APPLICATION FOR ROUTE PERMIT FOR A 161 KV TRANSMISSION LINE

SUBMITTED TO:

MINNESOTA PUBLIC UTILITIES COMMISSION

DOCKET NO. IP7013/TL-19-621

SUBMITTED BY:

BIG BEND WIND, LLC

8665 Hudson Boulevard North, Suite 110
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COTTONWOOD, MARTIN, AND WATONWAN COUNTIES, MINNESOTA

NOVEMBER 2020

Applicant:	Big Bend Wind, LLC
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Authorized Representative:	Ken Young, Chief Operating Officer of the Manager of the Sole Member of the Sole Member of Applicant
Signature:	
Project Contact:	c/o Apex Clean Energy, Inc. Attn: Brenna Gunderson, Director of Development 8665 Hudson Blvd. North, Suite 110 Lake Elmo, MN 55042 Phone: 612-260-6614 Fax: 434-220-3712 Email: Brenna.gunderson@apexcleanenergy.com

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AADT	Annual Average Daily Traffic
Alternate Crandall Route	Alternate route to connect the Big Bend Wind Project to the Blue Lake-Wilmarth-Interstate Interconnect 345 kV transmission line at Xcel Energy's Crandall Switching Station.
Alternate Peaking Plant Route	Alternate route to connect the Big Bend Wind Project to the Blue Lake-Wilmarth-Interstate Interconnect 345 kV transmission line at Great River Energy's Lakefield Junction point of interconnect.
AM	Amplitude Modulation
Apex	Apex Clean Energy Holdings, LLC
Applicant	Big Bend Wind, LLC
Application	Route Permit application
Application Alignment	Proposed transmission line alignment within the Route.
AQI	Air Quality Index
ARMER	Allied Radio Matrix for Emergency Response
APLIC	Avian Power Line Interaction Committee
Big Bend	Big Bend Wind, LLC
BMPs	best management practices
BWSR	Board of Soil and Water Resources
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
Commission	Minnesota Public Utilities Commission
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CSAH	County State Aid Highway
CWA	Clean Water Act
CWI	County Well Index
dB	decibels
dBA	A-weighted decibels
ECS	Ecological Classification System
EMF	electric and magnetic fields
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FM	Frequency Modulation
FPPA	Farmland Protection Policy Act
GIS	Geographic Information System
GPS	Global Positioning System
IAAs	impact assessment areas
IBA	Important Bird Area
IPaC	Information for Planning and Conservation
ISD	Independent School District
kV	kilovolt
kV/m	kilovolts per meter
L_{10}	ten percent of an hour
L_{50}	fifty percent of an hour
LGU(s)	local government unit(s)

MBTA	Migratory Bird Treaty Act
MBS	Minnesota Biological Survey
mG	milliGauss
MDH	Minnesota Department of Health
MHz	megahertz
MISO	Midcontinent Independent System Operator
MNDNR	Minnesota Department of Natural Resources
MNDOT	Minnesota Department of Transportation
MNHS	Minnesota Historical Society
MDPS	Minnesota Department of Public Safety
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utilities Commission
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAC	noise area classifications
NAS	National Audubon Society
NESC	National Electric Safety Code
NHD	National Hydrography Dataset
NHIS	Natural Heritage Information System
NIEHS	National Institute of Environmental Health Sciences
NLCD	National Land Cover Database
NO_2	nitrogen dioxide
NPC	native plant community(ies)
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O_3	ozone
ORVW	outstanding resource value waters
PM	particulate matter
POI	Point of Interconnection
PPSA	Power Plant Siting Act
Project	Big Bend Wind, LLC's proposed 161kV transmission line
Proposed Route or Route	The 18-mile transmission line presented in this Route Permit application for which Big Bend has voluntary easements.
PWI	Public Waters Inventory
QSI	Quality Services Inc.
Red Rock	Red Rock Solar, LLC
RIM	Reinvest in Minnesota
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SOBS	Sites of Biodiversity Significance
Solar Project	Red Rock Solar Project
SSA	sole source aquifer
SSURGO	U.S. Department of Agriculture Soil Survey Geographic Database
Step-up Substation	The step-up substation required for the Big Bend Transmission Line Project to connect to Xcel Energy's Crandall Switching Station.
SWPPP	Stormwater Pollution Prevention Plan

the existing 345 kV transmission line	The existing Blue Lake-Wilmarth-Interstate Interconnect 345 kV transmission line.
TMDL	total maximum daily load
Transmission Line	The proposed 161 kilovolt transmission line and associated facilities to support the Big Bend Wind Project and the Red Rock Solar Project.
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USG	unhealthy for sensitive groups
USGS	U.S. Geological Survey
USC	U.S. Code
WHPA	Wellhead Protection Area
Wind Project	Big Bend Wind Project
WMA	Wildlife Management Area
WNS	white-nose syndrome

1.0 INTRODUCTION

Big Bend Wind, LLC (Big Bend or Applicant) and Red Rock Solar, LLC (Red Rock), are indirect wholly-owned subsidiaries of Apex Clean Energy Holdings, LLC (Apex), and are proposing to construct up to 314 megawatts (MWs) of new renewable energy generation in Cottonwood and Watonwan Counties, Minnesota. As proposed, the renewable generation could consist of up to 314 MWs of wind (the Big Bend Wind Project or Wind Project), or a combination of wind and up to 60 MWs of solar (the Red Rock Solar Project or Solar Project). In addition, Big Bend is proposing to construct a 161 kilovolt (kV) transmission line and associated facilities (Transmission Line) to support the Wind Project and Solar Project. The Transmission Line is needed to interconnect the Wind Project and Solar Project to the transmission grid. The Transmission Line will consist of approximately 18 miles of 161 kV transmission line located in Cottonwood, Watonwan and Martin Counties, Minnesota. Big Bend submits this application for a Route Permit (Application) to the Minnesota Public Utilities Commission (MPUC or Commission) pursuant to Minn. Stat. § 216E and Minn. R. Ch. 7850. The Route Permit Application Completeness Checklist is provided in Appendix A.

Big Bend requests permission to construct and operate the Project, an approximately 18-mile-long 161-kV transmission line and associated facilities, to connect the Wind Project and Solar Project to an existing 345 kV transmission line near the Xcel Energy Crandall Switching Station in Martin County, Minnesota. The transmission line will be single-circuit. The Project will also require a step-up substation and a 345 kV segment of less than 1,500 feet to connect the step-up substation to the Crandall Switching Station and the existing Blue Lake-Wilmarth-Interstate Interconnect 345 kV transmission line (the Step-up Substation and the existing 345 kV transmission line).

The 18-mile transmission line presented in this Application represents Big Bend's effort to identify a route that follows existing roads and parcel lines, avoids residences, minimizes impacts on the environment and affected landowners, and for which Big Bend has voluntary easements (the Proposed Route or Route). In addition, Big Bend includes three segment alternatives to the Route for which Big Bend continues to work with landowners on routing (see Section 3.3). The Route presented in this Application meets the objective of the Project to interconnect the Big Bend Wind Project and Red Rock Solar Project to the existing transmission grid. However, the proximity of the existing 345 kV transmission line to the Wind Project and Solar Project also presents routing challenges due to the presence of other wind projects and natural gas peaking plants that already interconnect to the same line. These facilities are located in northwestern Martin County and are not crossed by the Proposed Route because the parcels are under easement with other entities. Big Bend has reached out to these entities but, to date, has not been able to reach agreement with these entities to develop a potential path for the transmission line across the parcels where they have existing wind turbines and/or leases. Big Bend continues to coordinate with these entities in an effort to create a more direct route to the existing 345 kV transmission line (see Section 3.4).

Big Bend holds an interconnection position in the Midcontinent Independent System Operator (MISO) queue at the Crandall Switching Station (Point of Interconnection; POI). This interconnection would facilitate commercial and industrial off-takers. However, the Great River Energy Lakefield Junction Peaking Plant, located approximately two miles southwest of the POI along the same 345 kV transmission line, offers a second interconnection opportunity. This interconnection would be a "net-zero" with the natural gas peaking plant and be independent of

the MISO interconnection process. Each of these interconnection opportunities are described in more detail in Section 3.4.

1.1 Project Ownership

The Project will be owned by Big Bend Wind, LLC.

1.2 Requested Action

This Application is submitted under the Alternative Permitting Process under Minn. Stat. §216E.04, subd. 2(3) and Minn. R. 7850.2800 to 7850.3900. See Minn. R. 7850.2800, Subp. 1(C). The rules require the applicant to propose one route. Minn. R. 7850.3100. The applicant must also describe any alternative routes that were considered, but rejected, and provide its reasons for rejecting them. In developing the Route, Big Bend evaluated alternate route segments which are described in Section 3.3.

For reasons presented herein, Big Bend Wind prefers the Route for constructing the new 161 kV transmission line to connect the Wind and Solar Project Substations to the POI at the existing Crandall Switching Station. Big Bend respectfully requests that the Commission approve the Route and authorize a route width of 500 feet on each side of the proposed transmission line route centerline (1,000 feet total width) for a majority of the route. Big Bend requests an expanded route width for three alternate segments where they continue to coordinate with landowners on the alignment (see Section 3.3). In each of these locations, the alternate segment is one mile or less from the corresponding segment of the Route.

This Application demonstrates that construction of the Project along the Route will comply with the applicable standards and criteria set out in Minn. Stat. § 216E.03, subd. 7, and Minn. R. 7850.4100. The Project, as proposed, will support the State's goals to conserve resources, minimize environmental, human settlement, and land use impacts, and supports the State's electric energy security through the construction of efficient, cost-effective electric transmission infrastructure.

Big Bend notes that the Project will not be constructed unless the Commission issues a Site Permit for the Big Bend Wind Project.

1.3 Permittee

The permittee for the Project will be:

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The contact persons regarding the Application are:

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1.4 Certificate of Need Process

Minnesota Statute section 216B.243 states that a Certificate of Need is required for a "large energy facility," defined in Minn. Stat. § 216B.2421 as "any electric power generating plant or combination of plants at a single site with a combined capacity of 50,000 kilowatts or more and transmission lines directly associated with the plant that are necessary to interconnect the plant to the transmission system;" and "any high-voltage transmission line with a capacity of 100 kVs or more and with more than ten miles of its length in Minnesota or that crosses a state line."[1] Big Bend filed an application for a Certificate of Need to construct the Wind Project and the Project on November 9, 2020. The application is available in Docket No. IP7013/CN-19-408.

1.5 Alternative Permitting Process for Route Permit

The Minnesota Power Plant Siting Act (PPSA) provides that no person may construct an HVTL without a Route Permit from the Commission. Minn. Stat. § 216E.03, subd. 2. Under the PPSA, an HVTL includes a transmission line that is 100 kV or more and is greater than 1,500 feet in length. Minn. Stat. § 216E.01, subd. 4. The proposed 161 kV transmission line is an HVTL greater than 1,500 feet in length and, therefore, a Route Permit is required from the Commission prior to construction.

The 161 kV Project qualifies for review under the Alternative Permitting Process authorized by Minn. Stat. § 216E.04, subd. 2(3) and Minn. R. 7850.2800, subp. 1(C), because the Project is an HVTL between 100 and 200 kV. Accordingly, Big Bend is following the provisions of the Alternative Permitting Process outlined in Minn. R. 7850.2800 to 7850.3900 for this Project.

1.6 Notice to the Commission

Big Bend notified the Commission on August 28, 2020 by letter (mailed and electronically filed) that it plans to file a Route Permit application for the Project and that it intends to use the Alternative Permitting Process of Minn. R. 7850.2800 - .3900 for the Project (Appendix B). This letter complies with the requirement of Minn. R. 7850.2800, subp. 2, to notify the Commission of this election at least 10 days prior to submitting an application for a Route Permit.

[1] Minn. Stat. § 216B.2421, subds. 2(1), and 2(3).

1.7 Request for Joint Proceeding with Certificate of Need Application

As described above, Big Bend has applied for a Certificate of Need for the Wind Project in Docket No. IP7013/CN-19-408 and Red Rock Solar has filed a Site Permit Application in Docket No. IP-7014/GS-19-620 and Certificate of Need in Docket No. IP-7014/CN-19-486. Minnesota Statute section 216B.243, subdivision 4 and Minnesota Rule 7849.1900, subpart 4 permit the Commission to hold joint proceedings for the Certificate of Need and Route Permit in circumstances where a joint hearing is feasible, more efficient, and may further the public interest.

Collectively, the Big Bend Wind Project, Red Rock Solar Project, and associated Big Bend Wind Transmission Line represent Minnesota's first hybrid wind/solar/transmission project. As such, Big Bend respectfully requests that the Commission order a joint regulatory review process for the Big Bend Route Permit, Site Permit, and Certificate of Need applications and Red Rock Solar Site Permit and Certificate of Need applications. Holding a joint proceeding is in the public interest because it will make it easier for members of the public to participate in the proceedings, provide a comprehensive record of all benefits, impacts and minimization measures related to the Wind Project, Solar Project, and the Transmission Line Project and improve administrative efficiency.

2.0 PROJECT INFORMATION

2.1 Project Location

The 161 kV transmission line will connect the Wind and Solar Project Substations at the intersection of 366th Street and 590th Avenue in Midway Township of southeastern Cottonwood County to the Crandall Switching Station in Cedar Township of northwestern Martin County, approximately 10 miles southeast. The Proposed Route is located in Midway and Mountain Lake Townships in Cottonwood County, Odin Township in Watonwan County, and Cedar Township in Martin County.

2.2 Route Width

The PPSA, Minn. Stat. § 216E, directs the routing of transmission lines in a way that "minimize[s] adverse human and environmental impact while ensuring continuing electric power system reliability and integrity and ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion." The PPSA further authorizes the Commission to meet its routing responsibility by designating a "route" for a new transmission line when it issues a Route Permit. A "route" may have "a variable width of up to 1.25 miles," within which the right-of-way for the transmission facilities can be located.

A route should be wide enough to provide flexibility for the permittee to work with landowners to address concerns and to address engineering issues that may arise after a Route Permit is issued. Once a route is established by the Commission, the permittee then does more detailed engineering and survey work and obtains input from landowners to establish a final alignment and pole placement.

Big Bend proposes a route width of 500 feet on each side of the proposed transmission line route centerline (1,000 feet total width) for a majority of the route. A wider route width is requested in three areas where Big Bend continues to work with landowners on alternate segments. These areas include the Alternate Red, Yellow, and Purple segments that are described below in Section 3.3. The route width in these areas varies from 1,000 feet to 1.15 miles. Additionally, Big Bend requests a route width of up to one mile in northwestern Martin County to provide routing flexibility on parcels that are currently under easement with other entities and for which Big Bend has been unable to initiate the easement process.

Once the permittee establishes a final alignment and structure placement, proposed construction drawings are provided to the Commission in the form of a "Plan and Profile" compliance filing so the Commission can confirm that the permittee's plans are consistent with the Route Permit.

Given the Commission's practice to identify an "anticipated alignment" in its Route Permit decisions, Big Bend has developed what it currently believes to be the likely alignment within the Proposed Route that minimize the overall potential impacts based on the routing factors identified in Minn. Stat. § 216E.03, subd. 7(b), and Minn. R. 7850.4100. This alignment is referred to as the "Application Alignment." This Application Alignment may require modifications after a Route Permit is issued due to limitations inherent in identifying an alignment absent detailed survey and engineering work, site review, and design. The Application Alignment that was developed for purposes of evaluating the potential impacts of the Proposed Route is available on the detailed maps in Appendix C. Big Bend completed a preliminary design for the Proposed Route based on the information known at the time of the filing of this Application.

After the Commission issues a Route Permit decision with an "anticipated alignment," a final alignment will be developed by reviewing that "anticipated alignment" with individual landowners and agencies with permitting responsibilities and performing detailed survey and engineering work, site review, and design. The final alignment will be provided to the Commission through the Plan and Profile submission and review process discussed above. As part of that submission, Big Bend will inform the Commission as to where deviations in the final alignment from the "anticipated alignment" occur.

2.3 Transmission Structure Design

Big Bend proposes either wood or steel monopole structures that generally range in height from 70 feet to 120 feet tall for the Project. Big Bend will use four structures that range from 170 feet to 190 feet to facilitate the two crossings above the existing 345 kV transmission line. The transmission design will use three types of structures:

- Dead end: used within the Wind Project Substation and Step-up Substation;
- Angle: used in locations where the alignment turns; and
- Tangent: for in-line (straight) segments.

Structure spacing will be dependent on the right-of-way width. In areas with a 100-foot right-of-way, structures will be spaced approximately 600 to 800 feet apart. In areas with a 150-foot right-of-way, structures will be spaced approximately 800 to 1,100 feet apart. Structures would be directly embedded into the ground, unless poor soil or geotechnical conditions necessitate concrete foundations. The wood poles have a diameter of approximately 30 inches. Drilled pier foundations may vary from approximately 3 to 6 feet in diameter and 20 to 30 feet or more in depth, depending on soil conditions.

The proposed 161 kV transmission line will be designed to meet or surpass all relevant local and state codes, North American Electric Reliability Corporation standards, and the National Electric Safety Code (NESC). Appropriate standards will be met for construction and installation, and applicable safety procedures will be followed during and after installation.

2.4 Transmission Line Right-of-Way

Big Bend anticipates constructing the new single-circuit 161-kV transmission line and structures using a design and span lengths that require a variable right-of-way. When paralleling existing road rights-of-way, Big Bend will utilize a right-of-way width of 150 feet, 50-feet wide on the roadside and 100-feet wide on the non-roadside of the alignment. Big Bend proposes to place poles on adjacent private property, within approximately 15 feet of the existing road right-of-way. These pole placements allow the transmission line right-of-way to share existing road rights-of-way to the greatest extent feasible and will reduce the overall size of the easement required from the private landowner along roads. Pole placement and offset distances may vary in areas such as highway interchanges due to county or state design requirements and in areas of planned future road expansion. Where the transmission line is not parallel to existing road rights-of-way, Big Bend will generally utilize a right-of-way width of 100 feet. This narrower right-of-way will help minimize impacts to the agricultural fields the Proposed Route typically crosses when not paralleling a road. However, there are three locations where the Proposed Route is not parallel to a road and has a 150-foot right-of-way to better facilitate current farming practices.

2.5 Step-up Substation

Big Bend will build a Step-up Substation on a five-acre parcel currently under option to purchase agreement for the Project near the intersection of 230th Street and 30th Avenue in Martin County. The Step-up Substation location is on the opposite side of 230th Street from the Crandall Switching Station. A less-than 1,500 foot 345-kV segment will connect the Step-up Substation to the existing transmission grid via the Crandall Switching Station. The Step-Up Substation will require a construction workspace of approximately 5.0 acres, with the final fenced-in area anticipated to be approximately 350 feet by 350 feet. For the purposes of this Application, Big Bend conservatively assumed permanent impacts to the 5.0-acre construction workspace. The Step-up Substation components will be mounted on concrete pads. For electrical and fire safety, the Step-up Substation will be graveled to maintain the area free of vegetation. The area will be fenced to prevent unauthorized entry by individuals and wildlife.

2.6 Project Schedule

An anticipated permitting and construction schedule for the Project is provided in Table 2.6-1. This schedule is based on information known as of the date of filing and may be subject to change as further information develops or if there are delays in obtaining the necessary federal, state, or local approvals that are required prior to construction.

Table 2.6-1
Anticipated Project Schedule

Activity	Estimated Activity Dates
Survey and Transmission Line Design Begins	Q3 2021
Minnesota Certificate of Need and Route Permit Issued	Q4 2021
Other Federal, State, and Local Permits Issued	Q3 2021
Start Right-of-Way Clearing	Q1 2022
Start Project Construction	Q2 2022
Project In-Service	Q4 2022

2.7 Project Costs

The total estimated Project cost of the transmission line along the Proposed Route is approximately $12-14 million. This estimate is an engineering estimate and expected to reflect actual Project costs within 20 percent. Final Project costs are dependent on a variety of factors, including the approved route, timing of construction, cost of materials, and labor. Refer to Chapter 2 of the Certificate of Need application (Docket No. CN-19-408) for more detailed information on the Big Bend's cost analysis.

