland areas were frequently ditched and drained. Trees were planted by landowners for wind blocks (windrows and homestead groves) or were established by natural means, such as being transported to the area by animals, birds, or wind.

Based on a review of aerial photographs, land use database information, USFWS database information, and a visit to the Corridor and Route, it was determined that the majority of the land area is agricultural land use. Table 5-2 (section 5.2.1) identifies current land use. **Forty-six percent of the land use within the Corridor is cropland and hayland. Approximately 6 percent of the Corridor is wetland, lake, open water, or riparian area. Approximately 40 percent of the land use within the Route is cropland and hayland. Approximately 5 percent of the Route is wetland, lake, open water, or riparian area.**

The principal crop in Morton and Oliver counties is wheat. Other crops include corn, oats, barley, sunflowers, and hay (USDA 2007). Grasslands are used for range and pasture of cattle. Heavily grazed range typically contains Kentucky bluegrass, quack grass, and brome grasses. Lightly grazed or undisturbed range contains native prairie species. CRP land is typically covered by brome grasses, orchard grass, and alfalfa. CRP may also be planted in native grasses such as big bluestem, little bluestem, and Indian grass. Land is typically put into CRP for 10-year cycles. Additional information on agriculture and farming can be found in section 5.9.

Approximately 338 acres of the Corridor and 7 acres of the Route are classified as forest, which includes deciduous, evergreen, and mixed forests. Small isolated windrows and homestead groves were found throughout the Corridor and Route. Typical tree species in forested areas include bur oak, cottonwood, aspen, green ash, box elder, American elm, silver maple and introduced conifer species.

5.14.2 Impacts

5.14.2.1 Corridor

Permanent impacts to vegetation will occur at each structure location. Temporary impacts will occur around each pole and along the easement as the transmission line is constructed.

5.14.2.2 Proposed Route

It is anticipated that 131 structures will be required for the Project. Approximately 13,100 ft^2 (0.3 acres) of permanent impacts are anticipated due to structure placement. Temporary impacts will occur during construction and will include ground disturbance by construction equipment around each structure and along the right-of-way as the line is constructed. These impacts are anticipated to be approximately 44 acres. It is anticipated that less than 2.8 acres of woodlands and windbreaks will be impacted.

Temporarily disturbed areas will be reseeded per NRCS recommendations to blend in with existing vegetation.

5.14.3 Mitigation

5.14.3.1 Corridor

MP will work closely with the USFWS to minimize impacts to vegetation along the Route. MP will conduct a pre-construction inventory of existing wetlands, native prairie, and forests. MP will work to avoid and to minimize impacts to existing trees and shrubs. If impacts to individual trees and shrubs cannot be avoided, these resources will be mitigated at a ratio of 2:1 and will be kept alive for three years.

If jurisdictional wetland impacts are proposed, then a Section 404 and 401 permit application will be submitted to the USACE and state of North Dakota, respectively. Permanent impacts to jurisdictional wetlands and waters will be mitigated according to USACE requirements.

MP will use BMPs during construction and operation of the transmission line to protect topsoil and adjacent resources and to minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, stabilizing restored material and revegetating rangelands with native species.

5.14.3.2 Proposed Route

See above, section 5.14.3.1.

5.15 WILDLIFE

5.15.1 Description of Resources

Information on the existing wildlife in the wind farm Project site was obtained from a variety of sources including observations during field visits and information from the North Dakota Parks and Recreation Department (NDPRD), NDGFD, and USFWS.

Wildlife in the Project site consists of birds, mammals, fish, reptiles, amphibians, and insects, both resident and migratory, which utilize the Project site habitat for forage, migratory stopover, breeding, and/or shelter. Species present in the Project area are associated with agricultural fields, pasture grasslands, and wetland areas. Common mammals in the Project area include raccoon, mink, skunk, weasel, white-tailed deer, coyote, red fox, badger, porcupine, and rabbit.

5.15.2 Impacts

5.15.2.1 Corridor

Raptors, waterfowl, and other bird species may be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission line. Waterfowl are typically more 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. Generally, the most difficult part of the structure for the bird to see is the shield wire.

Additionally, large birds, such as raptors, could potentially be impacted by new transmission lines through electrocution. Electrocution occurs when birds with large wingspans come in contact with either two conductors or a conductor and a grounding device.

5.15.2.2 Proposed Route

See above, section 5.15.2.1.

5.15.3 Mitigation

5.15.3.1 Corridor

The following measures will be used, to the extent practicable, to help avoid potential impacts to wildlife along the Route during transmission line design and operation:

- MP will prepare and implement an Avian and Bat Protection Plan during construction and operation of the Route.
- H-frame structures will be used as the primary structure design for the transmission line. H-frame structures put the conductor wires in parallel, making them easier for birds to see.
- The proposed design for the H-frame structures will exceed the recommended safe clearances of 60 inches required for raptors. MP proposes an H-frame design using suspension insulators with a clearance of approximately 84 inches.
- The proposed transmission line will be designed to meet APLIC raptor-safe design standards.
- MP is working with agencies to identify any areas that may require marking transmission line shield wires and/or to use alternate structures to reduce collisions.
- MP is conducting preconstruction inventories of wetlands, native prairies, and woodlands in the vicinity of the proposed transmission line and associated facilities to minimize impacts.
- MP will avoid or minimize disturbance of individual wetlands or drainage systems during construction and operation of the Project.
- MP will protect or replace existing trees and shrubs if impacted at a 2:1 ratio at the site.
- MP will maintain sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion. To minimize erosion during and after construction, North Dakota BMPs for erosion and sediment control (SN

19389 9/99) will be utilized. These practices include: temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, grassed waterways, and sod stabilization.

- MP will revegetate non-cropland and pasture areas with seeding mix as recommended by the USFWS and NRCS.
- MP will inspect and control noxious weeds in the vicinity of the transmission line and associated facilities immediately after construction and periodically for the life of the project.

MP is committed to minimizing wildlife impacts within the Project site. MP continues to consult with the USFWS and NDGFD regarding appropriate mitigation measures for wildlife impacts.

5.15.3.2 Proposed Route

See above, section 5.15.3.1.

5.16 RARE AND UNIQUE NATURAL RESOURCES

5.16.1 Description of Resources

The USFWS, NDGFD, and NDPRD were contacted to review the Project site for threatened and endangered species and unique habitats. **These agencies have not yet responded to inquiries sent on August 24, 2009[1], regarding rare and unique natural resources within the Project site (Appendix C).**

No federally-listed endangered, threatened, or candidate plant species are known to occur in the Project site. The USFWS identifies seven federally listed threatened and endangered wildlife species for Morton and Oliver counties (USFWS 2008) (see Table 5-10). Of these seven, the whooping crane and Dakota skipper have the highest potential, however remote, of occurring in the Project site. Habitat for the other species is either completely lacking or is extremely limited in the Project site.

Table 5-10.
Federally-Listed Threatened and Endangered Species

Species	County	Status
Black-footed Ferret (*Mustela nigripes*)	Morton, Oliver	Endangered
Dakota Skipper (*Hesperia dacotae*)	Oliver	Candidate
Gray Wolf (*Canis lupus*)	Morton, Oliver	Endangered
Interior Least Tern (*Sternula antillarum*)	Morton, Oliver	Endangered
Pallid Sturgeon (*Scaphirhynchus albus*)	Morton, Oliver	Endangered
Piping Plover (*Charadrius melodus*)	Morton, Oliver	Threatened
Whooping Crane (*Grus americana*)	Morton, Oliver	Endangered

[1] In the October 2009 Application, it was incorrectly stated that inquiries were sent to the USFWS, NDGFD and NDPRD on April 7, 2009. Instead, these agencies were contacted on August 24, 2009 (see Appendix C-1 of the October 2009 Application).

Potential direct impacts to the Dakota skipper can be minimized or reduced by avoiding specific types of native grasslands and areas occupied by the species. Potential direct impact to whooping cranes (i.e., mortality) is not likely given the current information provided in the Site Characterization Study done for the Bison I Wind Project (WEST 2009).

The state of North Dakota maintains a list of 100 species of conservation concern. Several of these species have been documented near the Project area during Breeding Bird Surveys conducted by the USGS as well as another wind facility study adjacent to the Bison I Wind Project. Impacts too many of these species can be avoided or minimized by focusing construction activities on cultivated landscapes. In a May 11, 2009 response letter for the Bison I Wind Project, the NDPRD indicated an occurrence of *Ameirus natalis* (yellow bullhead). MP will minimize, to the extent possible, disturbance to the yellow bullhead's habitat. On August 24, 2009 the NDPRD was asked to determine if the North Dakota Natural Heritage Inventory yields any rare animal and plant species or significant ecological communities within the Corridor. The NDRPD responded on September 16, 2009 stating several occurrences have been identified within or adjacent to the Corridor, including yellow bullhead, *Potamogeton vaginatus* (sheathed pondweed), and *Potamogeton amplifolius* (large-weaved pondweed). MP will minimize, to the extent possible, disturbance to sheathed pondweed and large-weaved pondweed habitat.

5.16.2 Impacts

5.16.2.1 Corridor

No impacts to rare and unique natural resources are anticipated.

5.16.2.2 Route

No impacts to rare and unique natural resources are anticipated.

5.16.3 Mitigation

5.16.3.1 Corridor

Mitigative measures will not be necessary, since no impacts are anticipated to rare and unique natural resources.

5.16.3.2 Route

A pre-construction inventory of existing wetlands, native prairie, and woodlands will be conducted along the Route. MP will avoid the resources identified to the extent practicable.

Though no impacts to rare and unique natural resources are anticipated, the following measures will be implemented as part of MP's North Dakota Avian and Bat Protection Plan. MP will:

- mark new transmission lines with bird flight diverters. MP will also mark an equal length of existing and previously unmarked transmission lines within the corridor to help reduce the potential for mortality associated with transmission line collisions;
- implement wildlife friendly on-site habitat management practices;
- contribute to off-site wildlife habitat enhancement efforts; and

- work closely with a number of other wind developers and the USFWS to prepare a regional Habitat Conservation Plan for the whooping crane.

5.17 SUMMARY OF ROUTE IMPACTS

Table 5-11 summarizes the resources that will be impacted as a result of the construction of the transmission line and the appropriate mitigation.

Table 5-11.
Summary of Route Impacts and Mitigation

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 property taxes. A nominal amount of land will be permanently removed from production due to the construction of the Project.	Impacts are primarily positive, so no mitigation is proposed for socioeconomic impacts. Impacts to landowners will be minimized to the extent practicable.
Land Use	Approximately 0.3 acre of land will be impacted due to the construction of the transmission line. Approximately 3 acres will be used for the Bison I Wind Project substation. Land use is primarily agriculture and will remain in agriculture land use since the land under or adjacent to the line can still be used by the landowner.	MP will work with landowners and regulatory agencies to minimize impacts of the Project.
Public Services	No impacts are anticipated.	The transmission system will be constructed according to the configuration identified by MISO to mitigate any potential impacts. Impacts to existing public services will be avoided to the extent practicable.
Human Health and Safety	No impacts are anticipated.	MP will follow "prudent avoidance" methods to minimize EMF exposure and any potential impacts to human health. If proper safeguards are implemented, no additional mitigation is required.
Noise	The noise sensitive land uses along the Route are the residences near transmission line. The noise level at 300 feet from the existing and proposed lines is between 38 and 40 dBA. Noise impacts are nominal. No impacts to noise sensitive land uses are anticipated.	No mitigative measures are proposed. MP will adhere to the avoidance criteria requirement of having a buffer of 500 feet from a residence. This will mitigate any potential impacts due to noise.
Visual	The transmission line will be evident to individuals traveling on Highways 31 and 25 as well as residences and landowners that live in close proximity to the Route.	The Route minimizes the number of residences impacted by the line.
Cultural and Archaeological	No impacts to previously identified cultural resources are anticipated.	MP has completed a Class I Cultural Resources Inventory for the Corridor and Route. MP will conduct a Class III inventory along the proposed Route.
Recreational Resources	Impacts to recreational resources are primarily visual, and limited to individuals using the resources.	The Route will follow existing transmission line routes and will avoid direct impacts to recreational areas.