As stated above, if the MPUC grants the necessary approvals, Big Bend will construct, operate, and maintain the proposed 161 kV transmission line, as well as the Big Bend Wind Project. Operating and maintenance costs after construction of the transmission line will be nominal for several years because the line will be new and minimal initial vegetation management is required. The anticipated annual operating and maintenance costs for the 161 kV transmission line is approximately $1,500 per mile. The principal operating and maintenance costs include inspections, which are typically ground-based and occasionally done by aerial inspections, generally on a yearly basis

2.8 Design Options to Accommodate Future Expansion

The proposed 161 kV transmission line is designed to meet current and projected needs. While the Big Bend Wind Project and Red Rock Solar Project will together generate up to 314 MW of renewable energy, the proposed transmission line would be designed, constructed, and operated to be capable of supporting and transmitting up to 374 MW of electricity. The capacity provided by the Project allows for potential future additional generation in southern Minnesota to be interconnected to the electric grid. Big Bend does not anticipate the need to connect the Wind Farm Substation at a higher voltage than 161 kV within the foreseeable future and is, therefore, not proposing to build the line to accommodate greater voltage or transfer capacity than proposed.

3.0 FACILITY DESCRIPTION AND ROUTE SELECTION PROCESS

In this Application, Big Bend includes the Proposed Route, three Alternate Segments to the Proposed Route for which Big Bend continues to work with landowners, and two Alternate Routes. As described below in Section 3.1 and Section 5.0, the Proposed Route has been sited to minimize adverse human and environmental impacts and has signed voluntary easements for its entire length. Big Bend continues to evaluate the three Alternate Segments to the Proposed Route to determine if they have the potential to avoid or further minimize human impacts, primarily aesthetics and land use. The Alternate Route Segments are described in detail in Section 3.3. Similarly, Big Bend includes two Alternate Routes that that are capable of interconnecting the Project to either the Crandall Switching Station or Lakefield Junction Peaking Plant. These Alternate Routes are constrained by parcels encumbered by easements through the Odell Wind Project in northwestern Martin County for which Big Bend has been unable to initiate coordination with the underlying landowners. This existing easement constraint has influenced routing of the Proposed Route as well as route width. Alternate Routes are described in more detail in Section 3.4.

3.1 Route Selection Process

When submitting an application under the Alternative Permitting Process, the applicant must submit one proposed route. Minn. Stat. § 216E.01, subd. 4(3). The Applicant must also "identify in the application any other sites or routes that were rejected by the applicant." *Id.* This section describes Big Bend's development of the Proposed Route; alternate route segments that were considered and rejected are described in Section 3.5.

In developing the Proposed Route and route alternatives in this Application, Big Bend first reviewed the statutory and rule criteria set forth in the PPSA, Minn. Stat. Ch. 216E, and Minn. R. 7850.4100. Big Bend also considered the State's policy of non-proliferation of new infrastructure routes.

The Proposed Route was developed with the following primary objectives:

- satisfy Minnesota routing requirements;
- parallel existing roads, survey boundaries, field lines, natural division lines, and transmission lines on land leased by Big Bend;
- minimize impacts to residences and farmsteads;
- minimize creation of new infrastructure corridors by locating proposed transmission facilities near existing transmission and transportation alignments; and
- minimize impacts to environmental and other sensitive resources.

Big Bend performed analysis of environmental resources in the Project area using regulatory and other natural resource information, Geographic Information System (GIS) data, computer mapping, aerial photographs, and topographic maps. Environmental resources, human settlement, economic, cultural resources, natural environment, and rare and unique natural resources identified along the Proposed Route are discussed in Sections 5.1 to 5.6 of this Application. The Proposed Route is designed to avoid or minimize Project impacts. Because the Proposed Route has three alternate segments, each segment alternate and its comparative

segment on the Proposed Route is described in more detail in Section 3.3 and analyzed in Appendix D. Similarly, Alternate Routes are described in more detail in Section 3.4 and analyzed in Appendix E.

To evaluate the route options, Big Bend considered the following land use/ROW, residential, and environmental criteria:

- **Existing Land Use and Transmission Line, Roads, Survey Lines, Natural Division Lines, and Agricultural Field Boundaries and Other ROWs**: Big Bend identified and mapped the locations of existing electric transmission lines, roadways, survey lines, natural division lines, and agricultural field boundaries. Big Bend then assessed whether the proposed transmission line could be co-located with or parallel to these features. Because most of the Project area consists of farmland, Big Bend reviewed parcel boundaries and assessed the potential for routing the proposed transmission line near these boundaries to minimize the impact to agricultural land use. Land use and infrastructure is discussed in Sections 5.1, 5.2.9, and 5.3.1.
- **Residences and Farmsteads**: Residences and farmsteads within 500 feet of the Proposed Route and each alternate segment and route were identified and mapped. The number of residences and farmsteads along each route alternative was analyzed and tabulated.
- **Wetlands**: Wetlands along the Proposed Route and each alternate segment and route were identified and mapped using existing desktop data. Wetlands along the routes are primarily small emergent wetlands associated with drainages and/or small depressions near or adjacent to the road. Wetlands are discussed in Section 5.5.5.
- **Streams and Drainages**: Streams and drainages along the Proposed Route and each alternate segment and route were identified using desktop resources and mapped. Water resources are discussed in Section 5.5.4.
- **Flora, Fauna, and Rare & Unique Natural Resources**: Big Bend reviewed publicly available rare and natural resource data and information, and consulted with applicable resource agencies, to identify and map the locations of such features near the Proposed Route and each alternate segment and route. This information is being used to avoid and minimize potential Project impacts and is further discussed in Sections 5.5.6, 5.5.7, and 5.6.
- **Cultural Resources**: A cultural resources literature review was conducted on a one-mile buffer of the Proposed Route and each alternate segment and route. The Project area has a low to moderate potential to contain significant cultural resources due to geography and history. Cultural resources are discussed in Section 5.4.

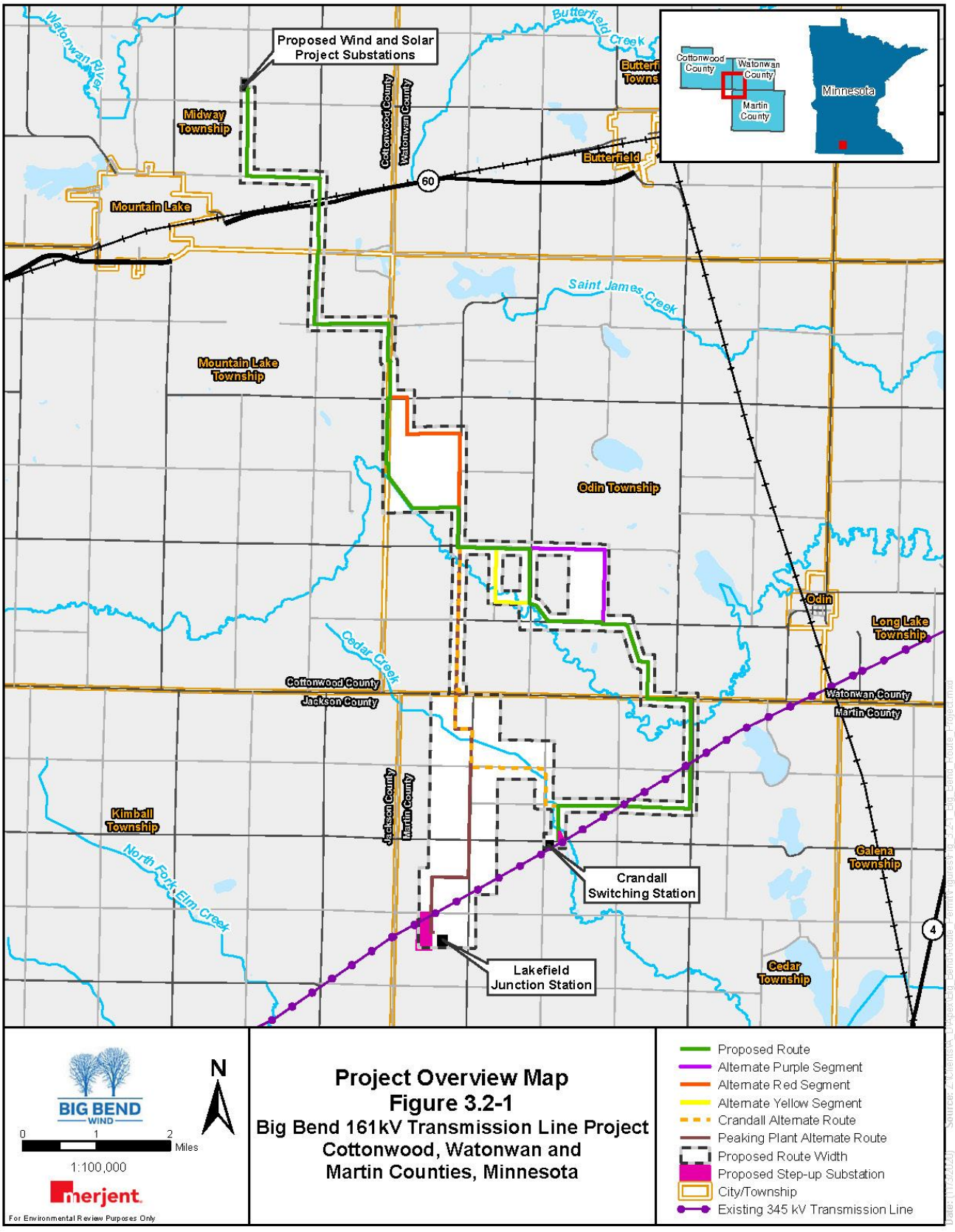
The analyses of this data is presented in Section 5 for the Proposed Route, Appendix D for Alternate Route Segments, and Appendix E for Alternate Routes.

3.2 Proposed Route Description

The Proposed Route begins at the collocated Wind and Solar Project Substations at the northwest corner of the intersection of 590th Avenue and 360th Street in Cottonwood County. The Proposed Route travels south on the west side of 590th Avenue for 1.2 miles before turning east on the north side of 370th Street for one mile. The Proposed Route turns south along the west side of 600th Avenue for two miles before turning east along the north side of 390th Street for one mile and

turning south again along 610th Avenue. The Proposed Route follows the west side of 610th Avenue for a half mile before crossing to the east side of 610th Avenue for an additional half mile before crossing back to the west side of 610th Avenue and continuing for an additional 0.9-mile. The Proposed Route crosses a parcel line to the east and continues south for 0.15 mile before turning southeast to parallel the Watonwan River for 0.55 mile and then travels east along the parcel line for 0.65 mile to County State Aid Highway (CSAH) 2 (620th Avenue). The Proposed Route then turns south along the west side of CSAH 2 for half mile before turning east along the south side of CSAH 22 (420th Street) for one mile and then turning south again on the west side of County Road 128. The Proposed Route travels south along County Road 128 for three-quarters of a mile before crossing to the east side of the road and paralleling the north side of the Watonwan River through agricultural land for 0.4-mile to the north side of County Road 134 (430th Street). This 0.4-mile segment is proposed to be buried to avoid impacts to a landing strip (see Section 5.1.12). The Proposed Route continues east on the north side of County Road 134 for three-quarters of a mile before crossing County Road 134 and continuing east for an additional 0.35 mile. The Proposed Route then travels southeast through agricultural land for approximately 0.5 mile before turning east for 0.1 mile. The Proposed Route then turns south along a parcel line through agricultural field for 0.5 mile to 250th Street before turning east along the south side of the road for 0.6 mile to the west side of CSAH 9. The Proposed Route follows CSAH 9 south along the west side for 1.5 miles before turning west for 1.8 miles along agricultural field edges. The Proposed Route turns south for 0.5 mile to the Step-up Substation along 230th Street.

The Proposed Route and Alternate Route Segments are displayed on Figure 3.2-1.


Proposed Wind and Solar Project Substations
Watonwan River
Butterfield Creek
Midway Township
Cottonwood County
Watonwan County
Butterfield
Mountain Lake
60
Saint James Creek
Mountain Lake Township
Odin Township
Odin
Long Lake Township
Cedar Creek
Cottonwood County
Jackson County
Watonwan County
Martin County
Kimball Township
Jackson County
Martin County
North Fork Elm Creek
Crandall Switching Station
Galena Township
Lakefield Junction Station
Cedar Township
4
Cottonwood County
Watonwan County
Martin County
Minnesota
BIG BEND WIND
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For Environmental Review Purposes Only
Project Overview Map
Figure 3.2-1
Big Bend 161kV Transmission Line Project
Cottonwood, Watonwan and
Martin Counties, Minnesota
Proposed Route
Alternate Purple Segment
Alternate Red Segment
Alternate Yellow Segment
Crandall Alternate Route
Peaking Plant Alternate Route
Proposed Route Width
Proposed Step-up Substation
City/Township
Existing 345 kV Transmission Line

3.3 Alternate Segments

As described above, Big Bend includes three alternate segments to the Proposed Route for which Big Bend continues to coordinate with landowners. All three alternate route segments are located in Watonwan County. An analysis of each Alternate Segment to its comparative segment on the Proposed Route, is included in Appendix D along with detailed mapping. The Alternate Segments are described in more detail below and are mapped on Figures throughout this Application for comparison and reference. For each Alternate Segment, the comparative segment along the Proposed Route has signed a voluntary transmission easement with Big Bend. However, based on coordination with signed landowners, Big Bend continues its commitment to seek easements for the Alternate Segments.

3.3.1 Alternate Red

The Alternate Red Segment begins at the intersection of 610th Avenue and CSAH 10 on the border of Cottonwood and Watonwan Counties. The Alternate Red Segment follows the north side of CSAH 10 for 0.25 mile before turning south through agricultural field edge for half mile. The Alternate Red Segment then turns east for 0.7-mile to the west side of CSAH 2 and travels south paralleling CSAH 2 for one mile before rejoining the Proposed Route.

The Alternate Red Segment is approximately 2.5 miles in length, approximately 0.15 mile longer than the comparative segment on the Proposed Route. The Alternate Red Segment would have more of its length collocated with roads and is routed further from the Watonwan River. However, there is a 160-acre parcel currently under lease with another developer along one mile of this segment.

3.3.2 Alternate Yellow

The Alternate Yellow Segment begins at the intersection of 420th Street and a township minimum maintenance road that runs north to south along the half-section line between CSAH 2 and County Road 128. The Alternate Yellow Segment follows the township road south for 0.35 mile before turning east and following a parcel line/field edge 0.5 mile east to Country Road 128 and the Proposed Route. The Alternate Yellow Segment is the same length as its comparative segment on the Proposed Route.

The residence on the west side of County Road 128 along the Proposed Route has signed a voluntary easement for the transmission line. However, the landowner is concerned about aesthetics. The Alternate Yellow Segment would cross the property on the west side of the residence, which has existing vegetative screening (i.e., trees). Lastly, the Alternate Yellow Segment crosses fewer parcels than the comparative segment on the Proposed Route (one instead of two).

3.3.3 Alternate Purple

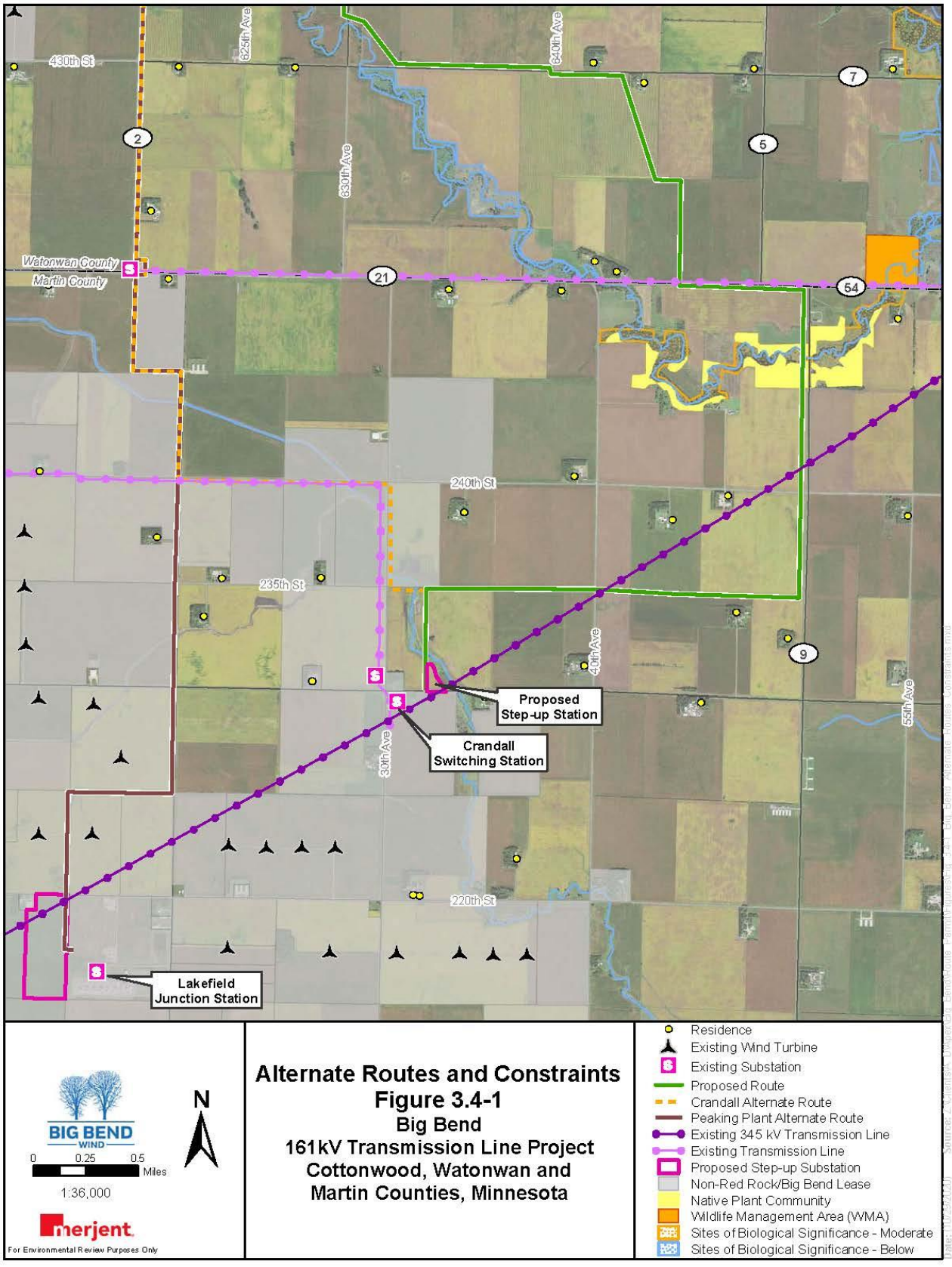
The Alternate Purple Segment begins at the intersection of 420th Street and County Road 128 and follows the south side of 420th east for mile before turning south along a township minimum maintenance road for one mile and rejoining the Proposed Route.

The Alternate Purple Segment addresses the same aesthetic concerns as the Yellow Segment. Additionally, the Alternate Purple Segment would eliminate the need to bury approximately 0.4 mile of the Proposed Route due to an existing landing strip located on the east side of County

Road 128, north of the Watonwan River and south of the farmstead driveway. Lastly, the Alternate Purple Segment crosses fewer parcels than the comparative segment of the Proposed Route (three instead of four). Big Bend continues to work with landowners to acquire easements along the Alternate Purple Segment.

3.4 Alternate Routes and POI Opportunities

As described in this Application, many parcels in northwestern Martin County are under lease with different developers as part of the Odell and Trimont Wind Farms. Additionally, this area already includes wind turbines, gen-tie transmission lines, and the existing 345 kV transmission line. From the intersection of CSAH 2 and CSAH 22 along the Proposed Route, Big Bend has signed voluntary transmission easements for a route south along CSAH 2 for two miles to the Martin County border. At the Martin County border, the easement constraints have challenged route development. Big Bend nonetheless continues to evaluate potential routes through this area. The Alternate Crandall Route, which would be approximately 3.5 miles shorter than the Proposed Route, also ends at the Crandall Switching Station. Similarly, the Alternate Peaking Plant Route is dependent on crossing these easements to reach the Lakefield Junction POI, should a net zero opportunity move forward, independent of the current MISO queue position. For purposes of comparison, Big Bend provides analysis of end-to-end routes (the Proposed Route, Alternate Crandall Route, and Alternate Peaking Plant Route) in Appendix E. Figure 3.4-1 shows the congestion and parcel constraints along the Alternate Routes in Martin County.


430th St
625th Ave
640th Ave
630th Ave
2
7
5
Watonwan County
Martin County
21
54
240th St
235th St
40th Ave
9
55th Ave
30th Ave
Proposed Step-up Station
Crandall Switching Station
220th St
Lakefield Junction Station
BIG BEND WIND
0 0.25 0.5 Miles
1:36,000
N
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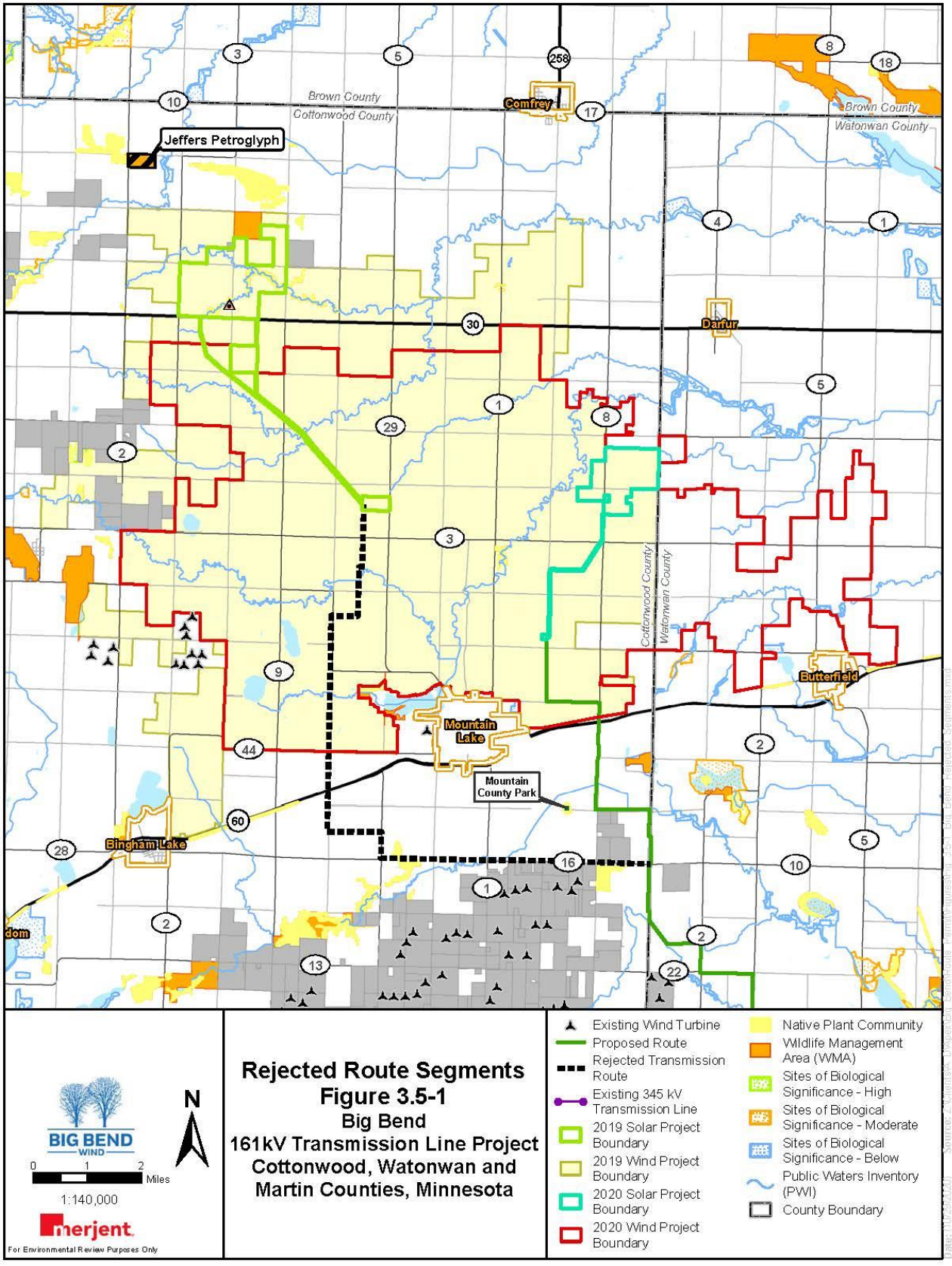
Alternate Routes and Constraints
Figure 3.4-1
Big Bend
161kV Transmission Line Project
Cottonwood, Watonwan and
Martin Counties, Minnesota
Residence
Existing Wind Turbine
Existing Substation
Proposed Route
Crandall Alternate Route
Peaking Plant Alternate Route
Existing 345 kV Transmission Line
Existing Transmission Line
Proposed Step-up Substation
Non-Red Rock/Big Bend Lease
Native Plant Community
Wildlife Management Area (WMA)
Sites of Biological Significance - Moderate
Sites of Biological Significance - Below

3.5 Alternative Route Segments Considered but Rejected

Apex has been developing the Big Bend Wind Project and Red Rock Solar Project since 2017. As design of the Projects advanced, Apex prioritized collocating facilities between the two projects as much as possible (i.e., Wind and Solar Project substations, a shared operations and maintenance facility, collection lines). Until late 2019, the Big Bend Wind Project was proposed in Cottonwood County. As a result of continued coordination with Jeffers Petroglyphs, Minnesota Historical Society (MNHS), Minnesota State Historic Preservation Office (SHPO), and interested Native American Tribes, Big Bend shifted the Wind Project boundary further south and added land in adjacent Watonwan County to address potential visual impact concerns of the Wind Project on Jeffers. The different configuration of the Wind Project boundary necessitated a shift in the Project substations to a more centralized location within the Wind Project boundary. Additionally, the Red Rock Solar Project shifted to be closer to the Project substations.

By shifting the Wind and Solar Project Substations, the Proposed Route is approximately six miles shorter than the comparative segment evaluated and mostly under voluntary easements in 2019. As compared to the earlier route, the Proposed Route has a higher percentage of collocation with roads, crosses fewer Public Waters Inventory (PWI) watercourses, and Minnesota Department of Natural Resources (MNDNR)-mapped native prairie, native plant communities, and Sites of Biodiversity Significance (SOBS). Figure 3.5-1 shows the 2019 Wind and Solar Project boundaries, the rejected route segment, and environmental features.


Jeffers Petroglyph
Brown County
Cottonwood County
Comfrey
Brown County
Watonwan County
Darfur
Butterfield
Mountain Lake
Mountain County Park
Bingham Lake
Cottonwood County
Watonwan County
BIG BEND WIND
0 1 2 Miles
1:140,000
N
For Environmental Review Purposes Only
Rejected Route Segments
Figure 3.5-1
Big Bend
161kV Transmission Line Project
Cottonwood, Watonwan and
Martin Counties, Minnesota
Existing Wind Turbine
Proposed Route
Rejected Transmission Route
Existing 345 kV Transmission Line
2019 Solar Project Boundary
2019 Wind Project Boundary
2020 Solar Project Boundary
2020 Wind Project Boundary
Native Plant Community
Wildlife Management Area (WMA)
Sites of Biological Significance - High
Sites of Biological Significance - Moderate
Sites of Biological Significance - Below
Public Waters Inventory (PWI)
County Boundary

4.0 RIGHT-OF-WAY ACQUISITION, CONSTRUCTION, RESTORATION, AND MAINTENANCE PROCEDURES

Big Bend developed right-of-way acquisition, construction, restoration, and maintenance procedures for the Project. Although certain procedures will be site-specific based upon the final route design, general procedures are discussed in some detail in this Application.

4.1 Right-of-Way Acquisition

New ROW is required for the Project. Big Bend has, through voluntary negotiations, acquired all the private land rights necessary to construct the Project along the Proposed Route. However, as noted above, Big Bend continues to work with landowners to acquire land for the alternate segments.

4.2 Construction Procedures

Construction will not begin until federal, state, and local approvals are obtained, property, and ROWs are acquired, soil conditions are determined, and design is completed for that construction area. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, system loading issues, weather, and available workforce and materials. At this time, no electrical outages to other existing lines are anticipated as a result of construction of the Project.

Big Bend will construct the proposed Project and will notify landowners of anticipated timing of construction. Construction of the Project by Big Bend will follow standard construction and mitigation practices, including best management practices (BMPs) that were developed from experience with past projects. These practices address ROW clearance, staging, erecting transmission line structures, and stringing transmission lines. Construction and mitigation practices to minimize impacts will be developed based on the proposed schedule for activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain, and other practices. In certain cases, some activities, such as schedules, are modified to minimize impacts to sensitive environments. BMPs for each specific project are based on the proposed schedules for activities, prohibitions, maintenance guidelines, inspection procedures, and other practices. In some cases, these activities, such as schedules, are modified to incorporate BMP installation that will assist in minimizing impacts to sensitive environments. Any contractors involved in construction of the transmission line will adhere to these BMP requirements.

Transmission line structures are generally designed for installation at existing grades. Typically, structure sites with 10 percent or less slope will not be graded or leveled. Sites with more than 10 percent slope will have working areas graded level or fill brought in for working pads. It is preferred to leave the leveled areas and working pads in place for use in future maintenance activities, if practical. If not, the site will be graded back to its original condition and original drainage maintained to the extent possible and imported fill is removed.

Typical construction equipment used on transmission projects includes tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, concrete trucks, and various trailers. Many types of excavation equipment are set on wheel or track-driven vehicles. Poles are transported on tractor-trailers. Staging areas are often established for these types of projects. Staging involves delivering the equipment and materials

necessary to construct the new transmission line facilities. The materials are stored at staging areas until they are needed for a given Project. For this Project, staging areas are associated with the Wind Project and extra space at the Step-up Substation.

Access to the transmission line ROW will be made directly from existing roads or farm field access roads that run parallel or perpendicular to the transmission line ROW. In some situations, private field roads will be used where necessary to accommodate heavy equipment used in construction, including cranes, concrete trucks, and hole drilling equipment. On landowners' parcels, existing access roads may be upgraded or new roads may be constructed to Project specifications. New access roads may also be constructed where no current access is available or the existing access is inadequate to cross roadway ditches. These activities are coordinated with the owner of the property affected and the Project counties.

Immediately prior to construction, surveyors will stake the transmission line centerline and pole locations. Trees and other vegetation will then be removed from the ROW. Erosion control measures will be installed where needed. When it is time to install the poles, they will either be moved from a staging area or directly delivered by the manufacturer or distributor to the installation location. Insulators and other hardware are attached while the pole is on the ground. The pole is then lifted, placed, and secured.

Tangent and angle structures may be placed on poured concrete foundations or direct embedded. Direct embedding involves digging a hole for each pole, filling it partially with crushed rock, and then setting the pole on top of the rock base. The area around the pole is then backfilled with crushed rock and/or soil once the pole is set. Any excess soil from the excavation will be spread and leveled near the structure or removed from the site, if requested by the property owner or regulatory agency. Big Bend anticipates the majority of structures to be direct embed.

Dead end poles are located within the Wind Project Substation and Step-up Substation and will have concrete foundations. Concrete foundation installation involves excavating and placing temporary steel casing, rebar, concrete, and anchor bolts. The base of the concrete foundation typically projects about one-foot above grade. In those cases, holes are drilled in preparation for the foundation. Drilled pier foundations may vary from approximately 3 to 8 feet in diameter and 20 to 30 feet or more in depth, depending on soil conditions. Steel reinforcing bars and anchor bolts are installed in the drilled holes prior to concrete placement. After the concrete foundation is set, the pole is bolted to the foundation.

Conductor stringing operations require brief access to each structure to secure the conductor wire and shield wire once the final sag is established. Temporary guard or clearance structures are installed, as needed, over existing distribution or communication lines, streets, roads, highways, railways, waterways, or other obstructions after any necessary notifications are made or permits obtained. This ensures that conductors will not obstruct traffic or contact existing energized conductors or other cables. In addition, the conductors are protected from damage.

Environmentally sensitive areas and wetland areas may also require special construction techniques in some circumstances. During construction, the most effective way to minimize impacts to wet areas will be to span wetlands, streams, and rivers. In addition, Big Bend will not allow construction equipment to be driven across waterways unless there is no other reasonable alternative for construction and only after discussion with the appropriate resource agency and any necessary permits are obtained. Where waterways must be crossed to pull in the new conductors and shield wires, workers may walk across or use boats. These construction practices

help prevent soil erosion and ensure that equipment fueling and lubricating will occur at a distance from waterways.

Additionally, there is MNDNR-mapped native prairie along the Proposed Route. Big Bend will span this area and avoid any pole placement, clearing or construction traffic through this portion of the right-of-way. Should construction traffic need to access this area, Big Bend will coordinate with MNDNR and implement BMPs such as matting and potentially seasonal timing restrictions.

4.3 Restoration and Clean-up Procedures

The ground will be disturbed during the normal course of work (as is typical of most construction projects), which can take several weeks in any one location. Big Bend will take the steps necessary to lessen the impact of the Project on the surrounding environment by restoring areas disturbed by construction in accordance with BMPs and the Project's permit conditions. This will begin with a pre-construction survey that will identify areas requiring special restoration procedures. During construction, crews will also attempt to limit ground disturbance wherever possible. As construction on each parcel of land is completed, disturbed areas will be restored to its original condition to the maximum extent practicable.

Big Bend or its contractor will contact each property owner after construction is completed to identify and address any damage that may have occurred as a result of the construction of the Project. If damage has occurred to crops, fences, drainage tiles, or the property, the Applicant will fairly compensate the landowner for the damages sustained in accordance with the terms and conditions agreed upon in the Transmission Easement Agreement entered into by Big Bend and the landowner.

In some cases, Big Bend may engage an outside contractor to restore the damaged property to its original condition to the extent practicable. Portions of permanent vegetation that are disturbed or removed during construction of transmission lines will be reestablished to pre-disturbance conditions. Resilient species of common grasses and shrubs typically reestablish naturally with few problems after disturbance. Areas with significant soil compaction and disturbance from construction activities along the approved route will require assistance in reestablishing the vegetation stratum and controlling soil erosion. Commonly used BMPs to control soil erosion and assist in reestablishing vegetation that may be used on the Project include, but are not limited to:

- Erosion control blankets with embedded seeds
- Silt fences
- Hay bales
- Hydro seeding
- Planting individual seeds or seedlings of non-invasive native species

4.4 Maintenance Procedures

Transmission lines are designed to operate for decades. Typically, they require only moderate maintenance, particularly in the first few years of operation. The estimated service life of the proposed Project is approximately 40 years. However, high voltage transmission lines are seldom completely retired.

Transmission infrastructure is reliable because it includes very few mechanical elements. It is built to withstand weather extremes, with the exception of severe weather such as tornadoes and heavy ice storms. Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent.

The principal operating and maintenance cost for transmission facilities is the cost of inspections, which will be performed monthly by either truck or by air. Inspections will be conducted to ensure that the transmission line is fully functional and that no vegetation has encroached so as to violate NESC prescribed clearances. Annual operating and maintenance costs for 161 kV transmission lines in Minnesota and the surrounding states are expected to be approximately $1,500 per mile per year. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

5.0 ENVIRONMENTAL INFORMATION

This section provides a general description of the environmental and human setting of Big Bend's Project. Topics discussed in the following subsections include environmental setting, human settlement, land-based economies, archaeological and historical resources, hydrologic features, vegetation and wildlife, and rare and unique natural resources that are known to occur or may potentially occur along the Proposed Route. Big Bend has defined impacts by their duration, size, intensity, and location. This context is used to determine an overall resource-level impact. Impact levels are described using qualitative descriptors that are not intended as value judgement, but rather as a measure to ensure a common understanding among readers and to compare resource impacts between route segments.

- **Minimal** – Minimal impacts do not considerably alter an existing resource condition or function. Minimal impacts may, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short term.
- **Moderate** – Moderate impacts alter an existing resource condition or function and are generally noticeable or predictable for the average observer. Effects may be spread out over a large area, making them difficult to observe, but they can be estimated by modeling or other means. Moderate impacts may be long term or permanent to common resources, but are generally short to long term for rare and unique resources.
- **Significant** – Significant impacts alter an existing resource or condition or function to the extent that the resource is severely impaired or cannot function. Significant impacts are likely noticeable or predictable for the average observer. Effects may be spread out over a large area, making them difficult to observe, but can be estimated by modeling. Significant impacts can be of any duration and may affect common or rare and unique resources.

In addition to identifying existing resources and the potential effects on those resources, Big Bend identified measures that can be used to avoid, minimize, or mitigate effects. These actions are collectively referred to as mitigation.

- **Avoid** – Avoiding an impact means that the impact is eliminated altogether by moving or not undertaking parts or all of a project.
- **Minimize** – Minimizing an impact means to limit its intensity by reducing the project size or moving a portion of the project from a given location.
- **Mitigate** – Impacts that cannot be avoided or minimized could be mitigated. Impacts can be mitigated by repairing, rehabilitating, or restoring the affected environment, or compensating for it by replacing or providing a substitute somewhere else.

Where specific, quantified impacts are discussed, Big Bend quantified these based on the Application Alignment shown in Appendix C. The Application Alignment was identified based on the best data available at the time of this Application. Big Bend anticipates that portions of the Application Alignment will need to be modified either before a Route Permit is issued or before construction begins to address design, engineering, or stakeholder concerns, including those of agencies and landowners.

Big Bend analyzed potential impacts to human and environmental resources based on specific impact assessment areas (IAAs). The IAAs for each resource is the geographic area within which the project may exert some influence. These IAAs vary with the resource being analyzed and the potential impact and are summarized in Table 5.0-1.

The following IAAs will be used:

- **Right-of-Way**. The Project has a variable right-of-way: 150 feet wide along roads (up to 50-foot-wide on the roadside and 100 feet wide on the non-roadside of the alignment) and 100 feet wide along portions that are not along roads. These distances are used as the IAA for analyzing potential displacement impacts and impacts to land-based economies (agriculture, forestry, and mining) and natural resources.
- **One thousand feet**. A distance of 1,000 feet from each side of the segment alignments is used as the IAA for analyzing aesthetic and electronic interference impacts. Impacts may extend outside of this 1000-foot distance, but are anticipated to diminish relatively quickly with distance from the line such that potential impacts outside this distance would be minimal.
- **One mile**. A distance of one mile from Proposed Route Application Alignment is used as the IAA for analyzing potential impacts to archaeological and historic resources, rare and unique species, and airports and airstrips.
- **Project Study Area**. The Project Study Area, defined generally as the townships and/or counties through which the Project passes, is used as the IAA for analyzing potential impacts to cultural values, socioeconomics, public utilities, land use, emergency services, air quality, and tourism and recreation. These are resources for which impacts may extend throughout communities in the Project Study Area.

Table 5.0-1
Impact Assessment Areas

Type of Resource	Specific Resource/Potential Impact to Resource	Impact Assessment Area
Human Settlement	Displacement, Electric and Magnetic Fields, Noise	Right-of-Way[1]
	Aesthetics and Electronic Interference	1,000 feet[2]
	Public Health and Safety, Socioeconomics, Cultural Values, Recreation, Public Services, Zoning and Land Use Compatibility, Transportation, Air Quality	Project Study Area
Land-Based Economies	Agriculture, Forestry, Mining	Right-of-Way[1]
	Tourism	Project Study Area
Archaeological and Historic Resources	-	One Mile
Natural Environment	Geology and Groundwater Resources, Soils, Water Resources, Flora, Fauna	Right-of-Way[1]
Rare and Unique Species	-	One Mile

[1] The right-of-way is 100 to 150 feet wide
[2] On each side of the anticipated alignment, for a total of 2,000-foot area of analysis

5.1 Description of Environmental Setting

The MNDNR and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota that is used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features (MNDNR, n.d.-a). Through the ECS, the State of Minnesota is split into Ecological Provinces, Sections, and Subsections. The Project is located within the North Central Glaciated Plains Section of the Prairie Parkland Province (251B). The Project is located in the Minnesota River Prairie ecological subsection.

The Minnesota River Prairie subsection coincides with large till plains flanking the Minnesota River. The subsection consists of a gently rolling ground moraine about 60 miles wide. The depth to bedrock in this subsection is typically 100 to 400 feet through glacial till; however, there are exposures of bedrock in Cottonwood County. Soils are loamy and well-drained with thick dark surface horizons. Annual precipitation in the Minnesota River Prairie subsection ranges from 25 inches in the west to 30 inches in the east and the average growing season lasts approximately 147 to 152 days in length. Prior to Euro-American settlement, vegetation in this subsection was predominantly tallgrass prairie, with many islands of wet prairies and forest restricted to the Minnesota River and other streams. Currently land used in this subsection is agricultural activity; there are few remnants of pre-settlement vegetation left (MNDNR, 2020a).