Resource	Impact	Mitigation
Land Based Economies	A total of approximately 0.3 acre of land will be permanently impacted by the transmission line construction. Approximately 44 acres of temporary impacts are anticipated. The Project Substation will occupy approximately 3 acres of land. It is anticipated that less than 2.8 acres of woodlands and windbreaks will be impacted.	MP will work with landowners to minimize impacts to their land. Prime farmland will be avoided to the extent practicable.
Soils	A total of approximately 0.3 acre of land will be permanently impacted by the transmission line construction. Approximately 44 acres of temporary impacts are anticipated. The Project Substation will occupy approximately 3 acres of land.	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 will be restored.
Geologic and Groundwater Resources	No impacts to geologic and groundwater resources are anticipated.	No mitigative measures are necessary.
Surface Water and Floodplain Resources	No impacts are anticipated to intermittent streams and drainageways.	To minimize impacts during construction an NPDES permit and SWPPP will be prepared and submitted to the North Dakota of Health.
Wetlands	A formal wetland delineation of the Route will be completed in September or October 2009.	MP will mitigate impacts according to USACE requirements. All additional wetlands will be avoided to the extent practicable.
Vegetation	A total of approximately 0.3 acre of land will be permanently impacted by the transmission line construction. Approximately 44 acres of temporary impacts are anticipated. The Project Substation will occupy approximately 3 acres of land. It is anticipated that less than 2.8 acres of woodlands and windbreaks will be impacted.	MP will avoid existing trees and shrubs as practicable. MP will use BMPs during construction and operation to minimize impacts. Impacts to individual trees or shrubs will be replaced at a ratio of 2:1 and will be monitored for survival for three years. Temporarily disturbed areas will be reseeded per USFWS and NRCS recommendations.
Wildlife	Impacts to wildlife populations are expected to be minimal. Potential avian and bat collisions may occur, but are anticipated to be relatively small.	A variety of mitigative measures will be implemented, as discussed in section 5.15.3.
Rare and Unique Natural Resources	Impacts to rare and unique natural resources are not anticipated.	No mitigative measures are necessary.

6.0 PUBLIC COORDINATION

Keeping the public informed on the status of the Project is a key component to its success. Principal stakeholders in the Project are landowners that have entered into easement agreements with MP. MP has provided written Project updates to the landowners and will continue to do so as it moves forward. In addition, MP hosted a landowner meeting to provide an update and to answer questions on the Project on April 14, 2009.

MP has also met with Morton and Oliver counties' commissioners representing the Project site and staff to inform them of the Project, discuss local permits, and answer questions. MP representatives have discussed this Project with county planning officials in anticipation of submitting local permit applications for the Project.

In addition, MP has been working with key state and Federal agencies including the NDGFD and the USFWS to inform them of the Project and to address areas of interest particular to each department.

Additionally, letters introducing the Project and requesting feedback were sent on April 7, 2009, to the following agencies and Project stakeholders:

- North Dakota Attorney General
- Governor of North Dakota
- North Dakota Aeronautics Commission
- North Dakota Association of Telecommunication Cooperatives
- North Dakota Department of Transportation
- North Dakota Game and Fish Department
- North Dakota Department of Agriculture
- North Dakota Department of Health
- North Dakota Department of Human Services
- North Dakota Department of Labor
- North Dakota Department of Career and Technical Education
- North Dakota Department of Commerce
- North Dakota Geological Survey
- North Dakota Indian Affairs Commission
- North Dakota Job Service
- North Dakota Office of Management and Budget
- North Dakota Parks and Recreation Department
- North Dakota State Land Department

- North Dakota State Soil Conservation Commission
- North Dakota State Water Commission
- State Historical Society of North Dakota
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- Morton County Highway Department
- Morton County Soil and water Conservation District
- Morton County Planning & Development Department
- Oliver County Highway Department
- Oliver County Soil and Water Conservation District
- Oliver County Planning & Development Department

MP is committed to keeping key stakeholders engaged in the Project as it moves forward. MP expects to participate in several additional landowners, agency, or other stakeholder meetings before the PSC's public hearing.

7.0 IDENTIFICATION OF REQUIRED PERMITS/APPROVALS

The Federal and state permits or approvals that have been identified as potentially being required for the construction and operation of the Project are shown in Table 7-1.

Table 7-1.
Possible Permits and Approvals

Agency	Type of Approval	Status	Need
Federal Approvals			
USACE	Section 404 Permit	Final layout will determine whether permit/approval is needed	Permit required for filling in jurisdictional waters of the U.S. Project will avoid or minimize impacts on waters of the U.S. to the extent practicable. Coverage under an existing Nationwide Permit may be necessary for minor unavoidable impacts.
Environmental Protection Agency	Spill Prevention Control and Countermeasure Plan	Will apply once Certificate is received	Required if the substation facility has greater than 1,320 gallons of oil. 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.
State of North Dakota			
Public Services Commission	Waiver of Procedures and Time Schedules	Subject of this Application	Included herein.
	Certificate of Corridor Compatibility	Subject of this Application	Included herein.
	Route Permit	Subject of this Application	Included herein.
North Dakota Department of Health	401 Water Quality Certification	Final layout will determine whether permit/approval is needed	Required for fill in jurisdictional waters of U.S.
	NPDES Permit: General Construction Storm Water	Will apply once Certificate is received	Required for disturbance of over 1 acre of land. Must prepare a Storm Water Pollution Prevention Plan (SWPPP).
North Dakota Division of Emergency Management	Emergency Planning and Community Right-to-Know Act Tier II report	Will apply once Certificate is received	Required for owner/operators of facilities containing hazardous materials. A copy of the report must be filed annually by March 1st.
North Dakota State Water Commission	Application For Authorization To Construct A Project within Islands And Beds Of Navigable Streams And Waters	Will apply once Certificate is received	Required to cross Nelson Lake.

Agency	Type of Approval	Status	Need
SHPO	Section 106 Compliance Approval	Final layout will determine whether permit/approval is needed	Section 106 Compliance Approval is required if there is federal involvement in the Project (i.e. federal funding or wetland fill). Need for approval is not anticipated at this time.
North Dakota Highway Patrol	Oversize/Overweight Permit	Will apply once Certificate is received	Permit required for hauling construction equipment and materials on state highways.
North Dakota Department of Transportation	Road Approach/Access Permit	Will apply once Certificate is received	Permit required for construction of access roads from state highways.
	Utility Permit/Risk Management Documents	Will apply once Certificate is received	Permit required for utility crossings on state highway ROW.
Local Permits			
Oliver County	Conditional Use Permit	Will apply once Certificate is received	Permit required for Project construction.
	Utility Permit	Will apply once Certificate is received	Permit required for Project construction in highway ROW.
Morton County*	Transportation Permit	Will apply once Certificate is received	Permit required for Project construction.
	Utility Occupancy Form	Will apply once Certificate is received	Permit required for Project construction in highway ROW.

** Since the October 2009 Application was submitted, it is no longer anticipated that a special use permit for Morton County is necessary.*

8.0 FACTORS CONSIDERED

The North Dakota Energy Conversion and Transmission Facility Siting Act lists 11 factors to guide the PSC in evaluation of the Corridor and Route.

8.1 PUBLIC HEALTH AND WELFARE, NATURAL RESOURCES, AND THE ENVIRONMENT

The preceding sections discuss the research and investigations relating the effects of the proposed facility on public health and welfare, natural resources, and the environment. The effects and mitigation in relation to the Corridor and Route are discussed in the impact and mitigation of section 5.0. Impacts evaluated in the Corridor and Route are minor.

8.2 TECHNOLOGIES TO MINIMIZE ADVERSE ENVIRONMENTAL EFFECTS

MP will utilize the most recent technologies that minimize impacts to the environment. The Corridor study and consequently the Route structures proposed for the project are the most appropriate technologies to minimize adverse environmental effects. This is evident in the minimal environmental effects identified in this application associated with the project.

8.3 POTENTIAL FOR BENEFICIAL USES OF WASTE ENERGY

This factor is not applicable to this project.

8.4 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS OF THE ROUTE

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

8.5 ALTERNATIVES TO THE PROPOSED CORRIDOR OR ROUTE

Alternatives to the proposed Corridor were not evaluated. The Corridor was selected to convey energy generated from the Bison I Wind Project to the Square Butte Substation.

Alternatives to the Route were considered, but rejected due to the exclusion and avoidance criteria within the Route. The proposed Route presented in this application minimizes and avoids impacts to the exclusion, avoidance, and selection criteria.

8.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF NATURAL RESOURCES FOR THE CORRIDOR OR 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. These resources will be utilized to construct the Project. During construction vehicles will be traveling to and from the site, utilizing hydrocarbon fuels.

8.7 DIRECT AND INDIRECT ECONOMIC IMPACTS OF THE PROPOSED FACILITY

Direct economic impacts include the impacts associated with up to 0.3 acre of agricultural land being removed from production due to the construction of the transmission line and associated facilities. In general, agricultural areas surrounding each structure can still be farmed, and landowners will be compensated for the land occupied by the transmission line and associated facilities.

The remaining direct and indirect economic impacts are primarily positive. To the extent that local contractors are used for portions of the construction, total wages and salaries paid to contractors and workers in Morton and Oliver counties 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 MP 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 county and the state.

Long-term beneficial impacts to the county's tax base as a result of the construction and operation of the wind farm will contribute to improving the local economy in this area of North Dakota. The development of wind energy in this region will be important in diversifying and strengthening the economic base of central North Dakota. Additional revenues are expected from property and income taxes.

8.8 EXISTING DEVELOPMENT PLANS OF THE STATE, LOCAL GOVERNMENT AND PRIVATE ENTITIES AT OR IN THE VICINITY OF THE CORRIDOR AND ROUTE

No conflicts are anticipated with existing state and local government and private entities' development plans.

8.9 EFFECT OF ROUTE ON CULTURAL RESOURCES

MP has reviewed cultural resources information on file at the SHPO for the data gathering area and prepared a Class I Literature Search (Appendix B). A review of previous cultural resources studies and cultural resource recordation forms at the SHPO identified 16 previously recorded archaeological resources and nine archaeological site leads within a half mile of the proposed transmission line corridor centerline. Currently, no impacts are anticipated to known cultural resources on the site. MP is committed to minimizing impacts to these resources and will avoid to the best of their ability these resources and any additional resources identified throughout the life of the Project. If avoidance is not possible, MP will work with the North Dakota SHPO to appropriately mitigate potential impacts.

There may be impacts to paleontological resources because the Project study area is located in the Sentinel Butte, Bullion Creek, Cannonball, Ludlow, and Slope Formations.

MP will review cultural resource information on file at the SHPO for the revised route segment data gathering area and augment the Class I Literature Search (October 2009 Application Appendix B). MP plans to minimize impacts to identified resources and avoid, to the best of their

ability, any newly identified resources documented during the Class III Resource Inventory. If avoidance is not possible, MP plans to work with the SHPO to appropriately mitigate potential impacts.

It is possible for impacts to paleontological resources to occur within the revised route segment because the Project data gathering area is located in the vicinity of the Sentinel Butte, Bullion Creek, Cannonball, Ludlow, and Slope Formations.

8.10 EFFECT OF ROUTE ON BIOLOGICAL RESOURCES

MP has implemented measures to avoid and minimize effects to biological resources at the proposed site. The impact of the Project on wildlife is expected to be minimal. The site will be designed to minimize impacts to avian species.

8.11 PROBLEMS RAISED BY AGENCIES

Since the October 2009 Application, no more agency responses have been received for the Bison I Wind Project Transmission Line. However, ongoing consultation with the SHPO as a result of the revised route segment is occurring. Please refer to Appendix D to see the letter sent to SHPO on December 3, 2009.

In April 2009, agencies were contacted to comment on the Bison I Wind Project. In most cases, the comments received for the Bison I Wind Project (Case # PU-09-151) were general enough to be applied to this Project. However, for agency comments that were more specific, MP sent a second letter asking for comments on the transmission line. These additional agency letters included the NDGFD, USFWS, NDPRD, and the NDDH (Appendix C).

8.11.1 North Dakota Game and Fish Department

The NDGFD initially reviewed the Project site for wildlife concerns. Their primary concern is disturbance of native prairie (Appendix C). MP proposes to survey the site for native prairie and will work with the NDGFD and NRCS to restore disturbed areas. Restoration may include reseeding the area with approved NRCS seed mixes. The NDGFD also recommended unavoidable wetland impacts be replaced in-kind, above-ground appurtenances not be placed in wetland areas and no alterations be made to existing drainage patterns. On August 24, 2009 the NDGFD was contacted again for records of state threatened and endangered species within the Corridor. The NDGFD responded on September 21, 2009, stating their primary concern is the disturbance of native prairie and wetland areas during construction. The NDGFD recommended that overhead lines be marked when placed over perennial streams or sited in close proximity to large wetland complexes to minimize possible avian impacts.

8.11.2 U.S. Fish and Wildlife Service

MP, HDR, and WEST met with the USFWS and NDGFD to discuss wildlife issues on March 17, 2009. In a letter dated May 4, 2009, the USFWS recommended of the following mitigative measures to minimize and/or compensate for impacts to wildlife and existing habitats (Appendix C):

- Develop an Avian and Bat Protection Plan.

- Schedule construction for late summer or fall/early winter.
- Avoid construction or disturbance on native prairie areas, wetlands, wooded draws, and riparian forests.
- Minimize impacts to wildlife and existing habitat.

MP continues to consult with the USFWS regarding appropriate mitigation measures to include as part of this Project. In general, native land cover in most of the Project site, including native grasslands and wetlands, are not unique in the region, but are of concern on a broader scale (i.e., concern regarding loss of native prairie). Project developments in the areas with less wetlands and native grasslands would likely have lower impacts (i.e., displacement) to wildlife, particularly grassland and bird species. On August 24, 2009, the USFWS was contacted specifically for transmission line concerns within the Corridor. MP has not received a response at the time of this filing.

8.11.3 North Dakota SHPO

The SHPO recommended a Class I Literature Search be completed for areas that may be impacted by the Project (Appendix C). They also stated that a Class III Cultural Resources Inventory will be necessary. MP has completed the Class I Literature Search (Appendix B). Twenty-one cultural resources reports were identified within or within a half-mile of the centerline. A review of these reports and cultural resource record forms at the SHPO identified 16 previously recorded archaeological resources and nine archaeological site leads (Table 7.8).

MP continues to consult with the SHPO in preparation for the need for a Class III inventory. The Class I Literature Search has also addressed the probability for archaeological sites within the Project study area and recommends survey strategies to identify additional cultural resources.

8.11.4 North Dakota Geological Survey

MP sent a letter to the North Dakota Geological Survey, April 7, 2009 (Appendix C). No response has been received.

8.11.5 North Dakota Parks and Recreation Department

In a May 11, 2009 response letter for the Bison I Wind Project, the NDPRD indicated an occurrence of *Ameirus natalis* (yellow bullhead). MP will minimize, to the extent possible, disturbance to the yellow bullhead's habitat. The NDPRD also stated all efforts should be made to avoid or minimize impacts to wildlife and their habitats, especially critical habitats. Pre and post construction monitoring for avian and bat species should also be conducted. Any impacted areas should be revegetated with species native to the project area. MP is committed to working with the NDPRD in conjunction with the USFWS, NRCS, and NDGFD to seed disturbed areas with appropriate seed mixes. On August 24, 2009 the NDPRD was asked to determine if the North Dakota Natural Heritage Inventory yields any rare animal and plant species or significant ecological communities within the Corridor. The NDRPD responded on September 16, 2009 stating several occurrences have been identified within or adjacent to the Corridor, including yellow bullhead, sheathed pondweed, and large-weaved pondweed. MP will minimize, to the extent possible, disturbance to sheathed pondweed and large-weaved pondweed habitat.

8.11.6 North Dakota Office of Attorney General

The North Dakota Attorney General's Office was asked to comment on the Project. The Office of Attorney General is prohibited by law from providing legal advice, opinions, or assistance to private businesses (Appendix C).

8.11.7 North Dakota Department of Commerce

MP sent a letter to the North Dakota Department of Commerce, April 7, 2009 (Appendix C). No response has been received.

8.11.8 North Dakota Department of Health

On August 24, 2009, a letter was sent to the NDDH to determine if they own land in or adjacent to the sections affected by the Corridor. In an August 31, 2009 response, the NDDH confirmed they own no land in or adjacent to the area. The NDDH believes the environmental impacts will be minor and can be controlled by proper construction methods. Included in Appendix C is their letter which provides comments and guidance on fugitive dust emissions, degradation of waterways, storm water management, and noise. MP will implement these measures, as appropriate.

8.11.9 North Dakota Department of Transportation

MP sent a letter to the North Dakota Department of Transportation, April 7, 2009 (Appendix C). No response has been received.

8.11.10 North Dakota State Water Commission

The State Water Commission asked that waste material be disposed of properly. In the NPDES permit required for the Project, MP will address and implement proper disposal of waste materials.

8.11.11 Natural Resources Conservation Service

The NRCS did not identify any problems with the Project. Since there are no federal funds, the Farmland Protection Policy Act (FPPA) does not apply. The NRCS recommended impacts to wetlands be avoided (Appendix C). A discussion of wetlands and potential wetland impacts are included in section 7.14. Temporarily disturbed areas will be reseeded per USFWS and NRCS recommendations to blend in with existing vegetation.

In addition, MP has considered the FPPA in the location of the line and selection of structures. The proposed route does cross prime farmland. However, the impacts are nominal. If all the structures for the line were placed in prime farmland, approximately 0.3 acre of prime farmland would be permanently removed from production.

8.11.12 North Dakota State Land Department

MP sent a letter to the North Dakota State Land Department, April 7, 2009 (Appendix C). No response has been received.

8.11.13 U.S. Army Corps of Engineers

MP will obtain permits through the USACE and North Dakota Department of Health in accordance with Sections 404 and 401 of the Clean Water Act, respectively. MP will also mitigate the impact as required by these regulatory bodies. No additional issues were raised.

8.11.14 Aeronautics Commission

MP sent a letter to the Aeronautics Commission, April 7, 2009 (Appendix C). No response has been received.

8.11.15 North Dakota Department of Agriculture

MP sent a letter to the North Dakota Department of Agriculture, April 7, 2009 (Appendix C). No response has been received.

8.11.16 North Dakota Department of Human Services

MP sent a letter to the North Dakota Department of Human Services, April 7, 2009 (Appendix C). No response has been received.

8.11.17 North Dakota Department of Labor

MP sent a letter to the North Dakota Department of Labor, April 7, 2009 (Appendix C). No response has been received.

8.11.18 North Dakota Department of Career and Technical Education

MP sent a letter to the North Dakota Department of Career and Technical Education, April 7, 2009 (Appendix C). No response has been received.

8.11.19 North Dakota Governor

MP sent a letter to the North Dakota Governor John Hoeven, April 7, 2009 (Appendix C). No response has been received.

8.11.20 North Dakota Indian Affairs

MP sent a letter to North Dakota Indian Affairs, April 7, 2009 (Appendix C). No response has been received.

8.11.21 North Dakota Office of Management and Budget

MP sent a letter to the North Dakota Office of Management and Budget, April 7, 2009 (Appendix C). No response has been received.

8.11.22 North Dakota Soil Conservation Committee

MP sent a letter to the North Dakota Soil Conservation Committee, April 7, 2009 (Appendix C). No response has been received.

8.11.23 Morton and Oliver Counties Soil Conservation Districts

MP sent letters to the Oliver County Soil Conservation District and Morton County Soil Conservation District, April 7, 2009 (Appendix C). Comments were deferred to the NRCS office in Jamestown, North Dakota. See section 8.11.11.

9.0 QUALIFICATIONS OF CONTRIBUTORS TO SITING STUDY

Name Project Role	Education And Professional Experience
TODD MATTSON Senior Environmental Project Manager HDR Engineering	Mr. Mattson has more than 14 years of experience as an environmental consultant specializing in managing regulatory compliance issues for major energy development projects. His responsibilities include directing project feasibility studies and constraints analyses, state and federal permitting, and Endangered Species Act compliance. Additionally, Mr. Mattson is HDR's National Environmental Lead for its wind energy projects. M.S., Zoology and Physiology (Wildlife Ecology), University of Wyoming, 1994 B.A., Biology, Minnesota State University Moorhead, 1992
LYDIA NELSON Senior Environmental Scientist HDR Engineering	Ms. Nelson has more that 25 years of experience as an environmental project manager and project scientist. Ms. Nelson has extensive hands-on experience in wetland delineation, functional assessment, mitigation design, water resources, prime farmlands, hydric soils, wildlife habitat, and endangered species. Additionally, Ms. Nelson has extensive experience working with federal, state, and local agencies in the development of NEPA documents and permit applications. B.S., Environmental Sciences/Studies (Soil Science), Oregon State University, 1983 B.S., Biology, Central Michigan University, 1981
TIM CASEY, QEP Environmental Specialist HDR Engineering	Mr. Casey is HDR's Environmental Acoustics Program Manager and has more than ten years of experience leading HDR's Environmental Acoustics efforts. He specializes in noise and vibration monitoring and modeling for stationary and mobile sources including railroads, highways, combustion turbines, diesel generators, pumps, industrial and municipal installations, etc. Extensive use of the FHWA Stamina 2.0/Optima model, FTA transit noise and vibration analysis methodologies, and PC-based GIS technology. Additional training and experience on FHWA Traffic Noise Model 1.0. Mr. Casey's experience includes presentations at public meetings, before city councils, and expert witness testimony for projects in locations throughout the United States and Puerto Rico. Mr. Casey holds the professional certification of Qualified Environmental Professional. B.S., Biological/Life Sciences, Saint Xavier University, 1988 Associate of Science, Science, Valley Community College, 1986
GINA RAMIREZ Acoustics Engineer HDR Engineering	Ms. Ramirez is an acoustic engineer with experience in environmental noise and architectural acoustics. She has experience performing noise and vibration analyses for projects such as wind farms, construction projects, surface transportation systems, and industrial noise. Her primary responsibilities include the monitoring, analysis and modeling of noise producing elements, in for both environmental and architectural projects. B.A., Acoustics, Columbia College, Chicago, IL, 2008
INGRID SCHWINGLER Environmental Scientist HDR Engineering	Ms. Schwingler has more than a year of experience in the wind industry including public involvement, fieldwork, data collection, and data analysis. She has worked as part of multi-disciplinary teams in the preparation of Environmental Impact Statements, Environmental Assessments and other NEPA-related and environmental permitting documents for energy projects across the United States. B.A., Environmental Studies, Political Science, Gustavus Adolphus College, St. Peter, MN, 2007

Name Project Role	Education And Professional Experience
STEPHEN SABATKE Archaeologist HDR Engineering	Mr. Sabatke has seven years of experience working in the cultural resource field. He has worked on a variety of cultural resource projects including: wind power transmission, transmission lines, rail roads, pipeline, recreation use development, prehistoric site preservation, historic building preservation, and historic building rehabilitation. Additionally, he has prepared cultural resource studies for federal and state review. He has reviewed and developed cultural resource plans, cultural resource proposals, conducted meetings with SHPO, led field survey investigations, managed cultural resource contractors, subcontractors, and staff, and has managed cultural resource budgets for projects. M.A., Anthropology, University of Minnesota Twin Cities, 2006 B.A., Anthropology, University of Minnesota Duluth, 2002
MEG DESMOND Senior Technical Editor HDR Engineering	Ms. Desmond brings more than 30 years of writing and editing experience to HDR. She is responsible for managing document production and the document production staff for the Environmental Sciences Section of HDR Minneapolis. She provides day-to-day supervision in terms of adjusting priorities and deadlines, determines consistency and style within technical reports, and edits technical reports and documents. She interacts with professional staff members to clarify the meaning, format, and style of their work. She also assists HDR's Minneapolis marketing department with quality control review of proposals and presentations. B.A., English Language & Literature, University of New Hampshire, 1976
ANJALI MALHOTRA GIS Specialist HDR Engineering	Ms. Malhotra has almost five years of professional experience in the field of Geographic Information Systems (GIS). Ms. Malhotra has provided spatial and data analysis, modeling, and GIS technical support on a variety of wind energy and environmental projects across the United States. Ms. Malhotra is proficient in generating cartographic products, mapping, and graphic presentations using GIS and advanced graphic software. She also has more than two years experience in Urban Planning & Design. Master of Urban and Regional Planning (Specialization: Information Technology and GIS); State University of New York at Buffalo, 2005 Bachelor of Architecture, Pune University, India, 2001

10.0 REFERENCES

American Wind Energy Association (AWEA). 2008. State-Level Renewable Energy Portfolio Standards (RPS). Retrieved August 2009. http://www.awea.org/pubs/factsheets/State_RPS_Fact_Sheet.pdf

Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006. http://www.aplic.org/SuggestedPractices2006(LR).pdf

Best Management Practices for Erosion and Sediment Control. North Dakota Department of Health. Division of Water Quality SFN 19389 (09/99)

Carlson, Clarence G. 1983. *Geology of Morton County, North Dakota*. North Dakota Geological Survey. Grand Forks, North Dakota. North Dakota State Water Commission. http://www.swc.state.nd.us/4dlink9/4dcgi/GetContentRecord/PB-272

———. 1976. *Geology of Mercer and Oliver Counties, North Dakota*. North Dakota Geological Survey. Grand Forks, North Dakota. North Dakota State Water Commission. http://www.swc.state.nd.us/4dlink9/4dcgi/GetContentRecord/PB-271

Energy Information Administration: Official Energy Statistics from the U.S. Government. Retrieved August 2009. http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=ND

Federal Aviation Administration. Airport Data (5010) & Contact Information Current as of 3/12/2009. Retrieved August 2009. http://www.faa.gov/airports_airtraffic/airports/airport_safety/airportdata_5010/

Federal Emergency Management Agency (FEMA). Floodplains (Q3 Flood Data) 1995.

Kopocis, Jeff. Snyder & Associates. BNI Aeronautical Study: Oliver & Morton Counties, ND. March 2008.