Most of the area crossed by the Proposed Route is between 1,210 and 1,280 feet above mean sea level, with elevation gradually increasing from east to west.

5.2 Human Settlement

Transmission lines have the potential to impact human settlements during construction and operation of the Project. Public health and safety issues during construction include injuries due to falls, equipment use, and electrocution. Health impact concerns related to the operation of the Project include health impacts from electric and magnetic fields (EMF), stray voltage, induced voltage, impaired air quality, and electrocution. Transmission lines and conductors also have the potential to displace homes or businesses, introduce new noise sources, affect the aesthetics and socioeconomics of the Project Study Area, be incompatible with local land use and zoning, interfere with electronic communications, and impact public services (i.e., transportation). Each of these resources related to human settlement and their potential impacts are discussed in more detail below.

Generally, the townships within the Project Study Area and crossed by the Proposed Route are sparsely populated rural areas with farmsteads located along roads, and away from population centers. As described further in Section 5.2.6, the three counties in the Project Study Area, Cottonwood, Watonwan, and Martin, have very small populations compared to the State of Minnesota as a whole, collectively comprising about one percent of the state's total population (U.S. Census Bureau, 2019). The municipalities nearest to the Route are Mountain Lake and Odin. The municipal boundary of Mountain Lake is approximately 0.4 mile west of the Route and the municipal boundary of Odin is roughly 1.6 miles east of the Route.

Figure 3.2-1 depicts the rural landscape along the Proposed Route.

5.2.1 Emergency Services and Public Health and Safety

Public emergency services within the Project Study Area are provided by local law enforcement and emergency response agencies located in nearby communities. The sheriff's offices of Cottonwood, Watonwan, and Martin Counties provide law enforcement to communities in the Project Study Area. Additionally, the Cities of Mountain Lake, Windom, St. James, and Trimont have local police departments. Fire services near the Project Study Area are provided by city and community fire departments, including Mountain Lake, Butterfield, Windom, St. James, and Trimont.

Ambulance response is provided by regional and local ambulance services. The Windom Ambulance Service provides response services to a 200-square-mile region surrounding Windom, Minnesota. The cities of Mountain Lake, St. James, and Trimont also provide ambulance services (Minnesota Emergency Medical Services Regulatory Board, 2020).

Additional details about emergency services within the Project Study Area are provided in Section 5.2.10.

There are 10 towers that are a part of the Allied Radio Matrix for Emergency Response (ARMER) in Cottonwood, Watonwan, and Martin Counties (MDPS, 2018). These ARMER towers are part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for emergency responders. There is one ARMER tower in the City of Mountain Lake; the municipal boundary of Mountain Lake is 0.5 mile from the Application Alignment. The remaining ARMER towers in Cottonwood, Watonwan, and Martin Counties are all greater than 10 miles from the Application Alignment (MDPS, 2018).

5.2.1.1 Impacts and Mitigation

No impacts to emergency services are anticipated as a result of the Project. Any temporary road closures required during construction would be coordinated with local jurisdictions to provide safe access of police, fire, and other rescue vehicles. Local law enforcement resources may be utilized for traffic control and law enforcement during construction activities. In the event that emergency services are needed for local residents during the approximate seven months of construction, construction will stop, and any impeding equipment will be relocated so that emergency vehicles may access the emergency site. Any accidents that might occur during construction of the Project would be handled through local emergency services. The influx of approximately 45 workers to construct the Project would not be expected to influence emergency or public health services. Once construction is complete, the Project will not impede emergency services. As such, construction and operation of the Project will have minimal impacts on the emergency services.

The Project will meet local, state, and NESC safety standards. The proposed transmission line will be equipped with protective devices to prevent damage from transmission line or pole falls or other potential accidents. The Project will be equipped with protective devices (circuit breakers and relays located in substations where transmission lines terminate) to safeguard the public in the event of an accident, or if a structure or conductor falls to the ground. The protective equipment will de-energize the transmission line should such an event occur. In addition, the Step-up Substation will be fenced and, accessible only by authorized personnel. Signage around the Project will warn the public of the safety risks associated with the energized equipment. The construction of the Project is not expected to have a negative impact on public health or safety.

Construction crews will comply with Occupational Safety and Health Administration measures to ensure their own safety.

While there are ARMER towers in the Project vicinity (i.e., within one mile of the Proposed Route), the Big Bend transmission line will not impact this communication system as Project facilities are proposed well below the typical height of a tower and line-of-sight near the top of these towers (i.e., greater than 150 feet above ground). The Big Bend transmission line structures will be up to 120 feet above ground. As such, no mitigation is proposed.

5.2.2 Electric and Magnetic Fields

This section discusses EMF and stray voltage with respect to the Project. The term EMF refers to electric and magnetic fields that arise from the electrical potential (voltage) and the movement of an electrical charge (current) associated with the transmission and use of electricity. EMF are invisible just like radio, television, and cellular phone signals, all of which are part of the electromagnetic spectrum. The frequency of transmission line EMF in the United States is 60 hertz and falls in the extremely low frequency range of the electromagnetic spectrum (any frequency below 300 hertz). For the lower frequencies associated with power lines, the EMF are typically evaluated separately. The general consensus is that electric fields pose no health risk to humans (National Radiation Laboratory, Ministry of Health, New Zealand, 2008).

Electric fields on a transmission line are solely dependent upon the voltage of the line, not the current. Electric-field strength is measured in kVs per meter (kV/m), and the strength of an electric field decreases rapidly as the distance from the source increases. Electric fields are easily shielded or weakened by most objects and materials, such as trees or buildings.

There is no federal standard for transmission line electric fields. The Commission, however, has imposed a maximum electric field limit of 8 kV/m measured at one meter (3.28 feet) above the ground[2]. The standard was designed to prevent serious hazards from shocks when touching large objects parked under alternating current transmission lines of 500 kV or greater[3].

Magnetic fields are created by the electrical current (measures in amperes) moving through a transmission line. The strength of a magnetic field is proportional to the electrical current and is typically measured in milliGauss (mG). As with electric fields, the strength of a magnetic field decreased rapidly as the distance from the source increases. Unlike electric fields, however, magnetic fields are not shielded or weakened by objects or materials.

There are presently no Minnesota regulations pertaining to magnetic field exposure. The internationally accepted guideline for the general public exposed magnetic fields is 833 mG (NEIHS, 2002).

[2] In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota, Docket No. ET-2/TL-08-1474, Order Granting Route Permit (adopting Administrative Law Judge Findings of Fact, Conclusions and Recommendation at Finding 194 [April 22, 2010 and amended April 30, 2010]) (September 14, 2010).

[3] See “Public Health and Safety Effects of High Voltage Overhead Transmission Lines” prepared by Robert S. Banks, Minnesota Department of Health (MDH), 1977.

5.2.2.1 Impacts and Mitigation

Levels of EMF from the Project will be considerably below acceptable Minnesota limits for electric fields and international guideline for magnetic fields. Project-specific EMF levels were not modeled for the 161 kV transmission line. However, several studies have documented EMF exposure of various high voltage transmission lines. The National Institute of Environmental Health Sciences provides typical EMF levels for power transmission lines (NIEHS, 2002). For 161 kV transmission lines, electric fields directly below the transmission line were reported at 1.0 kV/m before dissipating to 0.5 kV/m at 50 feet (approximate edge of right-of-way). Similarly, average magnetic fields directly below the transmission line were reported at 29.7 mG before dissipating to 6.5 mG at 50 feet (NIEHS, 2002). As demonstrated here, both electric and magnetic fields will be well below the Minnesota guidelines for electric fields (8 kV/meter) and international guidelines of 833 mG for magnetic fields.

Implantable Medical Devices

EMF may interfere with implantable electromechanical medical devices, such as pacemakers, defibrillators, neurostimulators, and insulin pumps. Most of the research on electromagnetic interference and medical devices relates to pacemakers. Laboratory tests indicate that interference from magnetic fields in pacemakers is not observed until 2,000 mG—a field strength significantly greater than predicted for this type of development, thus no impact is expected from magnetic fields. Electric fields may interfere with a pacemaker's ability to sense normal electrical activity in the heart. However, modern "bipolar" cardiac devices are much less susceptible to interactions with electric fields. Medtronic and Guidant, manufacturers of pacemakers and other implantable medical devices, have indicated that electric fields below 7 kV/m are unlikely to cause interactions affecting operation of most of their devices. The electric fields for the Project are well below levels at which modern bipolar devices are susceptible to interaction with the fields (Application to the Minnesota Utilities Commission for a Route Permit, Bull Moose 150 kV Project, Great River Energy, Docket No. ET2/TL-15-628. August 7, 2015.)

Stray Voltage and Induced Voltage

Stray voltage can occur with electrical distribution lines to residences and high voltage transmission lines that parallel them. Stray voltage flows through the ground between electrical systems that, by code, must be grounded (i.e. connected to the earth) to ensure safety. This voltage may be felt by animals standing on the ground.

Impacts from stray voltage are typically related to improper grounding of electrical service to the farm (distribution lines) or on-farm electrical wiring. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences and they are typically grounded properly. However, transmission lines can induce stray voltage on a distribution circuit that is parallel to and immediately under the transmission line.

Appropriate measures, such as proper grounding, will be taken to prevent stray voltage problems. Big Bend would be required to remedy any stray voltage issues caused by the Project as a condition of a Route Permit.

5.2.2.2 Farming Operations, Vehicle Use, and Metal Buildings near Power Lines

The power lines will be designed to meet or exceed minimum clearance requirements with respect to electric fencing as specified by the NESC. Nonetheless, insulated electric fences used in

livestock operations can be instantly charged with an induced voltage from transmission lines. The induced charge may continuously drain to ground when the charger unit is connected to the fence. When the charger is disconnected either for maintenance or when the fence is being built, shocks may result. The local electrical utility can provide site specific information about how to prevent possible shocks when the charger is disconnected.

Farm equipment, passenger vehicles, and trucks may be safely used under and near power lines. The power line will be designed to meet or exceed minimum clearance requirements with respect to roads, driveways, cultivated fields, and grazing lands as specified by the NESC; recommended clearances within the NESC are designed to accommodate a relative vehicle height of 14 feet.

Vehicles, or any conductive body, under high voltage transmission lines will be immediately charged with an electric charge. Without a continuous grounding path, this charge can provide a nuisance shock. Such nuisance shocks are a rare event because generally vehicles are effectively grounded through tires. Modern tires provide an electrical path to ground because carbon black, a good conductor of electricity, is added when they are produced. Metal parts of farming equipment are frequently in contact with the ground when plowing or engaging in various other activities. Therefore, the induced charge on vehicles will normally be continually flowing to ground unless they have unusually old tires or are parked on dry rock, plastic, or other surfaces that insulate them from the ground.

Buildings are permitted near transmission lines but are generally discouraged within the right-of-way itself because a structure under a line may interfere with the safe operation of the transmission facilities. For example, a fire in a building within the right-of-way could damage a transmission line. The NESC establishes minimum electrical clearance zones from power lines for the safety of the general public and transmission owners often acquire easement rights that require clear areas in excess of these established zones. Transmission owners may permit encroachment into that easement for buildings and other activities when they can be deemed safe and still meet the NESC minimum requirements. Metal buildings may have unique issues due to induction concerns. For example, conductive buildings near power lines of 200 kV or greater must be properly grounded.

There are no residences within the right-of-way for the Application Alignment (see Section 5.2.3), and there are no structures (barns, agricultural buildings, sheds) within the right-of-way for the Application Alignment. Big Bend will also work with landowners to ground fences, gates, buildings, or other structures that may be subject to induced current from the line and educate landowners on these concerns and protective measures. Should landowners identify safety concerns, Big Bend will investigate and take corrective action.

5.2.3 Displacement

Displacement is defined as compelling a person or persons to leave their home. NESC standards require certain clearances between transmission line facilities and the ground, and between transmission line facilities and buildings for safe operation of the transmission line. To comply with NESC standards and allow sufficient space for transmission line maintenance, transmission lines are generally routed to avoid residences or other buildings within the right-of-way. Residences or other buildings located within a proposed right-of-way that cannot be avoided are generally removed or displaced. Displacements are relatively rare and are more likely to occur in heavily populated areas where avoiding all residences and businesses is not always feasible.

The Proposed Route crosses sparsely populated rural areas that are primarily used for agricultural production. To limit proximity to residences and other buildings, Big Bend designed a route and alignment that is co-located along existing roadways and property lines where residences are typically not present. The proposed Route allows for a right-of-way that would avoid residences and buildings, i.e., there would be no residence or building located within the proposed right-of-way. Where the Route is sited near residences, Big Bend has made every effort to site the transmission line on the opposite side of the road from the house or work with the landowner to route the alignment along property lines and away from the primary residence.

5.2.3.1 Impacts and Mitigation

Displacement of residences or business properties is not anticipated if the Route is approved by the Commission because no home or building is located within the proposed transmission line right-of-way (i.e., within 50 to 75 feet of the Application Alignment). The closest residence to the Application Alignment is approximately 185 feet from the Application Alignment. Residences in proximity to the Application Alignment are displayed on the detailed maps in Appendix C.

5.2.4 Noise

Noise is defined as unwanted sound. It may be made up of a variety of sounds of different intensities, across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more “weight.” The A-weighted scale (dB(A)) is used to reflect the selective sensitivity of human hearing. This scale puts more weight on the range of frequencies that the average human ear perceives, and less weight on those that people do not hear as well, such as very high and very low frequencies.

A transmission line can generate a small amount of sound due to corona activity. Corona is the manifestation of energy loss through the line, and this energy loss can produce sound, such as buzzing or crackling. This noise can be greater in rainy or foggy conditions. During heavy rains, the sound of the rain generally is greater than the noise emitted from the transmission line and thus the transmission line noise is not noticeable. Substation noise may result from the transformers, which may create a humming noise. Transformers and transmission lines are equipped with circuit breakers which open to de-energize the transformers and transmission lines for fault conditions and for maintenance. As such, the circuit breakers are rarely opened and closed, at which time there is sound associated with the mechanical operation of the breakers. Circuit breakers do not emit a humming noise.

Corona noise levels depend on the presence of foul weather, the transmission line conductor design, operating voltage, and the distance from the transmission line. As mentioned above, potentially significant corona-generated noise is only produced during inclement weather. Based on historical weather records for this area, precipitation can be expected about 30% of the time (National Oceanic and Atmospheric Administration, National Climatic Data Center, 2020). Corona noise levels are generally quite low until the transmission line operating voltage exceeds 345 to 500 kV. For this Project, the transmission line voltage of 161 kV results in minimal noise emission. The ROW width varies along the route and is 100 feet at its narrowest and 150 feet at its widest. The closest residence is located approximately 185 feet from the Application Alignment.

The Minnesota Pollution Control Agency (MPCA) has promulgated noise standards in Minn. R. Ch. 7030. These standards limit the level of sound based on the noise area classifications (NAC)

determined at the location of the person who hears the noise. Residences are in the most restrictive NAC and are classified as NAC 1, business areas are classified as NAC 2, and industrial/agricultural areas are classified as NAC 3. A fourth area, NAC 4, is defined as undeveloped and unused land, but no noise standards apply to this land class. The noise standards specify the maximum allowable noise levels at a receptor and cannot be exceeded for more than 10 percent of an hour (L_{10}) or 50 percent of an hour (L_{50}). The MPCA's noise standards for daytime hours and nighttime hours are shown in Table 5.2-1.

Table 5.2-1
MPCA State Noise Standards: Hourly A-Weighted Decibels

Noise Area Classification	Daytime (7:00 a.m. – 10:00 p.m.)		Nighttime (10:00 p.m. – 7:00 a.m.)	
	L_{10}	L_{50}	L_{10}	L_{50}
1 – Residential	65	60	55	50
2 – Commercial	70	65	70	65
3 – Industrial	80	75	80	75
Source: Minn. R. Ch. 7030.0040				

The Project is in a rural area. Ambient noise levels in these locations are generally between 35 and 40 dBA during daytime hours. Noise levels will increase sporadically with passing vehicle traffic, high winds, or use of farm equipment, all-terrain vehicles, or snowmobiles. The primary noise receptors within the local vicinity of the Project are residences and farmsteads. Residences are assigned to NAC 1.

5.2.4.1 Impacts and Mitigation

Specific noise impacts are associated with construction and operation.

Construction

The overall impact intensity level is anticipated to be minimal for the Proposed Route. Potential impacts are anticipated to be short term; these unavoidable and localized impacts will affect residences and will be minimized.

During construction, construction vehicles and equipment will emit noise. The amount of noise will vary based on what type of construction is occurring at the Project on a given day. Major noise-producing activities are associated with clearing and grading, material delivery, auguring foundation holes, setting structures, and stringing conductors. Noise from heavy equipment and increased vehicle traffic will be intermittent and occur during daytime hours. Based on information from the U.S. Department of Transportation (2017), these major activities are anticipated to have the following noise, measured at 50 feet from the source:

- Clearing and grading: grader (85 dBA), chainsaw (84 dBA), and tractor (85 dBA);
- Material delivery: flatbed truck (74 dBA) and crane (81 dBA);
- Auguring foundation holes: augur drill rig (84 dBA); and
- Setting structures: crane (81 dBA).

Construction activity would only be present at a particular location for a few days at a time, but on multiple occasions throughout the period between right-of-way clearing and restoration. As such, construction noise would be highly localized, temporary, and minor. Additionally, construction will typically occur between 7 a.m. and 7 p.m. Construction will occur in accordance with Minn. R. Ch. 7030.

Big Bend will use sound-control devices on vehicles and equipment (e.g., mufflers), conduct construction activities during daylight hours, and not run vehicles and equipment unnecessarily.

Operation

During fair conditions, noise from the transmission line is anticipated to be inaudible. The transmission line may produce noise during rainy conditions due to the corona effect, a type of electrical conduction that occurs in the atmosphere near the conductor that may result in an audible hissing and cracking sound. It is likely, however, that most of the time when climatic conditions result in corona, the noise levels of falling rain would exceed the corona noise making the noise from the transmission line inaudible.

5.2.5 Aesthetics

Topography along the Proposed Route is generally flat and the vegetation cover is uniformly low, making the topography vulnerable to visual disruptions. Viewsheds in this area are generally broad and uninterrupted, with only small scattered areas where they are defined by trees or topography. The settlements in the vicinity are residences and farm buildings (inhabited and uninhabited farmsteads) scattered along rural county roads. The area is also shaped by a built environment. Horizontal elements, such as highways and county roads, are consistent with the long and open viewsheds in the area. Vertical elements such as transmission lines and wind turbines are visible from considerable distances and are the tallest and often the most dominant visual feature on the landscape.

There are several wind farms that are visible to residences along the Proposed Route, including:

- Mountain Lake Wind – one turbine immediately adjacent to Mountain Lake;
- Odell Wind Farm – 100 turbines located within one mile of the Proposed Route;
- Odin Wind Farm – 10 turbines within one mile of the Proposed Route; and
- Trimont Area Wind Farm – 67 turbines located within one mile of the Proposed Route.

5.2.5.1 Impacts and Mitigation Measures

The Project's transmission line structures and conductors would create aesthetic impacts that are anticipated to be minimal to moderate. The degree of impact would be minimal for the Proposed Route. The Project will result in an alteration of the current landscape through construction of wood poles of 70 to 120 feet. Big Bend has minimized aesthetic impacts by choosing routes where a transmission line is most harmonious with the landscape, such as along roads and field edges. Other minimization measures include crossing rivers and streams using the shortest distance possible (i.e., perpendicular to the waterbody) and with an existing road, avoiding placing structures directly in front of residences, and using construction methods that minimize damage to vegetation near the transmission line.

Construction of an up-to-5-acre Step-up Substation in an existing agricultural field will also present a new visual impact. The structures within the Switching Station will be up to 120 feet high at their highest for lighting protection, but will on average have the profile of a single-story building and will consist of high voltage electrical equipment. In addition, down-shielded lighting will help to maintain Step-up Substation security while minimizing lighting impacts.