The Minnesota State Interagency Working Group on EMF Issues. *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options.* http://www.capx2020.com/Images/EMFWhitePaper2002.pdf

Major Land Resource Regions Custom Report. USDA Agriculture Handbook 296 (2006). Accessed August 21, 2009. http://soils.usda.gov/MLRAExplorer

Morton County Planning and Zoning Commission. Morton County Comprehensive Land Use Plan – Draft. February 2000. http://www.co.morton.nd.us/vertical/Sites/{90CBB59C-38EA-4D41-861A-81C9DEBD6022}/uploads/{95B837B0-4C81-498A-B597-B843A8E065AC}.PDF

National Institute of Environmental Health Sciences EMF-RAPID Program Staff, 1999. NIEHS Report on Health Effects from Exposure to Power Line Frequency Electric and Magnetic Fields. Research Triangle Park, NC.

North Dakota Department of Transportation. Morton and Oliver Counties 2008 Map Counts. Bismarck, ND. http://www.dot.nd.gov/road-map/traffic/index.htm

North Dakota Game and Fish Department. Wildlife Management Area Guide. http://gf.nd.gov/hunting/wildlife.html. Retrieved April 22, 2009.

———. PLOTS Lands Layer. March 2009. http://web.apps.state.nd.us/imf/imf.jsp?site=NDGFPLOTSGuide

———. State WMA Layer. February 2006.

North Dakota State Land Department. State Surface Tracts. January 10, 2008.

North Dakota State Water Commission. Query Water Permits. **Accessed December 2009.** http://www.swc.state.nd.us/4dlink7/4dcgi/permitsearchform/Map%20and%20Data%20Resources

———. Ground and Surface water Data Query. **Retrieved December 2009.** http://www.swc.state.nd.us/4dlink2/4dcgi/WellSearchForm/Map%20and%20Data%20Resources

———. County Ground Water Studies http://www.swc.state.nd.us/4dlink9/4dcgi/GetSubCategoryRecord/Reports%20and%20Publications/County%20Ground%20Water%20Studies.

North Dakota State Water Commission and US Geological Survey. Water100k_poly (Lakes and Ponds) Layer. February 2008.

———. Water100k_line (Streams) Layer. February 2008.

North Dakota Geographic Information System. Watershed Layer. January 16, 2009.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. U.S. General Soil Map (STATSGO2) for North Dakota. Accessed August 2009. Available online at http://soildatamart.nrcs.usda.gov

Sterzinger, George; Beck, Fredric; Kostiuk, Damian. 2003. *The Effect of Wind Development on Local Property Values*. Renewable Energy Policy Project. http://www.crest.org/articles/static/1/binaries/wind_online_final.pdf.

U.S. Census Bureau. American Factfinder. http://factfinder.census.gov/servlet/BasicFactsServlet. Retrieved August 2009.

U.S. Department of Agriculture/The Census of Agriculture. 2007 Census Publications. Accessed August 2009. http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/North_Dakota/index.asp

———.. 2007 Census Publications. County Level Data. Accessed August 2009. http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/North_Dakota/index.asp

———. 2007 Census Publications. State and County Profiles. Accessed August 2009. http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/North_Dakota/index.asp

U.S. Department of Agriculture/National Agricultural Statistics Service. Retrieved August 2009. http://www.nass.usda.gov/Statistics_by_State/North_Dakota/index.asp

U.S. Department of Agriculture/National Resources Conservation Service (NRCSa). Web Soil Survey. Accessed August 21, 2009. http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

(NRCSb) Official Soil Series Descriptions. USDA-NRCS Soil Survey Division. View by Name. Accessed August 21, 2009. http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi

———. Conservation Reserve Program. Accessed August 2009. http://www.nrcs.usda.gov/programs/CRP/

———. SSURGO Soils Data Layer. Morton and Oliver Counties. March 2008

———. National Cartography & Geospatial Center. National Land Cover Dataset (NLCD) Layer. 2001.

———. STATSGO soils Layer. Statewide Soils Data North Dakota. 2006.

U.S. Department of Agriculture. Geospatial Data Gateway. http://datagateway.nrcs.usda.gov/. Floodplain and watershed data. Retrieved August 2009.

U.S. Department of Energy. Energy Efficiency and Renewable Energy. 2008. States with Renewable Portfolio Standards. http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm. Accessed August 2009.

———. Wind Powering America. ND Wind Resource Map. Accessed August 2009. http://www.windpoweringamerica.gov/maps_template.asp?stateab=nd

U.S. Environmental Protection Agency. Western Ecology Division. Level III Ecoregions. Accessed August 2009. http://www.epa.gov/wed/pages/ecoregions/level_iii.htm

U.S. Fish and Wildlife Service. Mountain-Prairie Region – North Dakota. http://mountain-prairie.fws.gov/nd.html. Retrieved August 2009.

———. National Wetland Inventory (NWI) Layer. May 22, 2008.

———. 2003. Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines. Washington, D.C. Wind Turbine Siting Working Group. http://www.fws.gov/r9dhcbfa/wind.pdf

U.S. Fish and Wildlife Service, Ecological Services, North Dakota Field Office. Endangered, Threatened, Proposed and Candidate Species in North Dakota Counties. October 2008. http://www.fws.gov/mountain-prairie/endspp/countylists/northdakota.pdf

Western Ecosystems Technology, Inc. (WEST). Site Characterization Study of the Bison Wind Resource Area. May 1, 2009.

11.0 DEFINITIONS

ADT	Average Daily Traffic
APLIC	Avian Power Line Interaction Committee
BMPs	Best Management Practices; prevents soil erosion and sedimentation
Capacity	The capability of a system, circuit, or device for storing electric charge.
Certificate	Certificate of Site Compatibility
Class I Cultural Resources Inventory	Existing data inventory – a large-scale review and compilation of known cultural resource data.
Class III Cultural Resources Inventory	Intensive field inventory – complete surface inventory of a specific area.
CRP	Conservation Reserve Program
Corridor Certificate	Certificate of Corridor Compatibility
dBA	A-weighted decibel
Distribution	Relatively low-voltage lines that deliver electricity to the retail customer's home or business.
Electromechanical	Of, relating to, or being a mechanical process or device actuated or controlled electrically; especially being a transducer for converting electrical energy to mechanical energy.
EMF	Electric and Magnetic Field
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FPPA	Farmland Protection Policy Act
Ft	Foot/Feet
Geotechnical	A science that deals with the application of geology to engineering.
GIS	Geographic Information Services
Interconnection	To be or become mutually connected.
kV	kilovolt
kW	kilowatt
MW	megawatt
m	meter

m/s	meter per second
MP	Minnesota Power, an operating division of ALLETE, Inc.
mph	miles per hour
NDDOT	North Dakota Department of Transportation
NESC	National Electric Safety Code
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NDDH	North Dakota Department of Health
NDGFD	North Dakota Game and Fish Department
NDPRD	North Dakota Parks and Recreation Department
NHID	Natural Heritage Inventory Database
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O&M	Operations and maintenance facility
Project, the	Bison I Wind Project, Bison I Wind Project Transmission Line and the BNI Wind Project
PSC	North Dakota Public Service Commission
RECs	Recognized Environmental Conditions
RES	Renewable Energy Standard
Resistance	The opposition offered by a body or substance to the passage through it of a steady electric current.
ROW	Right-of-Way
RPS	Renewable Portfolio Standards
SHPO	North Dakota State Historic Preservation Office
Step-up transformer	A transformer that increases voltage
Substation	A subsidiary station in which electric current is transformed.

SWPPP	Storm Water Pollution Prevention Plan
Transformer	An electrical device by which alternating current of one voltage is changed to another voltage.
Transmission	An assembly of parts including the speed-changing gears and the propeller shaft by which the power is transmitted from an automobile engine to a live axle; the speed-changing gears in such an assembly.
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WEST	Western EcoSystems Technology, Inc
WMA	Wildlife Management Areas

Figures

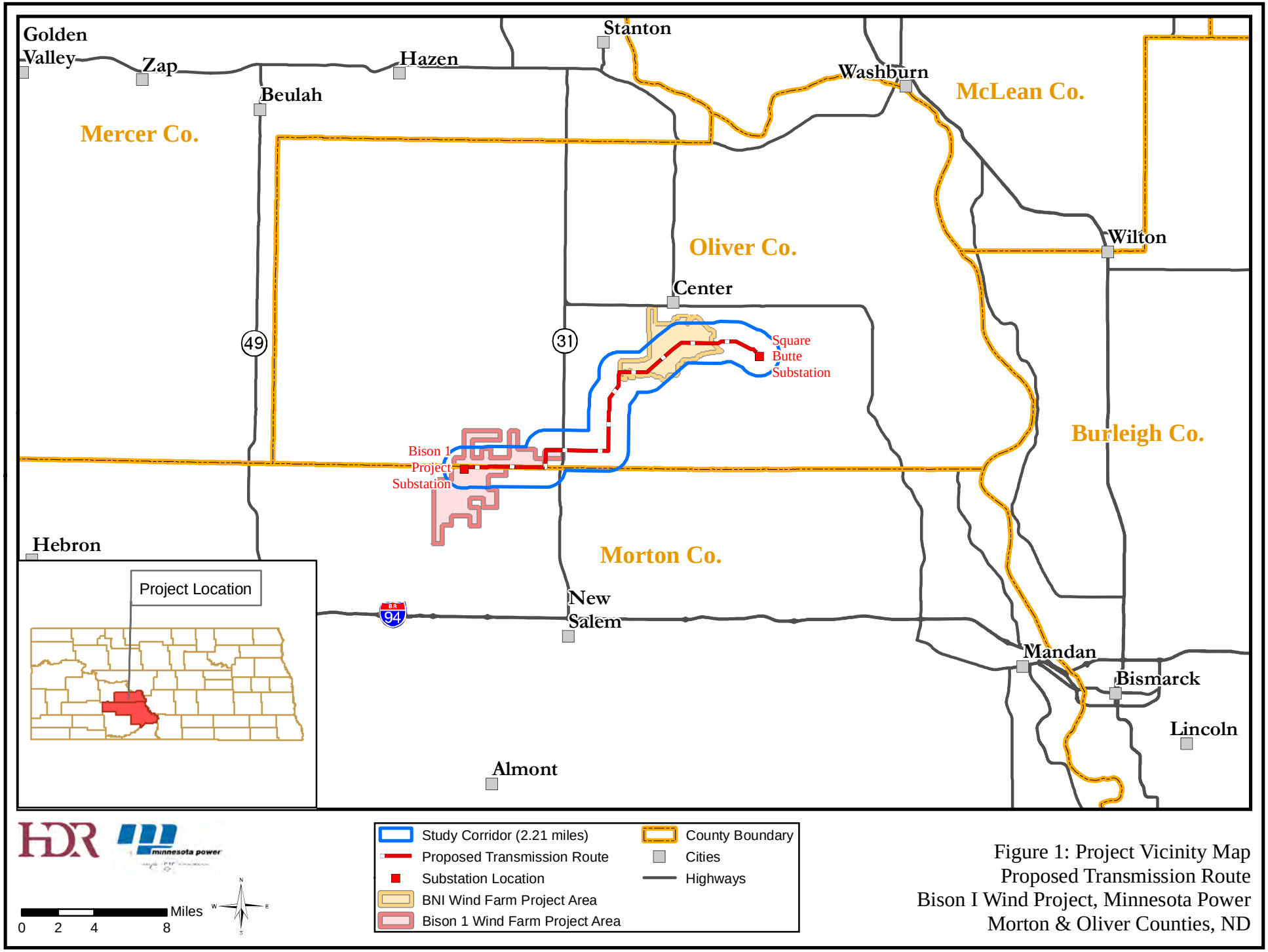

Figure 1: Project Vicinity Map
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Bison I Wind Project, Minnesota Power
Morton & Oliver Counties, ND

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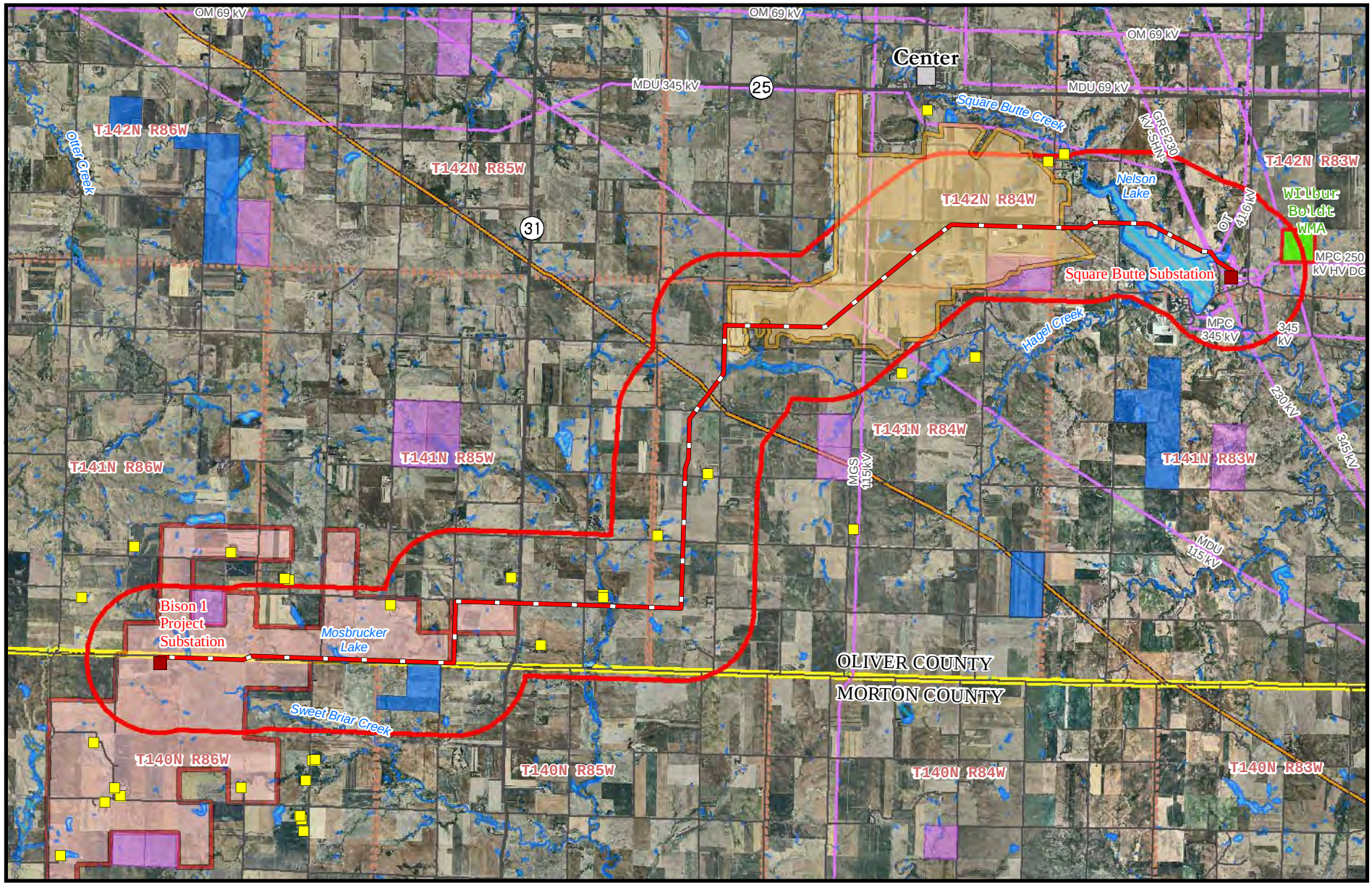

Figure 2: Corridor Exclusion and Avoidance Areas
Proposed Transmission Route
Bison I Wind Project, Minnesota Power
Morton & Oliver Counties, ND

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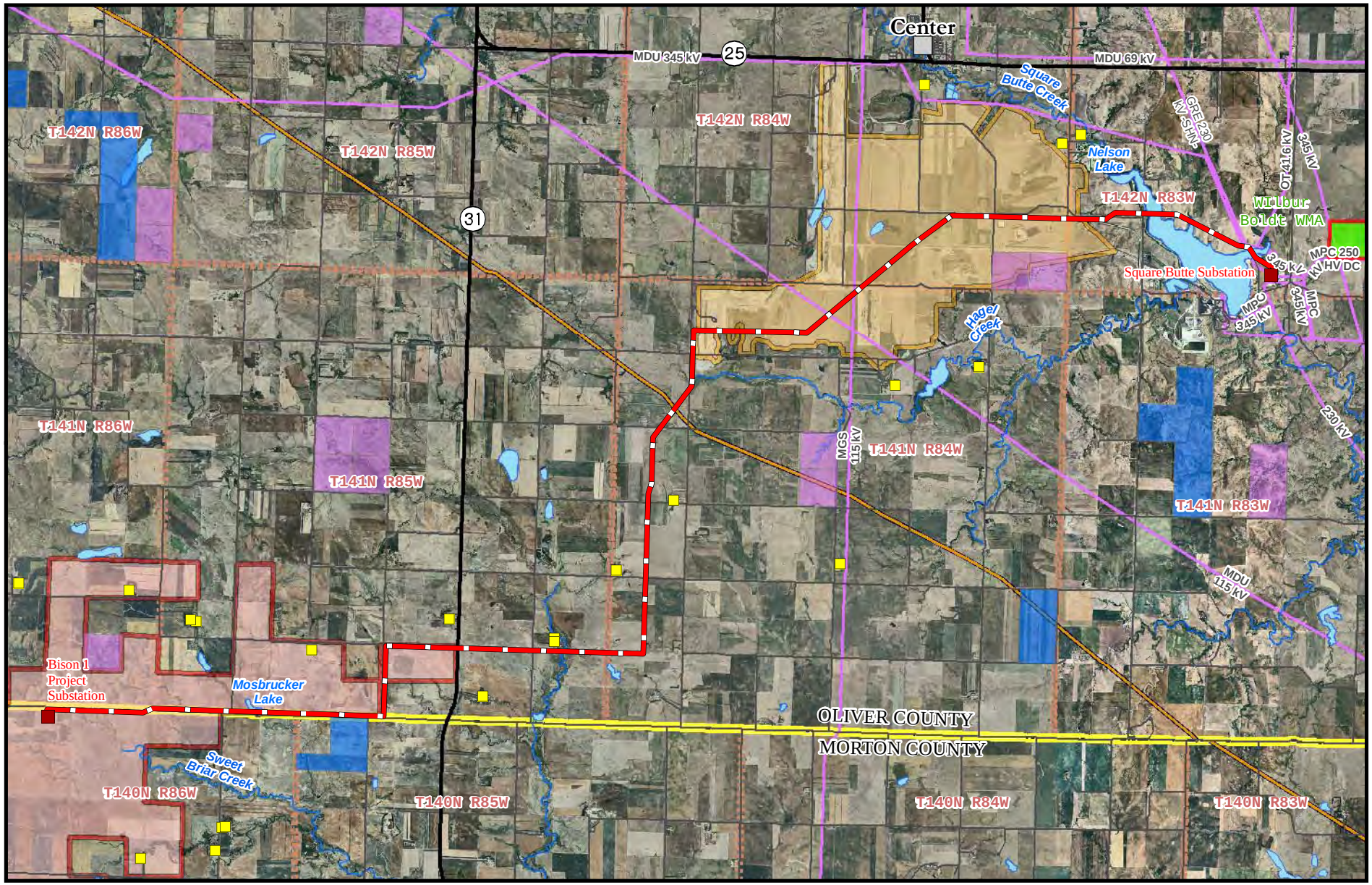

Figure 3. Route Exclusion and Avoidance Areas
Proposed Transmission Route
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Morton & Oliver Counties, ND

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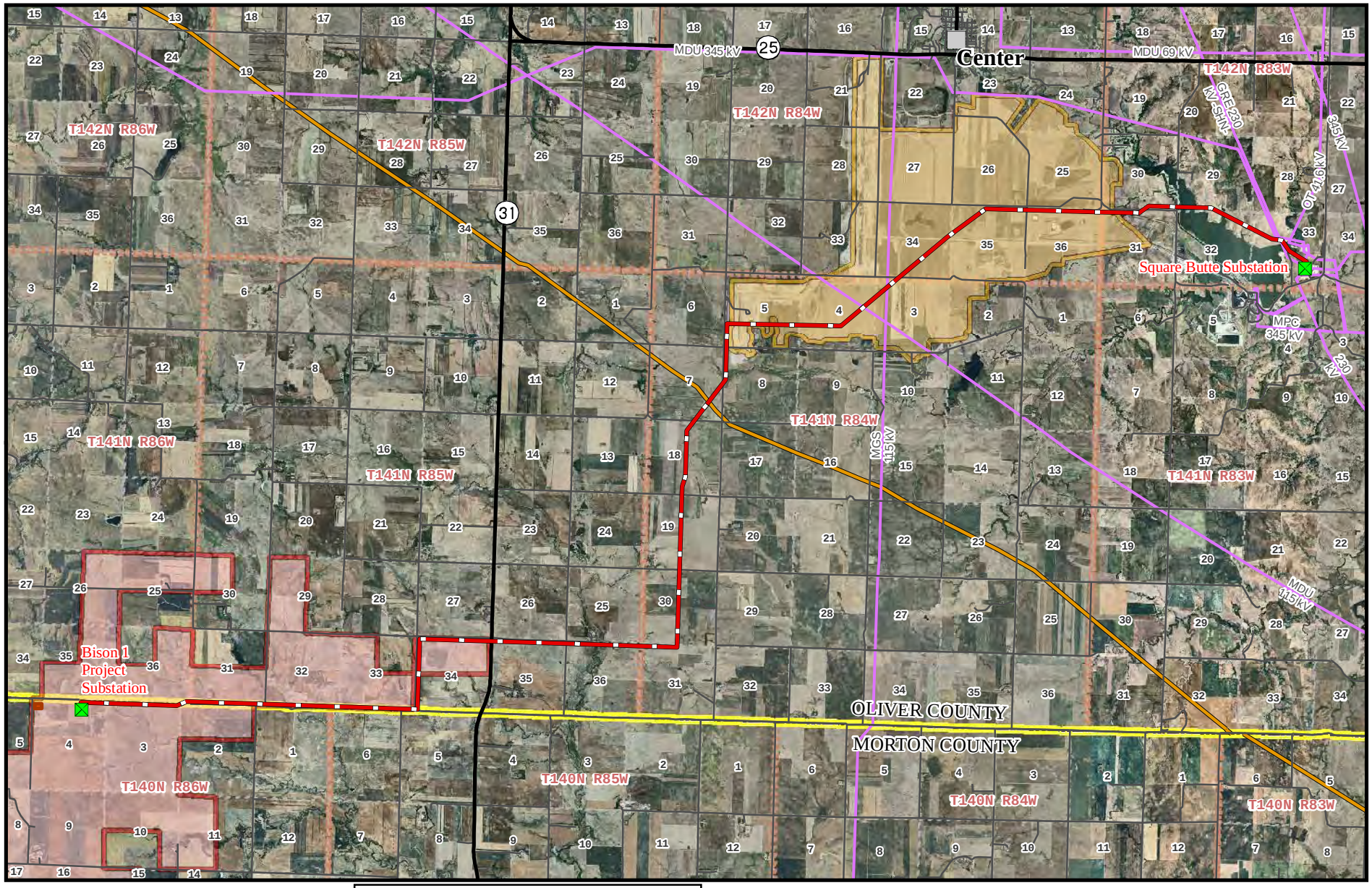

Figure 4. Project Location Map
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Bison I Wind Project, Minnesota Power
Morton & Oliver Counties, ND