5.2.6 Socioeconomics

Existing socioeconomic conditions within the Project Study Area are reported based on data from the U.S. Census Bureau's QuickFacts and Explore Census Data websites. Data is provided at the county level to characterize the socioeconomic conditions in the Project Study Area and at the state level for the purpose of comparison. Comparable census data about population, housing, ethnicity, and economic conditions is not available or for towns, cities, or townships with a population of less than 5,000 persons on the U.S. Census Bureau's website; therefore, the socioeconomic information provided is focused on the state and counties in the Project Study Area.

The three counties in the Project Study Area have very small populations compared to the State of Minnesota as a whole, collectively comprising about one percent of the state's total population. According to the U.S. Census Bureau's 2019 population estimates, the total population in Minnesota increased by 6.3 percent as compared to 2010 census data, while the estimated population in Cottonwood, Watonwan, and Martin Counties has decreased during this same time period (U.S. Census Bureau, 2019).

Most of the population in the Project Study Area identifies as white only, not Hispanic or Latino, which is consistent with the state level. However, in Cottonwood and Martin Counties the percentage of persons who identify as white only, not Hispanic or Latino is higher than the state level, while in Watonwan County the percentage is lower than the state level. The largest minority group in all three counties is comprised of residents who identify as Hispanic or Latino. Most notably, 26.9 percent of the population in Watonwan County identify as Hispanic or Latino.

The top three industries of employment in the State of Minnesota are education, health, and social services at 25.2 percent, manufacturing at 13.4 percent, and retail trade at 11.0 percent (U.S. Census Bureau, 2018). The top three industries of employment in the counties within the Project Study Area vary slightly from the state level, with manufacturing playing a larger role all three counties. Employment in the education, health, and social services industry is slightly lower in all three counties than at the state level, but employment in the retail trade industry in all three counties is similar to the state level.

Table 5.2-2 provides income and employment information, and Table 5.2-3 provides race and ethnicity information for Minnesota and the counties in the Project Study Area.

Table 5.2-2 Population and Economic Characteristics within the Project Study Area

Location	Population, Census, April 1, 2010[1]	ACS Population Estimates July 1, 2019[1]	Percent Change 2010 - 2019[1]	ACS 2018 Estimates Per Capita Income Level[2] (in 2018 U.S. dollars)	ACS 2018 Estimates Unemployment Rate[2] (%)	ACS 2018 Estimates Persons Living Below the Poverty Level[2] (%)	Top 3 Industries[2, 3]
Minnesota	5,303,925	5,639,632	6.3	$36,245	3.9	10.1	E (25.2%), M (13.4%), R (11.0%)
Cottonwood County	11,687	11,196	-4.2	$27,209	4.1	12.5	E (23.2%), M (20.0%), R (11.5%)
Watonwan County	11,211	10,897	-2.8	$27,772	2.6	12.7	M (22.7%), E (21.5%), R (12.0%)
Martin County	20,843	19,683	-5.6	$31,091	3.5	13.3	E (23.3%), M (15.6%), R (11.1%)

1 U.S. Census Bureau, 2019

2 U.S. Census Bureau, 2018

3 Industries are defined under the 2012 North American Industry Classification System (NAICS) and abbreviated as follows: E = Educational, Health and Social Services; M = Manufacturing; and R = Retail Trade.

Table 5.2-3 Race and Ethnicity of the Population in the Project Study Area

Location	White Alone, Not Hispanic or Latino (%)	Black or African American Alone (%)	American Indian or Alaska Native Alone (%)	Asian Alone (%)	Native Hawaiian/ Pacific Islander Alone (%)	Two or More Races (%)	Hispanic or Latino (%)	Total Minority (%)[1]
Minnesota	79.1	7.0	1.4	5.2	0.1	2.6	5.6	20.9
Cottonwood County	84.7	1.3	0.9	4.1	0.4	2.0	8.4	15.3
Watonwan County	70.4	1.2	1.3	1.1	0.1	1.2	26.9	29.6
Martin County	92.3	0.9	0.6	0.7	0.1	1.1	5.0	7.7

[1] Total minority percentage equals the total population minus the percentage of white alone, not Hispanic or Latino.

Source: U.S. Census Bureau, 2019

5.2.6.1 Impacts and Mitigation

Transmission line projects have the potential to impact the socioeconomic conditions of an area in the short term through an influx of non-local personnel, creation of construction jobs, purchases of construction material and other goods from local businesses, and expenditures on temporary housing for non-local personnel. In the long term, transmission line projects may beneficially impact the local tax base in the form of revenues generated from utility property taxes. Additionally, permanent job creation or relocation of project personnel to the area for operation of a transmission line project could affect area demographics.

Construction of the Project would have minimal, short-term impacts on the existing socioeconomic conditions in the Project Study Area. The Project would not result in long-term or signification changes in the population size or demographics, or significantly affect employment or income, in the Project Study Area. The construction and operation of the proposed Project is not anticipated to create or remove jobs in the Project Study Area or result in the permanent relocation of individuals to or from the area.

The communities in the Project Study Area will likely experience short-term positive economic impacts related to the increase in expenditures during construction of the Project. Construction of the Project would take approximately 5 months and the construction work force would be approximately 45 workers. Construction personnel would likely commute to the Project on a daily or weekly basis instead of relocating to the area. The influx of additional construction personnel in the Project Study Area will have a small positive impact on the local economy from construction crew expenditures in the local community (e.g., lodging, fuel, food). Construction materials (e.g., lumber, concrete, aggregate) may be purchased from local vendors when feasible.

No additional permanent staff will be necessary for operation and maintenance of the proposed transmission line. Therefore, the Project is not expected to have a long-term effect on population trends, economic conditions, or employment. However, the Project will have a long-term beneficial impact on the local tax base from the incremental increase in revenues generated by utility property taxes. As the overall socioeconomic impact of the Project is anticipated to be positive, no mitigation measures are proposed.

5.2.7 Cultural Values

Cultural values can be described as shared community beliefs or attitudes, among a given area or population, which provide a framework for that area's or population's commonality. The Project is in rural Cottonwood, Watonwan, and Martin Counties and according to the U.S. Census Bureau QuickFacts website, the majority of the population in these counties identifies as White Alone, not Hispanic or Latino with an ethnic background of European origin (U.S. Census Bureau, 2019). The communities in the Project Study Area primarily have cultural values tied to agricultural production, light industry, and recreational activities such as hunting and fishing. In addition, the Jeffers Petroglyphs Historic Site, which is about 11 miles northwest of the Project, is a culturally important site for many Native American tribes in the region.

Farm-related businesses play an important role in the regional economy, and the area has a diversified agricultural mix of crops and livestock production. In general, agricultural communities in southwestern Minnesota, and in the Project Study Area, are characterized by relatively flat and wide-open vistas with scattered farmsteads and associated shelterbelts dotted throughout the

landscape. However, in Cottonwood, Watonwan, and Martin Counties, recent transmission line and wind energy development is also a part of the landscape.

As described further in Section 5.3.3, cultural representation for both European and Native American groups in community events includes annual events like the Utschtallung (Heritage Fair) and the Mountain Lake Community Festival in the City of Mountain Lake (Mountainlakemn.com, 2018). The Utschtallung includes public tours, hosted by costumed tour guides, of 21 historic buildings in Heritage Village, an area of early Russian-Mennonite and German-Lutheran settlement on the southwest side of Mountain Lake. The annual Mountain Lake Community Festival includes a parade, tractor pull, animal petting zoo, performances by local artists, and other events. Guided or solo tours of the Jeffers Petroglyphs Historic Site offer visitors a chance to learn more about the Native American groups who inhabited this region (MNHS, n.d.).

Other community events near the Project are centered more around seasonal events, national holidays, and municipal events than to those based in ethnic heritage. Examples of regional cultural events include summertime events like the Summer Sizzler and the Butterfield Threshing Bee in Butterfield (Butterfieldmn.com, n.d.). A more detailed discussion of these events is presented in Section 5.3.3.

5.2.7.1 Impacts and Mitigation Measures

The presence of the Project will not significantly impact the use of land for agricultural production or the general character, aesthetics, or the cultural values of the Project Study Area. As demonstrated by other transmission line projects in the Midwest, agricultural practices continue throughout construction and operation. See Section 5.3.1.1 for a more detailed discussion of how the Project is expected to affect agricultural practices in the Project Study Area. No impacts on light industrial uses in the Project Study Area are anticipated from construction or operation of the Project.

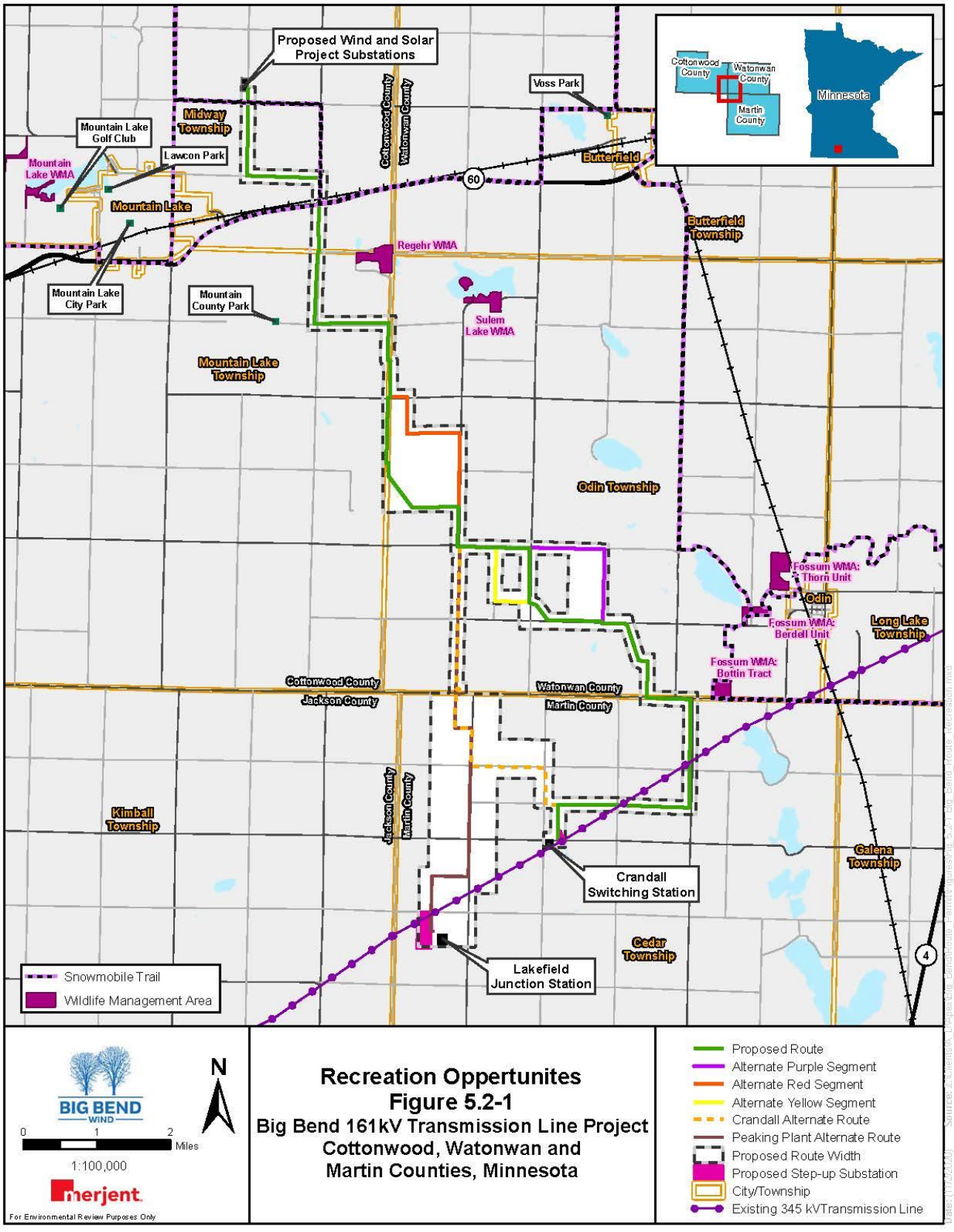
In terms of aesthetic impacts, the presence of existing transmission lines and operating wind farms in Cottonwood, Watonwan, and Martin Counties has already changed the traditionally bucolic landscape. See Section 5.2.5 for additional discussion of how the Project may affect aesthetic resources. The Project will not impact access to public hunting or fishing areas, so no impact to recreational fishing or hunting is anticipated.

Because no impacts on cultural values are anticipated, no mitigative measures specific to cultural values are proposed.

5.2.8 Recreation

There are various recreational opportunities in or near the Project Study Area. Recreational opportunities at public lands include MNDNR Wildlife Management Areas (WMAs), snowmobile trails, and county and city parks (refer to Figure 5.2-1). Each of these public lands offers many recreational opportunities that attract residents and tourists.

There are additional recreational opportunities within the nearby City of Mountain Lake such as museums and festivals. See the Tourism section in 5.3.3 for more information on these potential recreational activities that are not on public lands.


Proposed Wind and Solar Project Substations
Voss Park
Midway Township
Mountain Lake Golf Club
Lawcon Park
Mountain Lake WMA
Mountain Lake
Mountain Lake City Park
Mountain County Park
Cottonwood County
Watonwan County
Butterfield
Butterfield Township
Regehr WMA
Sulem Lake WMA
Mountain Lake Township
Odin Township
Fossum WMA: Thorn Unit
Odin
Fossum WMA: Berdell Unit
Long Lake Township
Fossum WMA: Bottin Tract
Jackson County
Martin County
Kimball Township
Galena Township
Crandall Switching Station
Cedar Township
Lakefield Junction Station
Snowmobile Trail
Wildlife Management Area
Minnesota
Recreation Oppertunites
Figure 5.2-1
Big Bend 161kV Transmission Line Project
Cottonwood, Watonwan and
Martin Counties, Minnesota
1:100,000
Miles
For Environmental Review Purposes Only
Proposed Route
Alternate Purple Segment
Alternate Red Segment
Alternate Yellow Segment
Crandall Alternate Route
Peaking Plant Alternate Route
Proposed Route Width
Proposed Step-up Substation
City/Township
Existing 345 kVTransmission Line

WMAs are managed to provide wildlife habitat, improve wildlife production, and provide public hunting and trapping opportunities. These MNDNR lands were acquired and developed primarily with hunting license fees. There are six WMAs within the Project Study Area: two WMAs are in Cottonwood County and four are in Watonwan County. None of the WMAs within the Project Study Area fall within the Proposed Route.

In Cottonwood County, the Mountain Lake WMA is a 70-acre parcel located just west of the City of Mountain Lake and about three to four miles west of the Application Alignment (MNDNR, 2020b). Also, in Cottonwood County, the Regehr WMA is a 65-acre parcel located a little over two miles southeast of the City of Mountain Lake and 0.5 mile east of the Application Alignment (MNDNR, 2020b). In Watonwan County, the Sulem Lake WMA is a 55-acre area located in the northwestern corner of the county, a little more than a mile from the Application Alignment. Finally, three areas associated with the Fossum WMA (the Thorn Unit [69 acres], Berdell Unit [30 acres], and Bottin Tract [40 acres]) are located just west of the Town of Odin and from 0.3 mile to 1.9 miles northeast of the Application Alignment (MNDNR, 2020b).

There are no MNDNR Scientific and Natural Areas, state trails, state water trails, Aquatic Management Areas, state parks, or migratory waterfowl feeding and resting areas in the Project Study Area.

Snowmobile trails are mapped by MNDNR and managed locally by each county and their respective snowmobile clubs. The Cottonwood Jackson County Snowmobile Trail is present within the Project Study Area near the City of Mountain Lake. The trail runs east and west along both sides of 360th Street, north and south along both sides of CSAH 8, and finally runs east-west along the south side of Highway 60. In addition, the Riverside Trail is within the Project Study Area in Watonwan County. This snowmobile trail is about 0.3 mile east of the Application Alignment, near the intersection of CSAH 21 and CSAH 9. The trail runs south/southwest, passing through the Fossum WMA, toward CSAH 21 then turns east and travels along both sides of the roadway away from the Application Alignment.

Mountain County Park and Historic Site is within the Project Study Area, about 1.5 miles southeast of Mountain Lake and about 0.4 mile west of the Proposed Route (MNOPEDIA.org, 2019). The park is owned by Cottonwood County and public use of the park is focused on camping, picnicking, hiking, and wildlife viewing. In particular, the Cottonwood County Bird Club hosts its annual bird count at the park. A more detailed description of the park is provided in Section 5.3.3.

In Cottonwood County there are two city parks in the Project Study Area. Mountain Lake City Park and Lawcon Park are both located within the municipal boundary of Mountain Lake. Mountain Lake Golf Club is also present in the City of Mountain Lake, on the west side of town directly south of Mountain Lake. In Watonwan County, Voss Park is located just outside the northwestern boundary of the Town of Butterfield. Because the transmission line does not cross municipal boundaries, none of these city parks are within the Proposed Route. In addition, no city parks are within the Project Study Area in Martin County.

5.2.8.1 Impacts and Mitigation

Construction of the Project is not anticipated to affect public access to nearby recreational opportunities. The Application Alignment was routed to avoid and/or minimize impacts to recreation areas and the Step-up Substation will be constructed directly adjacent to an existing

switching station, which is not near public recreation areas. The Application Alignment does not cross any federal, state, or local recreation areas.

The Application Alignment crosses the Cottonwood Jackson County Snowmobile Trail where the snowmobile trail runs along either side of 360th Street, then parallels the trail along the west side of CSAH 8, and eventually crosses the trail on the south side of Highway 60. Snowmobile trails are sometimes in road ditches adjacent to agricultural fields; in other instances, they're within agricultural fields. Collocation of the snowmobile trail with monopole structures for half mile along CSAH 8 is not anticipated to affect use of the snowmobile trail. Temporary disruptions to use of the snowmobile trail could occur if Project construction occurs during the winter months. However, any disruptions would be minimal, short-term, and would resolve with the completion of construction. The Application Alignment does not cross the Riverside Trail; therefore, no impacts on public use of the trail are anticipated.

The transmission line will be within 50 feet of the driveway to Mountain County Park, but is approximately 0.5 mile from the park itself. The right-of-way of the Application Alignment is co-located with the driveway easement; in this location, the right-of-way would be configured to include 50 feet on the south side of the alignment centerline and 100 feet on the north side. Temporary interruptions to public access to the park may occur during the period of active construction; however, such interruptions would be short-term and would resolve after construction is complete.

Impacts to recreation areas would mostly be related to Project construction, and will be minimal, temporary, and isolated to specific areas throughout the Route. Short-term increases in noise and dust would occur during construction of the Project, and could detract from public enjoyment of nearby recreational activities. However, these impacts would be minimal, and use of BMPs to limit noise and fugitive dust during construction would effectively mitigate their effects. Section 5.2.4.1 discusses how Big Bend would mitigate potential noise impacts and Section 5.5.1.1 provides a discussion of how Big Bend would mitigate fugitive dust emissions during construction of the Project.

Introduction of an aesthetic change to the predominantly agrarian landscape in the Project Study Area could impact public enjoyment of available recreation opportunities. Big Bend has minimized impacts to recreational opportunities by siting the Application Alignment to avoid these areas. A detailed discussion of how the Project could impact aesthetics and the measures Big Bend would use to mitigate aesthetic impacts is provided in Section 5.2.5.

5.2.9 Land Use and Zoning

Information about land use and zoning provides important insight into existing human settlement patterns and future development. Big Bend reviewed land use and county zoning information for the counties in the Project Study Area to assess the Project's potential to impact existing land uses and to identify any additional routing constraints that should be considered for development of the transmission line. The Route crosses through predominantly rural areas with sparsely scattered rural residences, farmsteads, commercial livestock operations, and agricultural support facilities throughout.

5.2.9.1 Land Use

Big Bend reviewed information available from the 2016 National Land Cover Database (NLCD) to identify existing land cover types and uses crossed by the Route (Yang, et al., 2018). The

primary land cover type crossed is cultivated cropland. The second most common land cover type crossed is developed land, which includes roads and illustrates the degree of co-location of the proposed Application Alignment.