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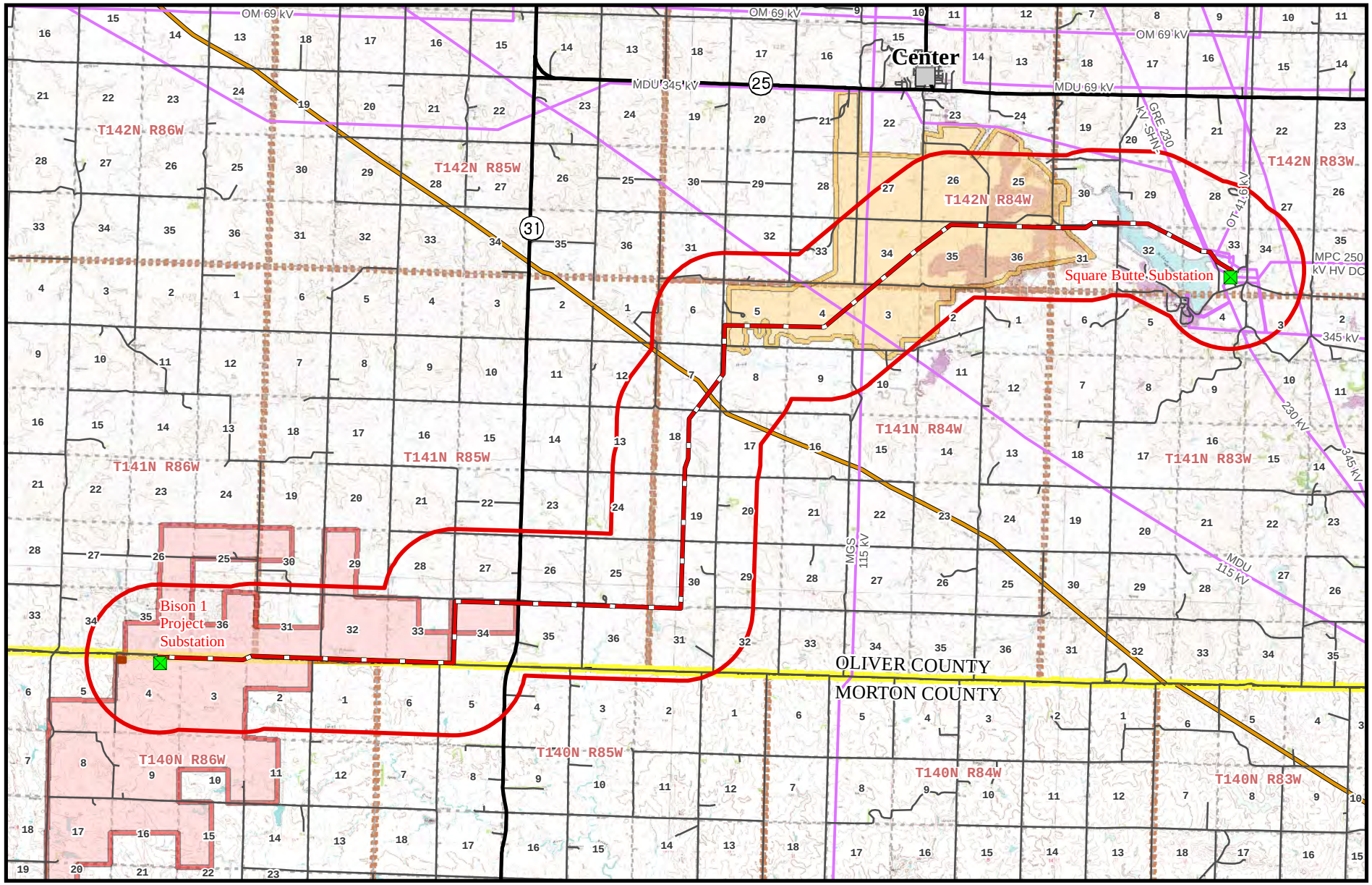

Figure 5. Project Location Map
(USGS Topographic)
Proposed Transmission Route
Bison I Wind Project, Minnesota Power
Morton & Oliver Counties, ND

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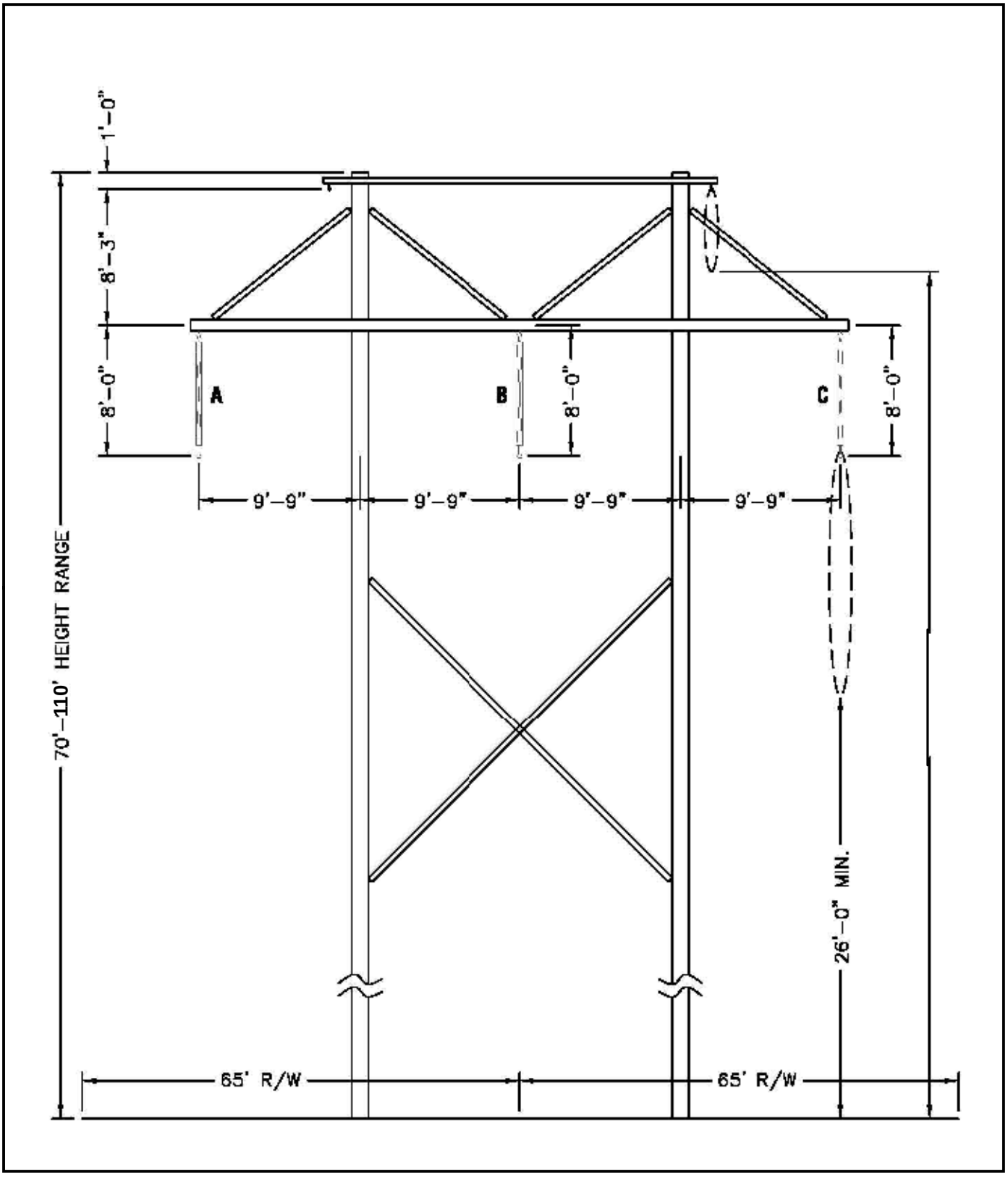

Figure 6. 230 kV Pole Type Drawing
Proposed Transmission Route
Bison I Wind Project, Minnesota Power
Morton & Oliver Counties, ND

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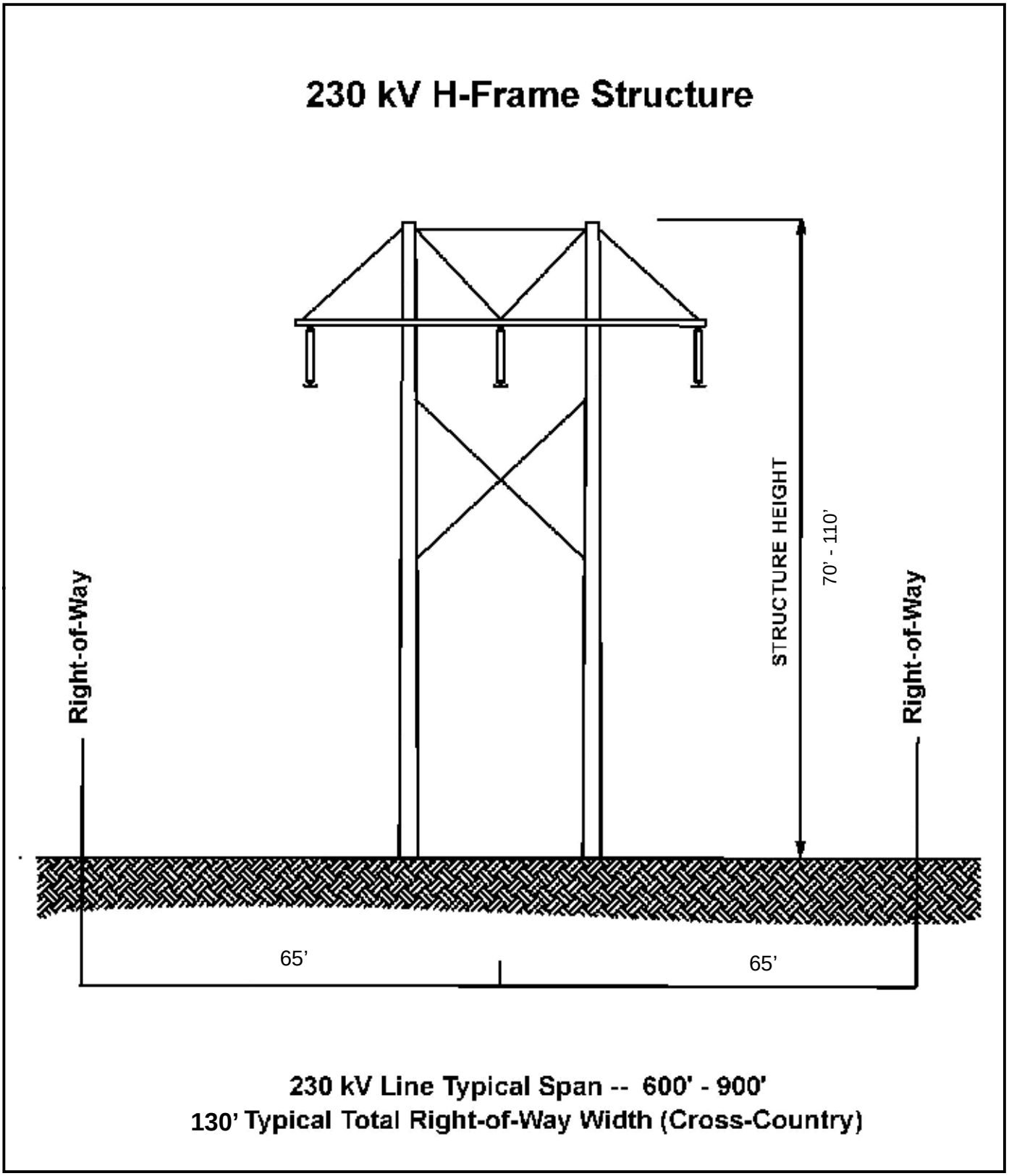

Figure 7. Right of Way Requirements
Proposed Transmission Route
Bison I Wind Project, Minnesota Power
Morton & Oliver Counties, ND

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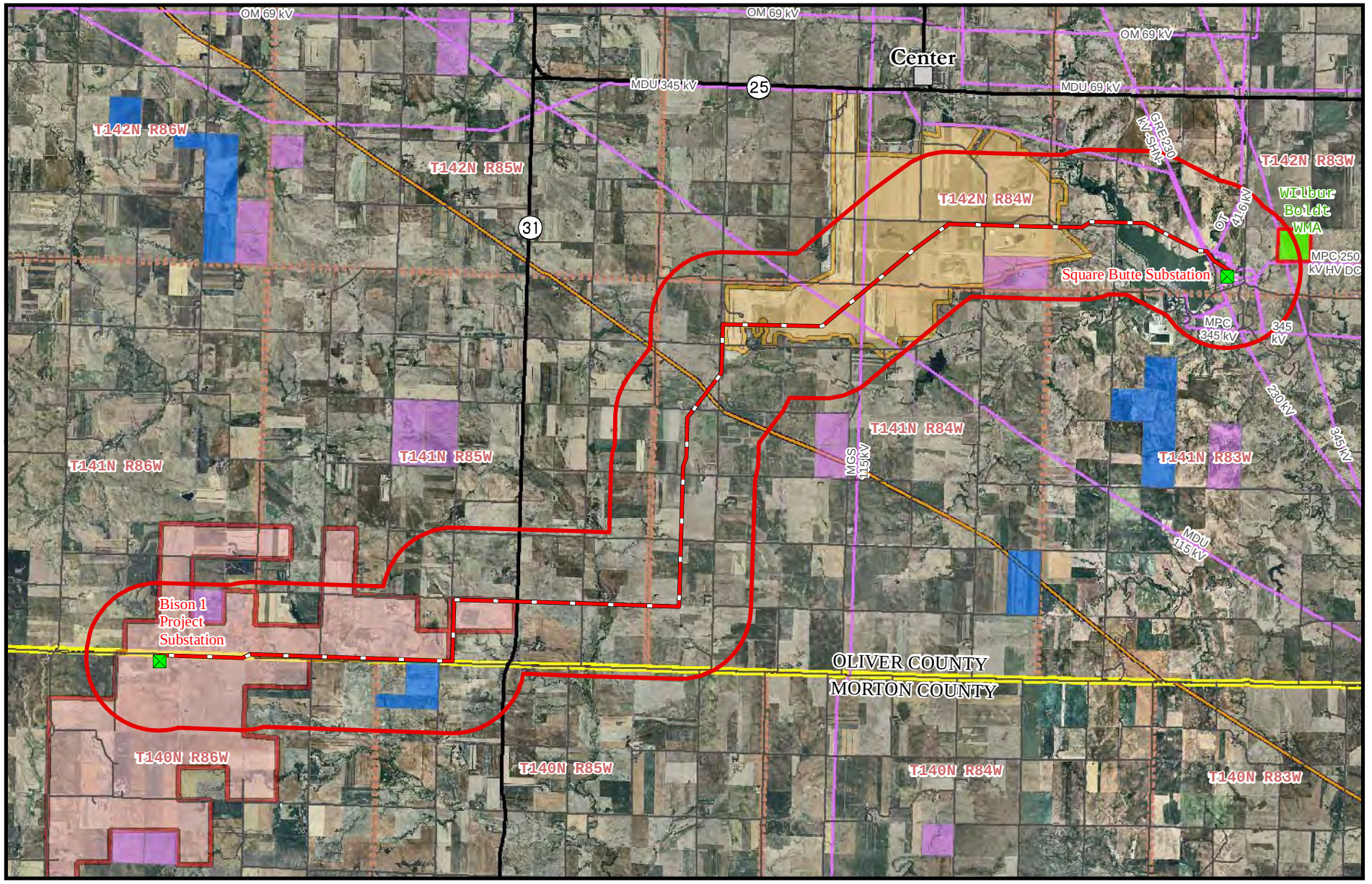

Figure 8: Public Lands
Proposed Transmission Route
Bison I Wind Project, Minnesota Power
Morton & Oliver Counties, ND

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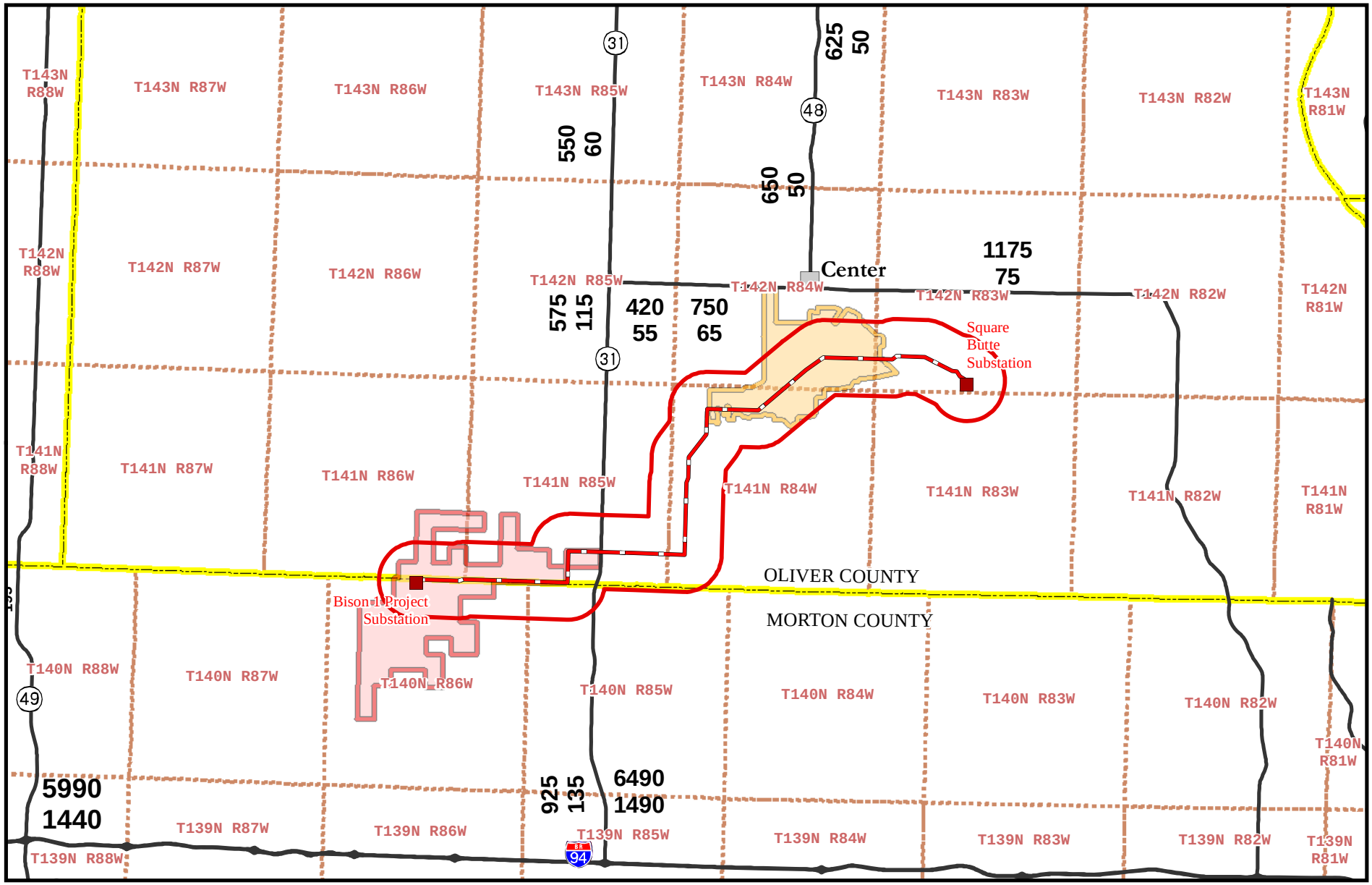

Figure 9: Average Daily Traffic Map
Proposed Transmission Route
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Morton & Oliver Counties, ND

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Figure 10: Existing Environment
Proposed Transmission Route
Bison I Wind Project, Minnesota Power
Morton & Oliver Counties, ND

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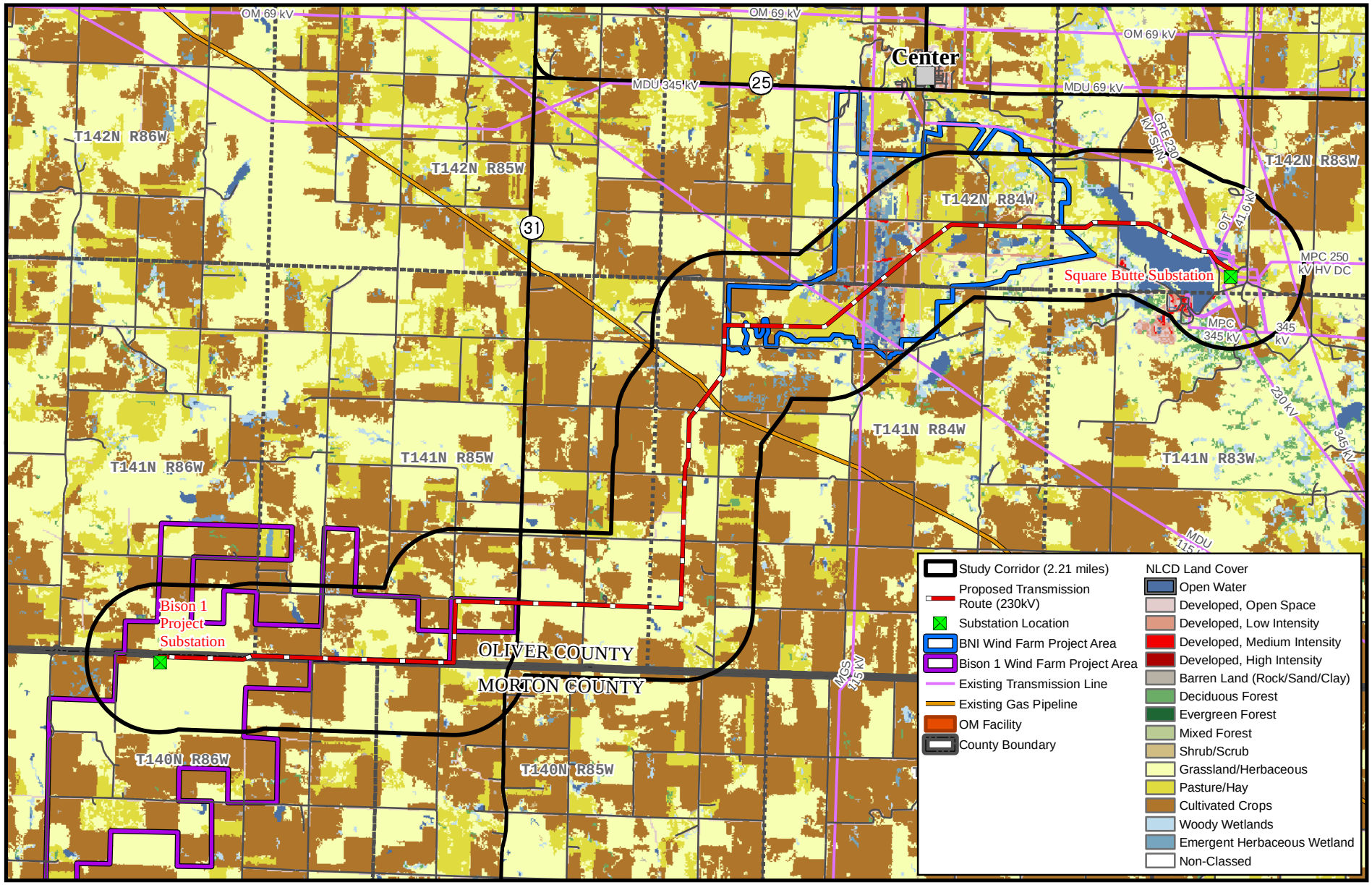

Figure 11.Land Use Map
(NLCD Land Cover)
Proposed Transmission Route
Bison I Wind Project, Minnesota Power
Morton & Oliver Counties, ND

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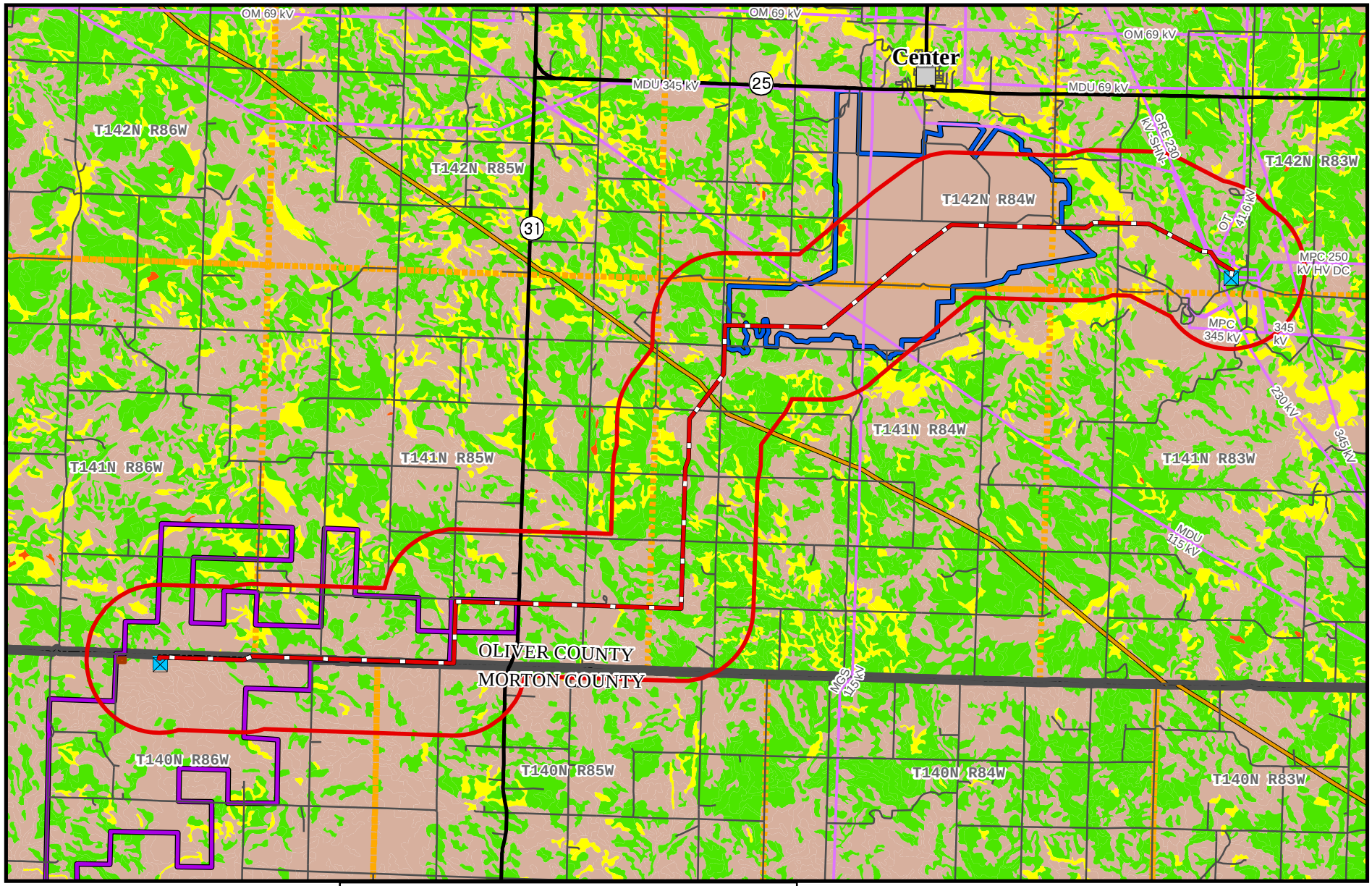