According to the NLCD data, the Proposed Route right-of-way also crosses a small amount of emergent herbaceous wetlands, hay/pasture land, and herbaceous land. A detailed discussion of potential wetland impacts is presented in Section 5.5.5 and a discussion of potential Project impacts on herbaceous vegetation is presented in Section 5.5.6. Table 5.2-4 presents details about the amount of each NLCD land cover type crossed by the right-of-way of the Proposed Route and this information is also displayed on Figure 5.2-2.

Table 5.2-4
Land Cover Types within the Proposed Route Right-of-Way

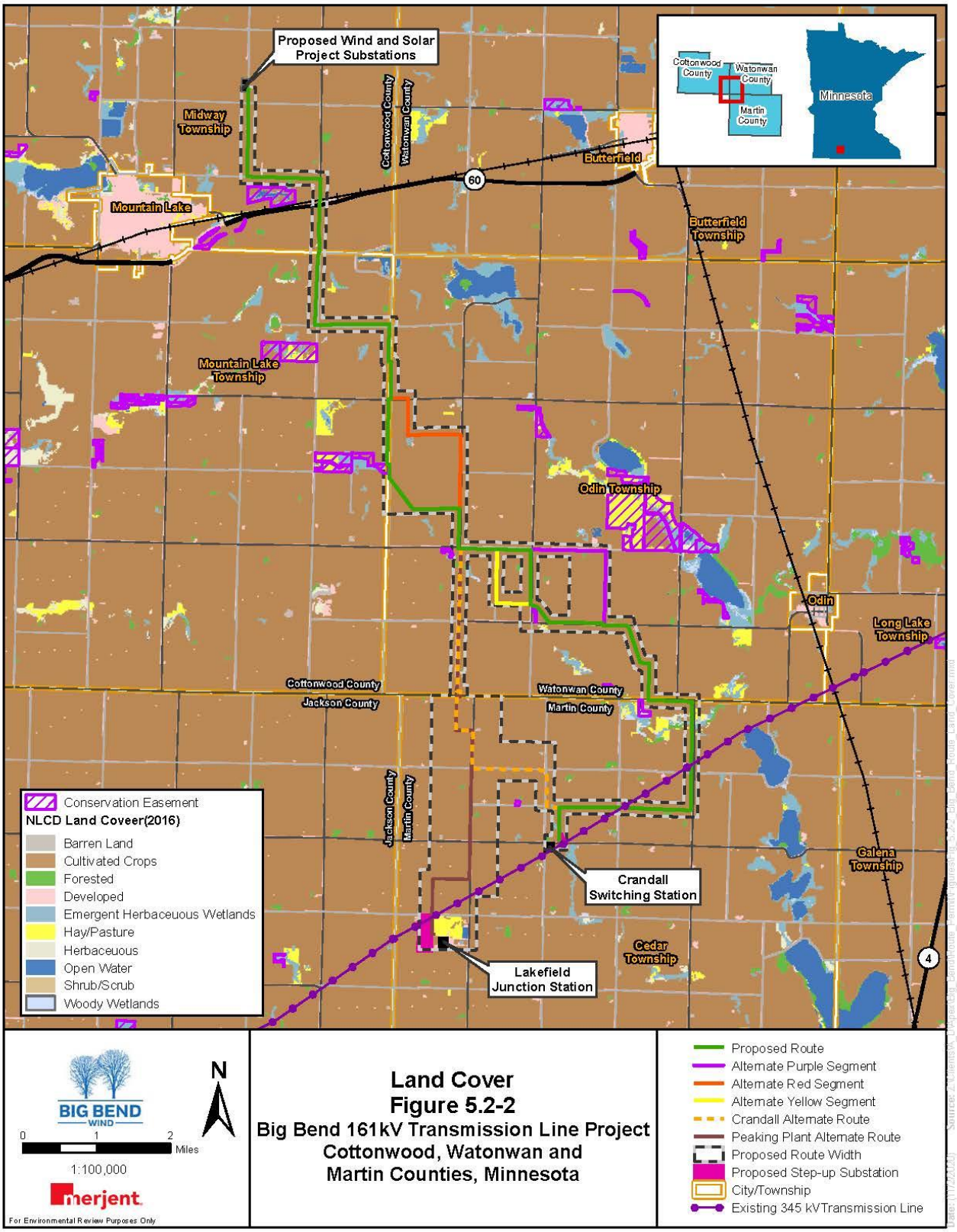
NLCD Land Cover Category	Proposed Route ROW	
	Acres	Percent
Cultivated Crops in Right-of-Way (acres)	247.8	82.5
Developed Areas in Right-of-Way (acres) (i.e., low density, medium density, open space)	47.5	15.8
Herbaceous Land in Right-of-Way (acres)	1.9	0.6
Emergent Herbaceous Wetlands in Right-of-Way (acres)	1.8	0.6
Hay/Pasture Land in Right-of-Way (acres)	1.4	0.5
Total	**300.4**	**100.0**

Source: Yang et al., 2018

As noted in Table 5.2-4, approximately 247.8 acres of cultivated cropland is crossed by the right-of-way of the Proposed Route. Of the remaining 52.6 acres, 47.5 acres are developed land. In addition, 1.8 acres of emergent herbaceous wetland, 1.9 acres of herbaceous land, and 1.4 acres of hay/pasture land are crossed by the Proposed Route right-of-way.

In addition to the transmission line right-of-way, construction of the Step-up Substation for the Project will affect approximately 3.4 acres of cultivated cropland, one acre of developed land, and less than one acre of emergent herbaceous wetland (see Section 5.5.5 for a more specific discussion of wetlands and wetland impacts).

Typical crops grown in the Project Study Area include corn, soybeans, forage (hay and green chop), and vegetables harvested for sale (USDA, 2017). A more detailed discussion of the existing agricultural economy in the Project Study Area is presented in Section 5.3.1, and a discussion of vegetation types within the non-agricultural areas is provided in Section 5.5.6.


Proposed Wind and Solar Project Substations
Midway Township
Cottonwood County
Watonwan County
Butterfield
Mountain Lake
Butterfield Township
Mountain Lake Township
Odin Township
Odin
Long Lake Township
Cottonwood County
Jackson County
Watonwan County
Martin County
Jackson County
Martin County
Galena Township
Crandall Switching Station
Cedar Township
Lakefield Junction Station
Cottonwood County
Watonwan County
Martin County
Minnesota
Conservation Easement
NLCD Land Coveer(2016)
Barren Land
Cultivated Crops
Forested
Developed
Emergent Herbaceuous Wetlands
Hay/Pasture
Herbaceuous
Open Water
Shrub/Scrub
Woody Wetlands
BIG BEND WIND
N
0 1 2 Miles
1:100,000
merjent
For Environmental Review Purposes Only
Land Cover
Figure 5.2-2
Big Bend 161kV Transmission Line Project
Cottonwood, Watonwan and
Martin Counties, Minnesota
Proposed Route
Alternate Purple Segment
Alternate Red Segment
Alternate Yellow Segment
Crandall Alternate Route
Peaking Plant Alternate Route
Proposed Route Width
Proposed Step-up Substation
City/Township
Existing 345 kVTransmission Line

5.2.9.2 Zoning

The Project is subject to Minnesota's PPSA (Minn. Stat. § 216E). As such, and pursuant to Minn. Stat. § 216E.10, subd. 1, a route permit issued by the Commission, "shall be the sole site or route approval required to be obtained by the utility. Such permit shall supersede and preempt all zoning, building or land use rules, regulations or ordinances promulgated by regional, county, local and special purpose government." Therefore, Big Bend is not required to apply to county zoning authorities for additional building or land use permits or approvals for the Project. However, as noted in Section 5.2.9, county zoning information provides important insight into existing human settlement patterns and future development and, for this reason, is presented herein.

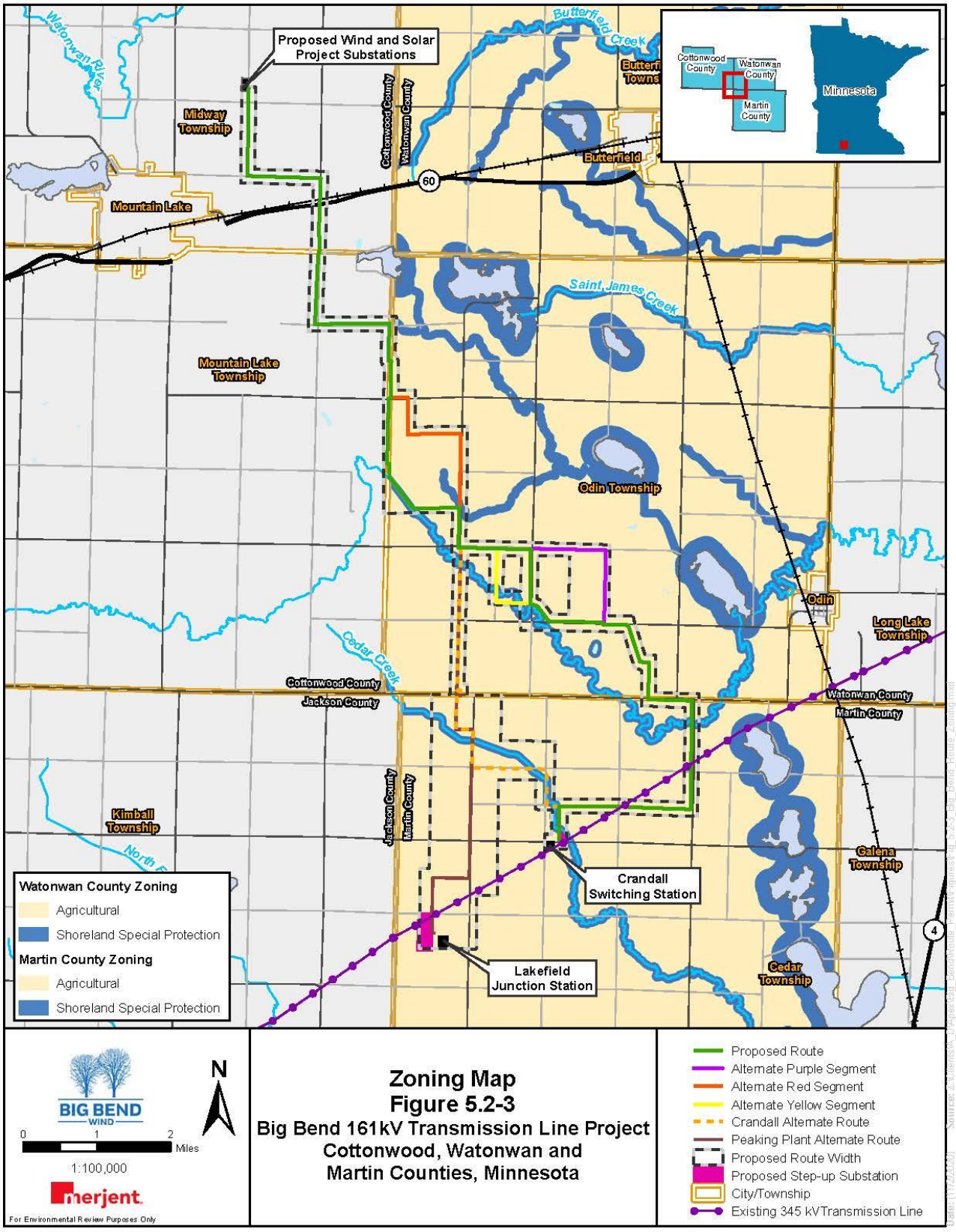
Big Bend reviewed county zoning information for Cottonwood, Watonwan, and Martin Counties to identify any additional routing constraints for the proposed transmission line. As noted in Section 5.2.3, NESC standards require certain clearances between transmission line facilities and buildings for safe operation of the transmission line. Areas zoned as commercial, industrial, or residential are the most likely areas where future development of residences and other structures may occur. As demonstrated with the land use data, and generally in the human settlement section, much of the Project Study Area is rural and agricultural. Zoning for the Project Study Area is depicted on Figure 5.2-3.

In Cottonwood County, most of the Proposed Route is within the Agricultural District, though the Route also crosses a few parcels zoned as Residential – Single Unit (Cottonwood County, 2016). Cottonwood County displays their zoning classifications at the parcel level. In Cottonwood County, farmsteads within the rural landscape (i.e., outside of municipal boundaries) are sometimes classified as single-family residential even though the area surrounding the farmsteads is zoned as agricultural. This results in pockets of smaller areas zoned as single-family residential within an area that is predominantly zoned as agricultural. Single-family residential zoning in this context is different than in an urban area or municipality where single-family residential zones are comprised of clusters of residences.

According to the Watonwan County Zoning Ordinance (2014) and review of the Watonwan County zoning map (2017), most of the Project Study Area falls within the Agricultural District. Smaller portions of the Proposed Route also overlap with the Flood Plain and Shoreland Overlay Districts (i.e., where the Proposed Route crosses or is co-located with the South Fork of the Watonwan River. Overlay districts impose additional criteria for development in addition to the criteria imposed by the underlying zoning district.

Based on review of the Martin County Zoning Ordinance (2008) and the Martin County Zoning District Map (2017), most of the Project Study Area is within the Agricultural District though portions fall within the Shoreland District, and specifically within the Special Protection District (i.e., where the Proposed Route crosses Cedar Creek).

As noted in Section 5.2.9.1, the Proposed Route was developed to predominantly cross cultivated crop and developed land along existing roadways and property lines and avoid residential areas. These areas correspond to the Agricultural District.


Proposed Wind and Solar Project Substations
Watonwan River
Butterfield Creek
Midway Township
Cottonwood County
Watonwan County
Butterfield
Mountain Lake
Saint James Creek
Mountain Lake Township
Odin Township
Odin
Long Lake Township
Cedar Creek
Cottonwood County
Jackson County
Watonwan County
Martin County
Kimball Township
Jackson County
Martin County
Galena Township
Crandall Switching Station
Lakefield Junction Station
Cedar Township
Minnesota
Watonwan County Zoning
Agricultural
Shoreland Special Protection
Martin County Zoning
Agricultural
Shoreland Special Protection
BIG BEND WIND
0 1 2 Miles
1:100,000
N
For Environmental Review Purposes Only
Zoning Map
Figure 5.2-3
Big Bend 161kV Transmission Line Project
Cottonwood, Watonwan and
Martin Counties, Minnesota
Proposed Route
Alternate Purple Segment
Alternate Red Segment
Alternate Yellow Segment
Crandall Alternate Route
Peaking Plant Alternate Route
Proposed Route Width
Proposed Step-up Substation
City/Township
Existing 345 kVTransmission Line

5.2.9.3 Impacts and Mitigation

Construction and operation of the Project is not expected to have a significant impact on land use within Cottonwood, Watonwan, and Martin Counties. Existing land uses along the Proposed Route will experience minimal, short-term impacts during the period of construction. Big Bend sited the Application Alignment to be co-located with roads or property lines for the majority of its length to minimize impacts to non-developed areas. When transmission line construction is complete, Big Bend will restore Project workspaces as described in Section 4.3, and land uses will be allowed to continue as before. No additional mitigation measures are proposed. For a more detailed discussion of impacts and mitigation measures that will be employed in agricultural land, refer to Section 5.3.1.

As noted in Section 2.5, the Step-up Substation will measure approximately 350 feet by 350 feet (2.8 acres). Big Bend will complete wetland delineations in Fall 2020 to confirm the 2.8-acre substation will occur in cultivated crops and uplands; the Step-up Substation is not anticipated to impact wetlands or require wetland fill. For the purposes of this Application, Big Bend conservatively assumed permanent impacts to the entire 5.0-acre construction workspace. The Step-up Substation components will be mounted on concrete pads, the Step-up Substation will be graveled to maintain the area free of vegetation, and a fence will be installed to prevent unauthorized entry by individuals and wildlife.

The Proposed Route predominantly cross areas zoned as agricultural in Cottonwood, Watonwan, and Martin Counties. Though a few smaller pockets of residential zoning are crossed by the Route in Cottonwood County, the Application Alignment is sited outside of the residential parcel boundary and on the opposite side of the road, thereby avoiding direct impacts to parcels zoned as residential. In addition, the Proposed Route crosses floodplain and shoreland districts (or overlay districts) in Watonwan and Martin Counties. Big Bend will avoid placing transmission line poles in shoreland districts by spanning the transmission line over these areas. If floodplain districts cannot be avoided, Big Bend will install the poles in a manner consistent with the requirements of the zoning ordinances for these districts. No areas zoned as commercial or industrial are crossed by the Proposed Route. Based on review of the zoning information for Cottonwood, Watonwan, and Martin Counties, the likelihood of future residential, commercial, or industrial development within the Proposed Route is low; therefore, no mitigation measures are proposed.

5.2.10 Public Services

Transmission line projects have the potential to impact public services during both construction and operation. This section provides information about public services in the Project Study Area including police, fire, and ambulance services; hospitals; water and wastewater services; school districts; utilities; and other public services such as public utility infrastructure. It also discusses whether the Project has the potential to affect these public services. A discussion of potential Project effects on radio, television, cellular phone, and Global Positioning Systems (GPS); transportation; and farming operations, vehicle use, and metal buildings near power lines is provided in Sections 5.2.11 and 5.2.12.

Use of heavy equipment during construction presents the potential for injuries such as falls, equipment-use related injuries, or electrocution. Operation of a transmission line presents a potential risk to public safety if the transmission line or structures are damaged by inclement weather or not operated in compliance with safety standards. Injuries as a result of construction

or operation of a transmission line project would require use of local emergency services such as police, fire, ambulance, or hospitals and could affect the availability of these services to the local population.

The influx of large numbers of non-local personnel to an area has the potential to increase enrollment in local school districts, if the non-local personnel are accompanied by their families. Finally, the location of existing utilities is one of the factors to be considered when siting of a transmission line. While co-location with existing utilities is encouraged, any co-location with existing utilities should be done in a way that avoids impacting the safe operation and routine maintenance of those utilities.

5.2.10.1 Police, Fire, and Ambulance Services

Public emergency services within the Project Study Area are provided by local law enforcement and emergency response agencies located in nearby communities. The sheriff's offices of Cottonwood, Watonwan, and Martin Counties provide law enforcement to communities in the Project Study Area. Additionally, the Cities of Mountain Lake, Windom, St. James, and Trimont have local police departments. Fire services near the Project Study Area are provided by city and community fire departments, including Mountain Lake, Butterfield, Windom, St. James, and Trimont.

Ambulance response is provided by regional and local ambulance services. The Windom Ambulance Service provides response services to a 200-square-mile region surrounding Windom, Minnesota. The cities of Mountain Lake, St. James, and Trimont also provide ambulance services (Minnesota Emergency Medical Services Regulatory Board, 2020).

5.2.10.2 Hospitals

Hospitals near the Project Study Area include Windom Area Health in Windom (Cottonwood County), Madelia Community Hospital and Clinic in Madelia (Watonwan County), and the Fairmont Medical Center in Fairmont (Martin County). Smaller medical clinics or medical centers in the area include Sanford Health Mountain Lake Clinic in Mountain Lake, Mayo Clinic Health System in St. James and Fairmont, and various eye clinics, dental offices, and chiropractors.

5.2.10.3 School Districts

School districts in the Project Study Area include Mountain Lake (Independent School District [ISD] 173), Butterfield-Odin (ISD 836), and Martin County West (ISD 2448).

5.2.10.4 Water and Wastewater Services

Most rural residences in Cottonwood, Watonwan, and Martin Counties are supplied water by wells (see Section 5.5.2) or by Red Rock Rural Water System (Red Rock Rural Water System, 2019). The City of Mountain Lake provides municipal water and sewer services, as well. The majority of residences in rural areas throughout the Project Study Area have private septic systems and/or drain fields.

5.2.10.5 Utilities

South Central Electric Association is the primary electrical provider for the Project Study Area (Minnesota Geospatial Commons, 2018). Mountain Lake Municipal Utilities service area includes

the city of Mountain Lake and areas within approximately half mile of the municipal boundary. Minnesota Energy Resources and CenterPoint Energy provide natural gas service in the Project Area (Minnesota Energy Resources, 2020; CenterPoint Energy, 2020).

The existing 345 kV transmission line and the existing Crandall Switching Station owned by Xcel Energy, Inc. are present at the south end of the Proposed Route. The Crandall Switching Station is located southeast of the intersection of 230th street and 30th Avenue. Northwest of this same intersection there is a step-up substation associated with the Odell Wind Farm.

Based on review of the National Pipeline Mapping System, the Proposed Route does not cross natural gas pipelines (National Pipeline Mapping System, 2020).

5.2.10.6 Other Public Services

Other public services within the Project Study Area are located primarily within municipalities. Public works and utility departments design, build, and maintain streets and sidewalks, sanitary sewers, water mains, and public landscaping. Public facilities within municipalities in the Project Study Area include athletic fields, parks, and libraries.

5.2.10.7 Impacts and Mitigation

No impacts to the availability of emergency services and schools, or impacts to existing utilities as a result of the Project are anticipated. Big Bend will coordinate with utility providers and authorities, including emergency services, to determine the locations of facilities, appropriate safety precautions and standards, and measures to address these precautions and standards. Big Bend will meet with utility providers and residents as needed to avoid direct and indirect impacts to their services.

The Proposed Route crosses the existing 345 kV transmission line twice before reaching the Project Step-up Substation in northwest Martin County. At the request of Xcel Energy, Big Bend will construct the proposed transmission line to cross over the top of the existing 345 kV transmission line at each location. As noted in Section 2.5, Big Bend will construct the Step-up Substation for the Project directly adjacent to the existing Crandall Switching Station and run a short segment (less than 1,500 feet) of 345 kV transmission line from the Step-up Substation to the Crandall Switching Station to connect the Project to the transmission grid. No impacts or interruptions of service will be necessary to cross the existing 345 kV transmission line or connect the Project to the Crandall Switching Station. Furthermore, the proposed Application Alignment and Step-up Substation would not affect the existing step-up substation associated with the Odell Wind Farm.

Project activities could damage existing underground utilities during grading, but this is improbable. Prior to construction, Big Bend will locate and mark underground utilities using the Gopher State One-Call system. If Big Bend needs to cross an underground utility or other underground infrastructure with heavy equipment, they will employ BMPs to protect the infrastructure, such as construction matting.

Because no impacts to public services are anticipated, no mitigation measures are proposed.

5.2.11 Radio, Television, Cellular Phone, and Global Positioning System

Operation of transmission lines has the potential to interfere with reception of radio, television, cellular, and GPS signals. Corona, as well as spark discharge, from transmission line conductors can generate electromagnetic "noise" at the same frequencies that some radio, television, cellular, and GPS signals are transmitted. Electromagnetic noise, which typically occurs from about 0.1 to 50 megahertz (MHz), can interfere with the reception of these signals, depending on the frequency and overall strength of the radio and television signal.

Big Bend conducted online research to identify radio, television, and cell phone towers located within the Project Study Area. The results of this review and a discussion of potential impacts to these services from operation of the Project are presented below.

5.2.11.1 Radio

There are numerous Amplitude Modulation (AM) and Frequency Modulation (FM) radio broadcasting stations such as KNSW (91.7 FM), KKCK (94.7 FM), KUSQ (95.1 FM), KBEW (98.1 FM), KUXX (105.7 FM), KWOA (730 AM), KNUJ (860 AM), KKOJ (1190 AM), and KMHL (1400 AM) that operate or can be heard within the Project Study Area.

5.2.11.2 Television

There are more than 30 digital channels broadcast in the Project Study Area; these channels would be received from cities including Redwood Falls, Mankato, Jackson, and Worthington, Minnesota.

5.2.11.3 Cellular Phone

There is one cellular tower along the Proposed Route near the intersection of CSAH 8 and 370th Street in east of Mountain Lake. Several cellular phone service providers operate in the vicinity of the Application segments, including large carriers like Verizon, AT&T, Sprint, T-Mobile, Virgin Mobile, Boost Mobile, Cricket, Straight Talk, and Republic Wireless.

5.2.11.4 Global Positioning System

GPS applications are important components of daily life, used in aviation, vehicle navigation, surveying, and agricultural activities. GPS equipment relies on satellites and typically mobile receiver equipment to provide locational information for navigation between endpoints, as well as geographic orientation for farm and other equipment. GPS equipment is likely used throughout the Project Study Area

5.2.11.5 Impacts and Mitigation

No impacts on radio, television, cellular phones, or GPS units are expected from construction or operation of the Proposed Route. As such, no specific mitigation measures are proposed.

AM radio frequencies are most commonly affected by corona-generated noise. Interference from a spark discharge source can be found and corrected. AM radio frequency interference typically occurs immediately under a transmission line and dissipates rapidly within the right-of-way to either side. If radio interference from transmission line corona does occur, satisfactory reception

from AM radio stations previously providing good reception can be restored by appropriate modification of (or addition to) the receiving antenna system.

Television broadcast frequencies are typically high enough that they are not affected by corona-generated noise. In particular, digital and satellite television transmissions are not affected by corona-generated noise because they are dependent on packets of binary information, or transmitted in the Ku band of radio frequencies (12,000-18,000 MHz), respectively. Digital and satellite transmissions are more likely to be affected by multi-path reflections (shadowing) generated by nearby towers. In addition, line-of-sight interference from transmission line structures can affect satellite television transmissions. The use of shielded coaxial cable for cable television transmittals generally makes them insusceptible to interference from electromagnetic noise. Interference to digital and satellite signals as a result of the Project is not anticipated. If interference to these signals were to occur from multi-path reflections or line-of-sight interference, such interference can be mitigated by use of an outdoor antenna to improve digital signals or by moving the affected satellite antenna to a slightly different location.

Cellular phone signals use an ultra-high frequency, generally around 900 MHz, which is significantly higher than the range of electromagnetic noise generated by transmission line conductors. GPS signals operate at a higher frequency as well, within the range of 1,225 to 1,575 MHz Because both cellular phone signals and GPS operate at frequencies outside the range of electromagnetic noise generated by transmission line conductors, the risk of interference is negligible.

5.2.12 Transportation

Transmission line projects have the potential to affect local transportation networks such as roadways, railroads, airports, and airstrips. Use of heavy equipment during construction may damage existing road surfaces and local roadways could experience temporary road and/or lane closures during construction. In addition, the influx of construction contractors could increase traffic volumes on local roadways. Co-location of transmission lines with existing public roads could limit future roadway expansion or realignments, and could interfere with routine maintenance of roadways. In addition, if a transmission line is sited too close to an operating railroad, it could interfere with safe operation of the railroad.

The Federal Aviation Administration (FAA) and the Minnesota Department of Transportation (MNDOT) have both established guidelines for development of transmission lines near public airports. The FAA has developed height restrictions for development near public airports and has developed guidelines for placement of buildings and other structures near high frequency omni-directional range navigation systems. MNDOT has established zoning areas around public airports that restrict the area where buildings and other structures can be placed. Both the FAA and MNDOT guidelines apply only to public airports and are not applicable to private airstrips.

Big Bend conducted online research to identify roadways, railroads, airports, and airstrips within the Project Study Area. The results of this review and a discussion of potential impacts to these features from construction and operation of the Project is presented below.

Roadways

The Proposed Route crosses one state highway, Highway 60, about 1.5 miles east of the City of Mountain Lake. The remainder of the Proposed Route primarily crosses and is co-located with CSAHs and township roadways (refer to Table 5.2-5). Highway 60 extends east to west across

southern Cottonwood and Watonwan Counties connecting the towns of St. James, Butterfield, Mountain Lake, Bingham Lake, and Windom in the Project Study Area. Multiple paved county roads are crossed by or exist within the Project Study Area along with numerous other paved and unpaved roads.

Traffic volumes are relatively low on most roads crossed by the Proposed Route, as expected given the rural nature of the area (refer to Table 5.2-5). Annual Average Daily Traffic (AADT) rates are highest near Mountain Lake on Highway 60 (5,881) followed by CSAHs (ranging from 50-410) and then county and township roads (ranging from 20-130; MNDOT, 2020).

Table 5.2-5
Annual Average Daily Traffic on Roads Co-located with the Route

Road	County	AADT	Traffic Count Year	Co-located Distance (miles)
CSAH 8	Cottonwood	65	2014	2
Highway 60	Cottonwood	5,881	2018	Crossed
CSAH 2	Watonwan	80	2016	0.5
County Road 128	Watonwan	50	2014	0.8
County Road 134	Watonwan	20	2014	1.1
CSAH 21	Watonwan	410	2016	0.6
CSAH 9	Martin	90	2018	1.5
County Road 150	Martin	130	2010	0.1

Source: MNDOT, 2020

Railroads

The Proposed Route crosses the Chicago & Northwestern Railroad just north of the intersection of Highway 60 and 600th Avenue east of Mountain Lake. The Proposed Route does not cross any additional railroads.

Airports and Airstrips

There are no operating public-use airports or heliports in the Project Study Area. The nearest public airport is located approximately 11 miles west of the Proposed Route in Windom, Minnesota. Aerial crop dusting can be an important part of agricultural activities within the Project Study Area and various fields crossed by the Proposed Route may be subject to these activities.

One private landing strip was identified within the Project Study Area during landowner coordination and early Project planning. The landing strip runs north-south parallel to County Road 128, just north of the intersection of County Road 128 and CSAH 7 in Watonwan County. The Proposed Route is located on the opposite side of County Road 128 from the landing strip, then crosses over County Road 128 near the southern end of the landing strip.

5.2.12.1 Impacts and Mitigation

Roadways

Construction activities are not expected to permanently or significantly impact transportation in the Project Study Area. Construction could create a minor increase in traffic from construction vehicles and material/equipment delivery along these and other roadways; however, this increase would be temporary and traffic volumes would return to normal conditions after construction activities are completed. Line and construction maintenance at crossing locations could also cause temporary delays if maintenance vehicles are present. To minimize overall impacts, Big Bend will limit vehicle traffic to the Project right-of-way and existing access points to the greatest extent feasible.

Temporary road or lane closures may occur during the construction process to ensure safety of the construction crews and the traveling public. While the line is being constructed, the electrical conductors will be strung on support structures using a pulley system or a tensioner mounted on the back of a digger/derrick truck. At road crossings, roads or lands may be temporarily closed for safety purposes when stringing electrical conductors between support structures. These closures could range in duration from minutes to hours based on the width of the road and the complexity of the crossing. Temporary closings are not expected to have significant impacts on transportation in the area because of the generally rural nature of the area and subsequent low traffic levels on most roads. Once an aerial crossing is completed, the road(s) will be reopened to allow normal traffic flow.

The Application Alignment crosses Highway 60 just north of the intersection of Highway 60 and 600th Avenue and east of Mountain Lake. Any occupation of state highway right-of-way requires a Utility Permit from the MNDOT, per Minn. R. Ch. 8810.3100-3600. MNDOT's Accommodation Policy provides requirements and guidelines for the installation of utility facilities in and along MNDOT rights-of-way, which the Project was developed to meet. Big Bend has begun coordinating with MNDOT and will continue to work with MNDOT throughout the Route Permit process to ensure that the Application Alignment meets MNDOT guidelines.

After the completion of construction, Big Bend will ensure that township, city, and county roads used for purposes of access during construction are returned to either the condition they were in, or better, before right-of-way clearing began. Big Bend will meet with township road supervisors, city road personnel, or county highway departments to address any issues that arise during construction with roadways to ensure the roads are adequately restored, if necessary, after construction is complete.

Railroads

Impacts to the Chicago & Northwestern Railroad are not anticipated as a result of construction and operation of the Project. Big Bend will obtain all necessary railroad crossing permits from Chicago & Northwestern for their rail line. Big Bend will also coordinate with the appropriate railroad personnel during construction to schedule electrical conductor stringing over the rail line for the safety of construction personnel and rail line operations.

Airports and Airstrips

Big Bend does not anticipate any impacts on public airports or heliports because there are none present within the Route and the structures for the transmission line will be less than 200 feet in

height. Big Bend will coordinate with the FAA and MNDOT to address any Project-related concerns for aviation activities as the Project progresses and more detailed design information becomes available, including specific structure locations and heights above ground.

Crop-dusting operations servicing fields crossed by existing transmission lines will have already accommodated the presence of a transmission line. Big Bend will mail notice of the Application filing to aerial applicators registered with the Minnesota Agricultural Aircraft Association in the Project Study Area.

Regarding the landing strip identified along County Road 128 in Watonwan County, the Application Alignment is located on the opposite side of County Road 128 from the landing strip then crosses over County Road 128 and the southern end of the landing strip. To avoid impacts on the landing strip and interference with its use by the landowner, Big Bend has agreed to bury an approximately 0.4 mile section of the proposed transmission line beginning on the west side of CSAH 128, crossing the road and landing strip, and continuing southeast to CSAH 7, about 0.2 mile east of the intersection of County Road 128 and CSAH 7. Burying this segment of the transmission line will avoid the need for aboveground structures near the landing strip, which could interfere with its use.

5.3 Land Based Economies

Construction and operation of the Project has the potential to affect land-based economies in Cottonwood, Watonwan, and Martin Counties through introduction of a physical, long-term presence which could prevent or otherwise limit use of the land for other purposes. The placement of transmission line structures in cultivated cropland has the potential to interfere with farming operations, if co-location with field edges and roadways is not possible due to other routing constraints. Interference with farming operations can negatively affect farm income. Additionally, trees and structures are not allowed within transmission line rights-of-way due to safety concerns, a restriction that could affect forestry businesses along the right-of-way, if present. Impacts to tourism could result from an aesthetic change to the predominantly agrarian landscape and interruption of public access to nearby recreational and tourism opportunities. Placement of transmission line towers near mining operations could interfere with access to existing mines and could limit the expansion of the mines. The following subsections present an overview of agricultural, forestry, tourism, and mining operations in the Project Area and discuss how the Proposed Route may affect these industries and what measures Big Bend will implement to mitigate Project effects.

5.3.1 Agriculture

As described in Section 5.2.9.1, most of the land crossed by the Proposed Route is classified as cultivated cropland. According to the U.S. Department of Agriculture's (USDA's) 2017 Census of Agriculture, the average farm size in Cottonwood County (498 acres), Watonwan County (508 acres), and Martin County (493 acres) are generally larger than the average size of all Minnesota farms (371 acres). As shown in Table 5.5-2 in Section 5.5.3, most of the soils crossed by the Proposed Route are classified as "Prime Farmland (all categories)" and "Farmland of Statewide Importance." Prime farmland crossed by the Proposed Route is described in Section 5.5.3.2.

Crop sales account for a slightly larger percentage of the total market value of agricultural products sold in Cottonwood and Watonwan Counties, which is similar to the state level. In contrast, livestock sales account for about 58 percent of the total market value of agricultural

products sold in Martin County. Corn, soybeans, and forage crops are the dominant agricultural crops by acreage in Cottonwood. In Watonwan and Martin Counties, corn and soybeans are still in the top three agricultural crops by acreage, but vegetables harvested for sale are more common that forage in these counties. Cattle, hogs and pigs, and poultry are the dominant livestock raised in Cottonwood County. In both Watonwan and Martin Counties, hogs and pigs make up a larger portion of the livestock inventory by farms, followed by cattle and sheep and lambs/poultry (layers) in Watonwan County and by sheep and lambs in Martin County. Agricultural statistics for counties within the Project Study Area are summarized in Table 5.3-1.

Table 5.3-1
Agricultural Statistics of Minnesota and the Counties within the Project Study Area

Location	Number of Farms	Average Farm Size (acres)	Land in Farms (acres)	Market Value of Agricultural Production - Crops	Top 3 Crops by Acreage	Market Value of Agricultural Production - Livestock	Top 3 Livestock Inventories by Farms
State of Minnesota	68,822	371	26 million (46.7% of state)	$10.2 billion (55.4%)	Corn, soybeans, forage	$8.2 billion (44.6%)	Cattle, poultry (layers), hogs and pigs
Cottonwood County	744	498	370,389 (89% of county)	$194 million (51%)	Corn, soybeans, forage	$188 million (49%)	Cattle, hogs and pigs, poultry (layers)
Watonwan County	497	508	252,417 (89% of county)	$146 million (54%)	Corn, soybeans, vegetables harvested for sale	$123 million (46%)	Hogs and pigs, cattle, sheep and lambs/poultry (layers)
Martin County	911	493	449,064 (96% of county)	$2.6 million (41.8%)	Corn, soybeans, vegetables harvested for sale	$3.7 million (58.2%)	Hogs and pigs, cattle, sheep and lambs

Source: USDA, 2017

Specialty crops typically include nurseries, vineyards, orchards, citrus groves, dairies, aquaculture, and tree farms. If present along the Application segments, specialty crop farms (e.g., organic farms) or livestock operations may necessitate additional specific mitigation measures to minimize the effects of construction. To date, no farmland engaged in specialty crop production has been identified along the Proposed Route. Big Bend will continue to work with individual landowners through the easement process to identify any specialty crops or livestock operations that may be impacted by the Project. If any specialty crops or livestock operations are identified, Big Bend will work with landowners to determine measures to avoid and minimize impacts to these resources.

The Conservation Reserve Enhancement Program (CREP) is an offshoot of the Conservation Reserve Program (CRP), which is a land conservation program established by the USDA and administered by the Farm Service Agency that pays farmers a yearly rental fee for agreeing to take environmentally sensitive land out of agricultural production in an effort to improve environmental health and quality (USDA, n.d.). Minnesota implemented the CREP to target state-identified, high-priority conservation issues by offering payments to farmers and agricultural landowners to retire environmentally sensitive land using the Reinvest in Minnesota (RIM) Reserve Program (BWSR, 2019). Enrollment in the CRP and CREP is voluntary and participation in the program comes with certain restrictions on the types of development allowed on parcels enrolled in the program, if such development is inconsistent with the conservation goals of the program. No CREP or RIM parcels have been identified within the Proposed Route.

5.3.1.1 Impacts and Mitigation

Construction of the Project could cause minimal, temporary impacts to farmland from soil compaction and rutting, accelerated soil erosion, crop damage, temporary disruption to normal farming activities, and introduction of noxious weeds to the soil surface. Table 5.3-2 summarizes the impacts of the Project on existing farmland.

Table 5.3-2
Summary of Impacts of the Proposed Route Right-of-Way on Agricultural Land

Resource	Amount
Route Length (miles)	17.7
Right-of-Way (acres)	300.4
Cultivated Cropland in Right-of-Way (acres)[1]	247.8
Cultivated Cropland in Step-up Substation (acres)	3.4
Number of Structures in Cultivated Cropland (based on preliminary pole spacing)[1, 2]	163
Total Impact from Structures in Cultivated Cropland (acres)	0.1

[1] Agricultural land includes cultivated crops. Pasture and hay are not included as they are classified separately in Table 5.2-4 in Section 5.2.9.1. The Proposed Route is co-located with roads for the majority of its length, which are classified as developed. Where structures are adjacent to roads (developed), the next closest land cover type was used to reflect that poles will not be placed on roadways.

[2] Pole spacing is representative and assumes the Project minimum of 600 feet where the right-of-way is 100 feet wide and 800 feet where the right-of-way is 150 feet wide; final pole spacing may vary from this estimate and would likely result in fewer poles overall as changes to final design are incorporated. Pole spacing will range from approximately 600-800 feet in the 100-foot right-of-way and 800-1,100 feet in the 150-foot right-of-way.

Big Bend will implement measures to reduce compaction, soil erosion, and the introduction of noxious weeds. Construction impacts to farmland would be short term and minimal in nature and would be mitigated through the proper use and installation of BMPs, such as minimizing the number of vehicles and protection and maintenance of topsoil during right-of-way clearing and generation-tie-line construction. Big Bend will further mitigate impacts on agricultural production by coordinating with landowners or farm operators regarding the timing of construction to avoid peak growing season by constructing the Project before spring planting or after harvest in the fall. If this is not possible, Big Bend will compensate the landowner or farm operator for crop damage, including any compaction that results from construction. See Section 4.0 for a discussion of construction methods and operation and maintenance procedures.

The Proposed Route was developed with attention to minimizing impacts to agricultural land; however, permanent impacts to agricultural land will occur where structures are placed in cultivated fields. Structures in cultivated fields act as barriers and can hinder efficient operation of large machinery. As described in Section 3.0, the proposed Application Alignment predominately follows roads and property lines. Big Bend proposes to minimize impacts to agricultural land by placing structures along field edges, as closely as feasible (within 15 feet) from the edge of road rights-of-way or parcel lines. Furthermore, Big Bend will make reasonable efforts to work with landowners to finalize the structure locations. The final spacing and location of structures will be designed to accommodate the movement of farm equipment within agricultural fields while still maintaining safety and design standards. The estimated permanent impacts from each transmission structure foundation will be up to 3 feet in diameter at the surface. Refer to Table 5.3-2 for an estimate of total acres of permanent impact from structures in agricultural lands. In addition, Big Bend estimates that the proposed Step-up Substation will result in up to approximately 5 acres of construction impact on agricultural land.