Figure 12. Soil Distribution Map
(Ssurgo Soil Data)
Proposed Transmission Route
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Morton & Oliver Counties, ND

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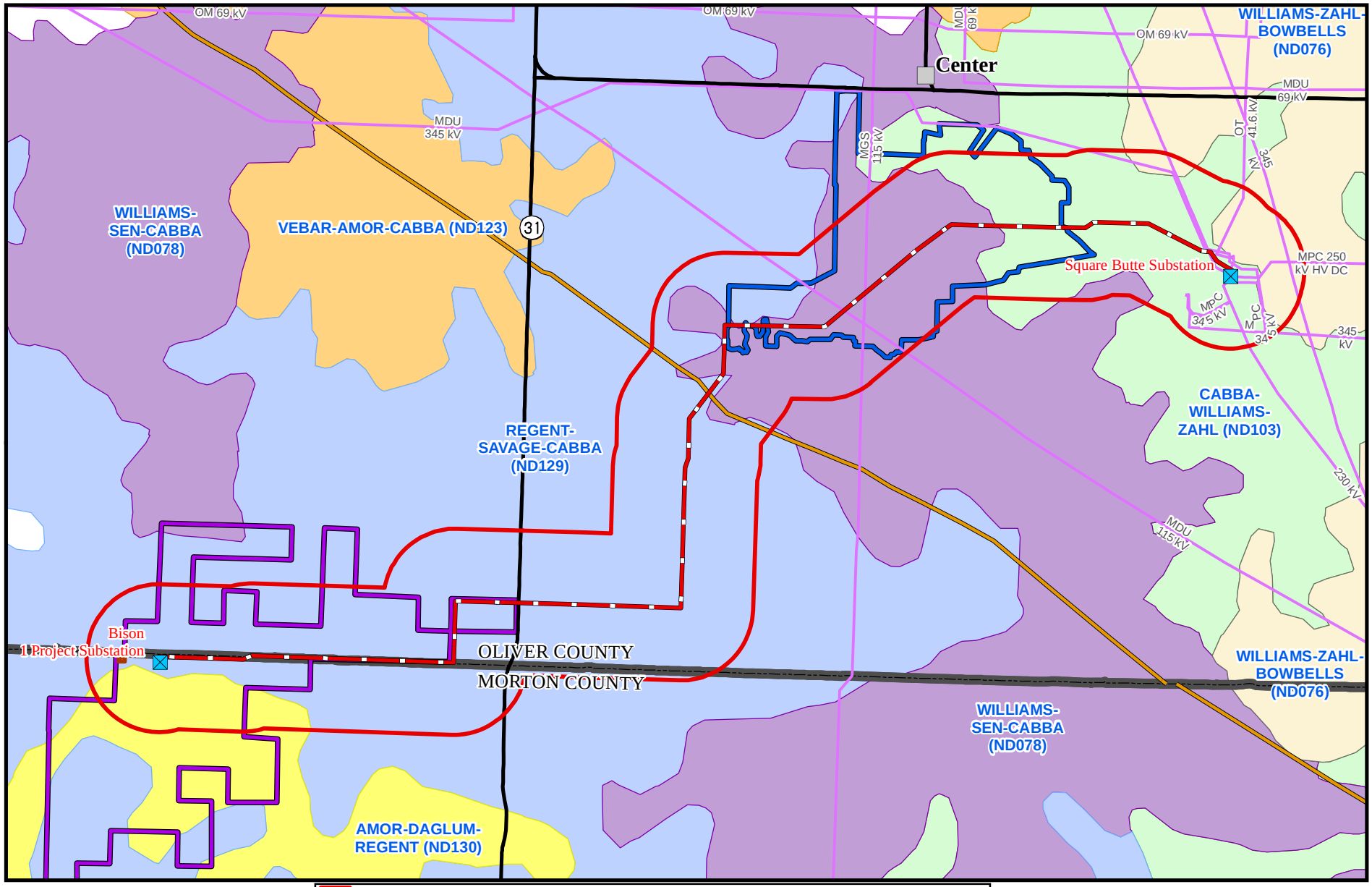

Figure 13. State Soils Associations Map (Statsgo Soil Data)
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Morton & Oliver Counties, ND

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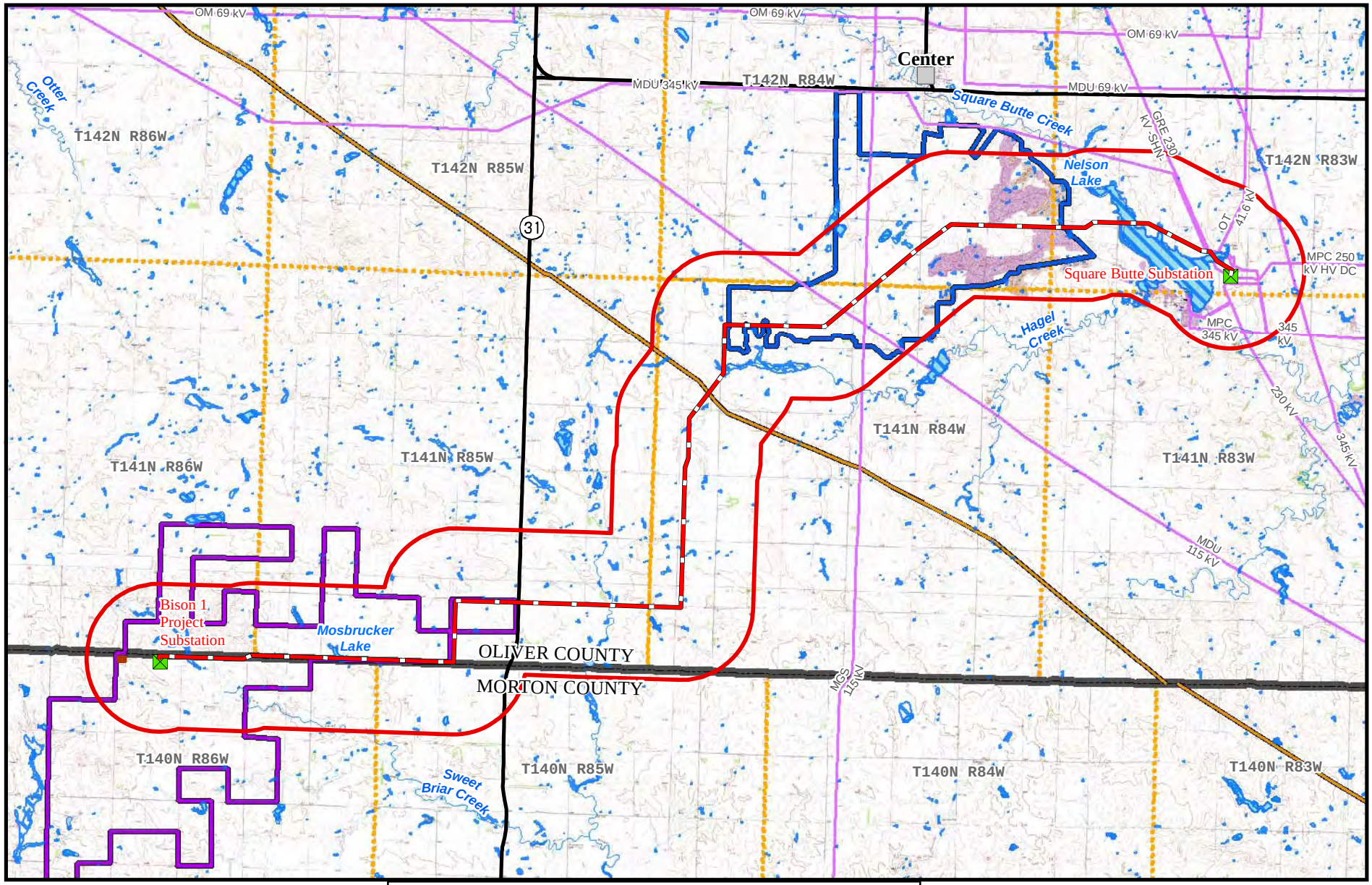

Figure 14. National Wetlands Inventory and Surface Waters
Proposed Transmission Route
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Morton & Oliver Counties, ND

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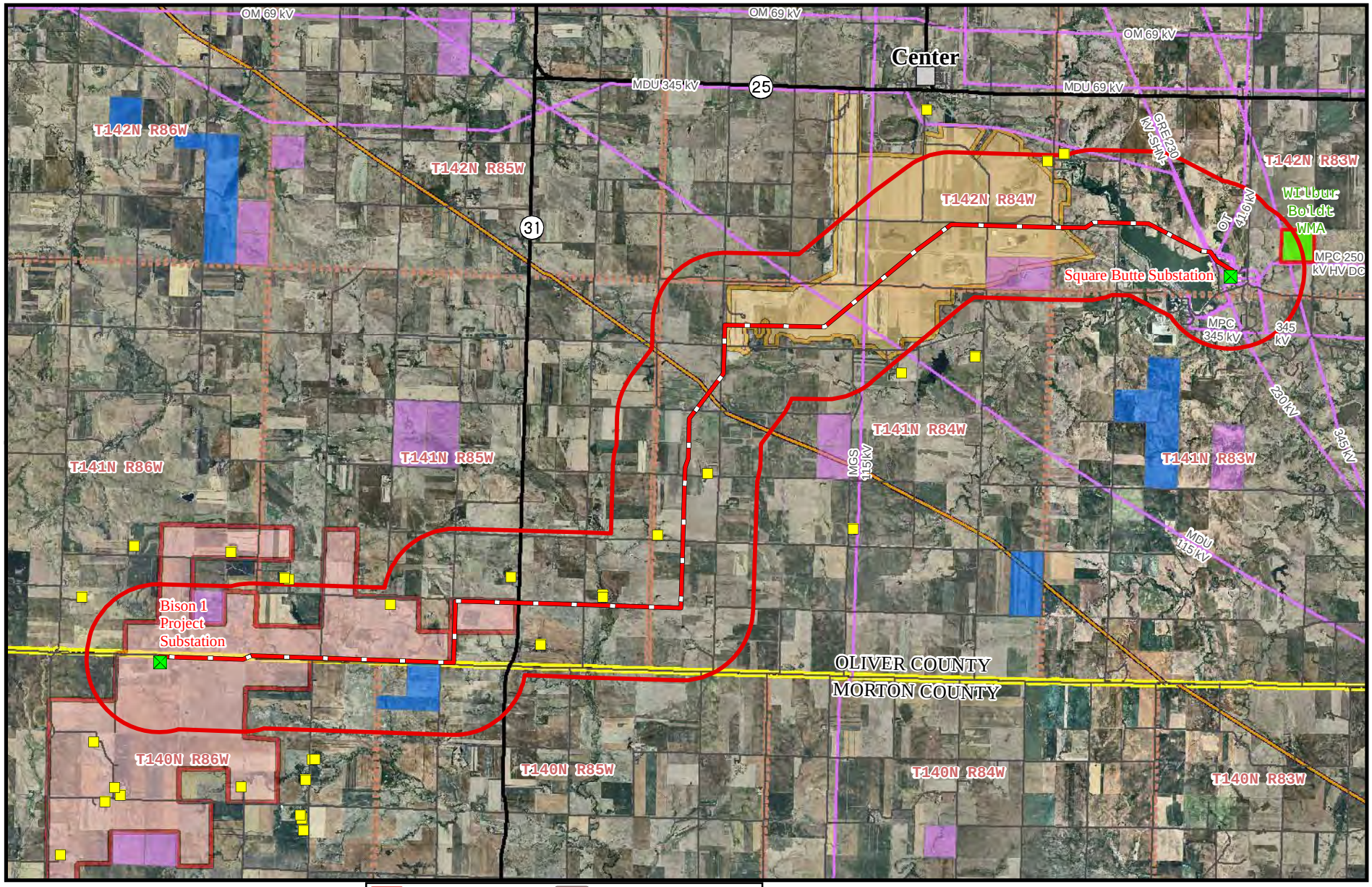

Figure 15: Public Lands Potentially Available for Recreation
Proposed Transmission Route
Bison I Wind Project, Minnesota Power
Morton & Oliver Counties, ND

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Figure 16

This figure has been replaced by a full set of plan and profile figures, which is attached as Appendix E.

Appendix E
Plan and Profile