Big Bend has designed the Proposed Route to avoid CREP and RIM parcels. If these easements are identified during the easement and title clearance process and final Project design requires transmission line structures to be placed on parcels enrolled in the CREP or RIM programs, Big Bend will work with landowners and the Board of Soil and Water Resources (BWSR) to address potential impacts to these conservation easements and to fully compensate landowners for lost CREP revenue resulting from the placement of the line within a CREP easement.

Post-construction restoration efforts will include restoration of any temporary access modifications and deep plowing to remove compaction. Both crop and livestock activities will be able to continue around Project facilities after construction. While no impacts to agricultural land are anticipated during operation of the Project, if impacts to crops do occur during operation or maintenance of the transmission line, Big Bend will compensate the landowner or farm operator for crop damages.

5.3.2 Forestry

There are no forestry operations along the Proposed Route. Wooded areas along the Proposed Route consist of isolated rows of trees that are used as shelter belts or wind breaks along the edges of agricultural fields or surrounding farmsteads and in riparian areas along waterbodies. Big Bend made every effort to develop an Application Alignment that minimizes tree clearing.

5.3.2.1 Impacts and Mitigation

No forestry operations are present along the Proposed Route; therefore, no mitigation measures specific to forestry operations are proposed. The Project may result in the removal or trimming of

trees within and/or adjacent to the transmission line right-of-way to ensure it is clear of obstructions. Vegetation management is necessary for the safe operation of the transmission line as tree branches can cause stress on transmission lines and increase the risk of outages, especially in areas with a strong wind resource, which is typical of this area of the state.

To the extent possible, Big Bend will minimize the need for trimming and removal of trees during construction and operation of the transmission line. Where trimming of trees is necessary, it will be performed with best practices for tree trimming so as to minimize stress on the tree.

5.3.3 Tourism

Tourism in the vicinity of the Project Study Area centers around various festivals and activities hosted by the cities near the Project, such as Mountain Lake and Butterfield, and outdoor recreational opportunities described in Section 5.2.8.

According to their website, the City of Mountain Lake hosts a number of public events annually (Mountainlakemn.com, 2018). Utschtallung (Heritage Fair), held the second Saturday in September, includes public tours, hosted by costumed tour guides, of 21 historic buildings in Heritage Village, an area of early Russian-Mennonite and German-Lutheran settlement on the southwest side of Mountain Lake. Scattered throughout the historic buildings are interpretive displays on early pioneer life in this area of southwestern Minnesota. One of the buildings in the tour is the Minnesota Hall of Fame Telephone Museum, a one-of-a-kind museum in the state.

The City of Mountain Lake also hosts an annual Community Festival, an event that lasts for five days in mid-June. Activities include a parade, tractor pull, animal petting zoo, performances by local artists, and other events. Other tourism opportunities in Mountain Lake include the Island View Campground, and nearby Lawcon Park which boasts a 9-hole disk golf course available for public use during the non-winter months. The Island View Campground and Lawcon Park are both located in the northwest corner of the city.

Located just outside of the municipal boundary of the City of Butterfield is Voss Park, a community park and campground where most of the public events hosted by the City of Butterfield are held (Butterfieldmn.com, n.d.). Butterfield Summer Sizzler is an annual community event that lasts for three days after the 4th of July holiday. The event is held at Voss Park and includes the Chicken Run (a community fun run), the Butterfield Community Club Auxiliary Flea Market, 1st Lutheran Church's ice cream social, a kid's fishing contest, a scavenger hunt, and various other family friendly events. The Summer Sizzler ends with a firework display over Butterfield Lake, which is directly adjacent to Voss Park. The Butterfield Threshing Bee is held annually at Voss Park in mid-August. The event is hosted by the Butterfield Threshermen's Association, and includes a tractor pull, tractor parade, tractor and horse plowing demonstrations, and live entertainment on the park stage.

Mountain County Park and Historic Site is located about 1.5 miles southeast of Mountain Lake and about 0.4 mile west of the Proposed Route (MNOPEDIA.org, 2019). Situated on high ground that was once surrounded by swampy lowland areas associated with Mountain Lake, the park is home to one of the oldest prehistoric habitation sites in Minnesota. Artifacts recovered during archaeological investigations at the site in the 1970s provide, "…a near-continuous record of human activity stretching back 3,000 years." (MNOPEDIA.org, 2019). In the early 1900s, European settlers in the area drained Mountain Lake to create additional farmland and better access to this area of high ground which was a common source of wood for settlers.

Archaeological investigations of the area in the early 1970s led to the site being listed on the National Register of Historic Places (NRHP) in 1973. Cottonwood County purchased the site in 1976 and developed roads, toilets, trails, a picnic shelter, entry signage, and a well using funds from the Law and Water Conservation Fund. Current public use of Mountain County Park is focused on camping, picnicking, hiking, and wildlife viewing. In particular, the Cottonwood County Bird Club hosts its annual bird count at the park.

The Jeffers Petroglyphs Historic Site is another tourist attraction in this area of southwestern Minnesota (MNHS, n.d.). The site and associated Visitor Center are located on 160 acres, approximately 11 miles northwest of the Project Area boundary. About 5,000 prehistoric rock carvings are found at this site and visitors can choose between guided or solo tours; field trips for school groups are also available. In addition, 1.2 miles of maintained trails run through the site and are available for public use. The Visitor Center has interpretive displays and a short video presentation that provides information about Native American culture and prairie ecology, as well as a museum store. The Jeffers Petroglyphs Historic Site is open Tuesday through Sunday from late May to early September, Saturdays only between early September and mid-October, then only by reservation for groups of 10 or more for the rest of the year.

5.3.3.1 Impacts and Mitigation

Construction of the Project is not anticipated to affect public access to nearby tourism and recreational opportunities. Impacts on tourism would mostly be related to Project construction, which will be minimal, temporary, and isolated to specific areas throughout the Proposed Route.

Construction and operation of the Project is not expected to impact public access to any of the festivals held by the Cities of Mountain Lake or Butterfield. The transmission line will be within 50 feet of the driveway to Mountain County Park, but is approximately 0.5 mile from the park itself. The right-of-way of the Application Alignment is co-located with the driveway easement; in this location, the right-of-way would be configured to include 50 feet on the south side of the alignment centerline and 100 feet on the north side. Because the Jeffers Petroglyphs Historic Site is located over 11 miles northwest of the Project, no impacts on public access to or enjoyment of this site are anticipated.

Short-term increases in noise and dust would occur during construction of the Project, and could detract from public enjoyment of nearby recreational activities and tourism. However, these impacts would be minimal, and use of BMPs to limit noise and fugitive dust during construction would effectively mitigate the effect of short-term increases in noise and dust. In regard to Mountain County Park, temporary interruptions to public access to the park may occur during the period of active construction; however, such interruptions would be short-term and would resolve after construction is complete. Section 5.2.4 discusses how Big Bend would mitigate potential noise impacts and Section 5.5.1 provides a discussion of how Big Bend would mitigate fugitive dust emissions during construction of the Project.

Introduction of an aesthetic change to the predominantly agrarian landscape in the Project Study Area could impact public enjoyment of available tourist attractions. Big Bend has minimized impacts to tourism opportunities by siting the Proposed Route to avoid recreation areas and municipalities where tourism opportunities are available. A detailed discussion of how the Project could impact aesthetics and the measures Big Bend would use to mitigate aesthetic impacts is provided in Section 5.2.5.

5.3.4 Mining

Mining does not comprise a major industry in Cottonwood, Watonwan, and Martin Counties. Gravel operations are found throughout all three counties; however, based on MNDOT's Aggregate Source Information System, County Pit Maps, and several years of aerials imagery, there are no gravel pits within the Proposed Route (MNDOT, 2003a, 2003b, 2018). The closest mapped mining resources to the Project are an inactive gravel pit that is 4.7 miles east of the Proposed Route in Watonwan County, just south of the Town of Butterfield, and an inactive gravel pit near Cedar Lake in Martin County that is 4.1 miles southeast of the Proposed Route.

5.3.4.1 Impacts and Mitigation

No mining resources are located within the Proposed Route. Construction of the Project will require the use of sand and aggregate for structure backfill and to construct reliable access routes for construction equipment. Based on availability, some of the sand and aggregate material could come from sources nearby the Project. Increased demand for sand and aggregate material as a result of the Project would be temporary and limited to the period of construction. Additional new mining operations or expansion of existing mines would not be necessary to satisfy Project demand.

No direct impacts to mining operations will occur as a result of the Project and no mitigation measures are proposed.

5.4 Archaeological and Historic Architectural Resources

Cultural resources can be defined as physical evidence or place of past human activity and include archaeological and historic architectural resources that provide important information about the history of human occupation and alteration of the landscape over time. Archaeological resources include prehistoric and historic artifacts, structural ruins, and earthworks or rock art that are typically found either partially or completely below the ground surface. Historic architectural resources include standing structures, such as buildings and bridges, as well as historic districts and landscapes.

5.4.1 Previously Recorded Archaeological and Historic Architectural Resources

Big Bend hired Quality Services Inc. (QSI) to conduct the Phase Ia literature review for the Project. Background research on known cultural resources was conducted in 2017, 2018, 2019, and 2020 by requesting information from the Minnesota SHPO, reviewing the NRHP and the National Historic Landmark online databases, and visiting the SHPO office and local historical societies to obtain more detailed information.

Data regarding known cultural resources information resulting from previous professional cultural resources surveys was reviewed to identify the types of archaeological sites that may be encountered and landforms or geographic features that have a higher potential for containing significant cultural resources. Table 5.4-1 summarizes the results of the literature review within one mile of the Proposed Route Application Alignment. A copy of Big Bend's Phase Ia literature review is provided in Appendix F.

Table 5.4-1
Summary of Previously Recorded Archaeological and Historic Architectural Resources

Cultural Resources Categories	Proposed Route Application Alignment	
	Within 1 Mile	Crossed by
Total Archaeological Sites	1	0
Total Eligible for NRHP [1]	1	0
Number of Historic Architectural resources	16	1
Total Eligible for NRHP [1]	1	1
Total Previously Recorded Cultural Resources	**17**	**1**
Total NRHP-eligible Resources	**2**	**1**

[1] The number of NRHP-eligible resources shown is a subset of the total number of archaeological sites or historic architectural resources.

No previously recorded archaeological sites, and one previously recorded historic architectural resource were identified being crossed by the Proposed Route Application Alignment. The previously recorded historic architectural resource is the St. Paul & Pacific Railroad which is crossed by the Proposed Route Application Alignment just north of Highway 60; this railroad is recommended as eligible for listing in the NRHP.

Within one mile of the Proposed Route Application Alignment, one previously recorded archaeological resource was identified during the background literature review. The previously recorded archaeological site is the Mountain Lake Site, which is listed in the NRHP. Additional details about the Mountain Lake Site are provided in Section 5.3.3, related to its association with Mountain County Park. The remaining previously recorded resources are architectural resources. These include 12 farmsteads, two bridges, one church, and one town hall. Four of the previously recorded historic architectural resources have been evaluated for the NRHP and determined to be not eligible for listing and 12 have not been evaluated for NRHP listing.

5.4.2 Impacts and Mitigation

Transmission line projects have the potential to impact archaeological and historic resources. Archaeological resources could be impacted by the disruption or removal of subsurface archaeological materials, structural remains, or earthworks during transmission line construction. Historic architectural resources may be impacted by the placement of a transmission line within the established viewshed of an historic property, which could affect the integrity of the viewshed in a way that decreases the historic value of the resource.

Information regarding the location of previously documented cultural resource sites was taken into consideration during initial route design. Big Bend designed the Route to avoid any direct physical impacts to all previously recorded NRHP listed, eligible, or unevaluated archaeological and historic architectural resources identified during the background literature review.

Big Bend understands the area surrounding Proposed Route also has potential to contain additional, previously undocumented cultural resources. Archaeological resources would most likely be located on or near elevated landforms near permanent water sources. Historic architectural resources would most likely be located near existing municipalities, farmsteads, and infrastructure such as roads and bridges. After the final Route is ordered by the Commission, and in consideration of the literature search results and coordination with SHPO, Big Bend will conduct field surveys in high-potential areas that could host previously unrecorded cultural resources. The survey protocol for the Project was developed in consultation with SHPO and report will be

submitted to SHPO after completion of the field surveys (refer to Section 6.1 for additional details). If archaeological or historic architectural resources are identified as a result of field surveys, Big Bend will work with SHPO to identify measures to avoid, minimize or mitigate any effects to these resources.

If archaeological resources are discovered during construction, measures will be implemented in accordance with the Project's Unanticipated Discoveries Plan and may include halting construction and/or notification of the SHPO and THPOs, if appropriate. Additionally, if unanticipated human remains or burial resources are discovered during construction, they will be reported to the State Archaeologist per Minn. Stat. § 307.08 and construction will cease in that area until adequate mitigation measures have been developed between Big Bend and the State Archaeologist.

5.5 Natural Environment

Transmission lines have the potential to impact natural resources through temporary, construction-related impacts and long-term impacts to air quality, geology and groundwater, soils, water resources, flora, and fauna. Construction of the Project would temporarily impact air quality with vehicle emissions and dust, impact bedrock and groundwater resources with structure foundations, temporarily disturb soils and vegetative cover, which could affect water quality in adjacent water resources, and could affect habitat for flora and fauna. Avian species could also be impacted by operation of the Project through collisions with transmission line structures and conductors.

Potential impacts to natural resources as a result of the Project are anticipated to be minimal. This assessment is due to the fact that the Project Study Area is primarily agricultural land with limited natural resource diversity and that impacts to natural resources, to a great extent, can be avoided and mitigated.

5.5.1 Air Quality

Section 109(b) of the Clean Air Act (CAA) requires that the U.S. Environmental Protection Agency (EPA) establish National Ambient Air Quality Standards (NAAQS) "requisite to protect" public health and welfare (40 Code of Federal Regulations [CFR] Part 50). The CAA identifies two classes of NAAQS: primary standards, which are limits set to protect the public health of the most sensitive populations, such as asthmatics, children and the elderly; and secondary standards which are limits set to protect public welfare, such as protection against visibility impairment or damage to vegetation, wildlife and structures. The EPA has promulgated NAAQS for six criteria pollutants: ozone (O3), particulate matter (PM10/PM2.5), sulfur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), and lead. Minnesota has been in compliance with the primary and secondary NAAQS for all criteria pollutants since 2002 (MPCA, 2019a).

In Minnesota, air quality is tracked using air quality monitoring stations across the State. The MPCA uses data from these monitors to calculate the Air Quality Index (AQI), on an hourly basis, for O3, PM2.5, SO2, NO2, and CO. The pollutant with the highest AQI value for a particular hour sets the overall AQI for that hour. The AQI is used to categorize the air quality of a region as one of five levels of quality: good, moderate, unhealthy for sensitive groups (USG), unhealthy, or very unhealthy (MPCA, 2019b).

The Project is located nearest to the air quality monitor in Marshall, Minnesota. This station monitors for O3 and PM2.5. The AQI for Marshall for the past five years is provided in Table 5.5-1 (MPCA, 2020).

Table 5.5-1
Days in Each Air Quality Index Category (Marshall, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2019	327	35	0	0	0
2018	333	32	0	0	0
2017	329	31	0	0	0
2016	336	19	1	0	0
2015	338	26	1	0	0

Source: MPCA, 2020.

Air quality has been considered good for the majority of the past five reported years in Marshall. Since 2015, the largest number of days classified as moderate or USG occurred in 2015. No days have been classified as unhealthy or very unhealthy.

Potential air quality impacts associated with the Project come from two primary sources: short-term emissions from construction vehicles and ozone and nitrogen oxide emissions from operating the facility.

5.5.1.1 Impacts and Mitigation

During construction, the amount of dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and road surface characteristics. Dust emissions would be greater during dry periods and in areas where fine-textured soils are subject to surface activity. If construction activities generate problematic dust levels, Big Bend may employ construction-related practices to control fugitive dust such as application of water or other commercially available dust control agents on unpaved areas subject to frequent vehicle traffic, reducing the speed of vehicular traffic on unpaved roads, and covering open-bodied haul trucks.

Air emissions during construction would primarily consist of emissions from construction equipment and would include carbon dioxide, NOX, and particulate matter; dust generated from earth disturbing activities would also give rise to particulate matter. Emissions would be dependent on weather conditions, the amount of equipment at any given location, and the period of operation required for construction at that location. Any emissions from construction would be similar to those from agricultural activities common in the Project Area and would only occur for short periods of time in localized areas.

During operation of the line, air emissions would be minimal. An insignificant amount of ozone is created due to corona from the operation of transmission lines (Electric Power Research Institute, 1982; Whitmore and Durfee, 1973; U.S. Department of Energy, Bonneville Power Administration, 1989). A corona signifies a loss of electricity and Big Bend has engineered the transmission line so as to limit the corona. The production rate of ozone due to corona discharges decreases with humidity and less significantly with temperature. Rain causes an increase in ozone production, but also accelerates the decay of ozone. Ozone production by high voltage transmission lines is

not detectable during fair weather above ambient conditions. Ozone production under wet-weather conditions is detectable with special efforts, but is still considered insignificant.

Design of the transmission line also influences its ozone production rate. The production rate decreases significantly as the conductor diameter increases and is greatly reduced for bundled conductors over single conductors. The production rate of ozone increases with applied voltage. The emission of ozone from the operation of a transmission line of the voltages proposed for the Project is not anticipated to have a significant impact on air quality and no mitigation is proposed.

5.5.2 Geology and Groundwater Resources

The land surface in southwestern Minnesota was heavily influenced by the most recent glaciation. Ice sheets crossed the region several times during the Wisconsin glaciation, depositing a mantle of drift 100 to 600 feet thick in most places. The dominant landform in the Minnesota River Prairie ecological subsection is loamy ground moraine. Topography is level to gently rolling till plains, moraines, lake plains, and outwash plains.

Minnesota is divided into six groundwater provinces based on bedrock and glacial geology. The aquifers within these provinces occur in two general geologic settings: bedrock, and unconsolidated sediments deposited by glaciers, streams, and lakes. The Project is within the Western Province, which is characterized by clayey glacial drift overlying Precambrian and Cretaceous bedrock. In this province, groundwater is typically derived from limited extent surficial and buried sand aquifers. Fractured bedrock is usually buried deeply beneath glacial sediments and is only locally used as an aquifer (MNDNR, 2001).

Big Bend reviewed the Proposed Route for EPA designated sole source aquifers (SSA), wells listed on the Minnesota County Well Index (CWI), and MDH Wellhead Protection Areas (WHPAs).

The EPA defines a SSA or principal source aquifer area as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer, where contamination of the aquifer could create a significant hazard to public health, and where there are no alternative water sources that could reasonably be expected to replace the water supplied by the aquifer (EPA, 2016). There are currently no EPA-designated SSAs in the Project vicinity (EPA, 2017).

The CWI is the most complete record of well construction and location in Minnesota and is kept up-to-date and maintained by the Minnesota Geological Survey, in cooperation with the MDH. Based on the CWI, there are no water supply wells within the Proposed Route right-of-way (MDH, 2019a).

Under the Safe Drinking Water Act (SDWA), each state is required to develop and implement a Wellhead Protection Program to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. The SDWA was updated in 1986 with an amendment requiring the development of a broader-based Source Water Assessment Program, which includes the assessment of potential contamination to both groundwater and surface water through a watershed approach. A WHPA encompasses the area around a drinking water well where contaminants could enter and pollute the well.

Public and non-public community water supply source-water protection in Minnesota is administered by the MDH through the Wellhead Protection Program. WHPAs for public and community water-supply wells are delineated based on a zone of capture for 10-year groundwater time-of-travel to the well and are available through a database and mapping layer maintained by

MDH (2019b). A search for WHPAs in the MDH database identified the Mountain Lake WHPA on the west side of Mountain Lake; the Proposed Route does not cross the WHPA.

5.5.2.1 Impacts and Mitigation

Big Bend does not anticipate any impacts to bedrock during construction or operation of the Project as bedrock along the Proposed Route segments is at depths greater than proposed structure depths of approximately 20 feet deep. Similarly, Big Bend does not expect any impacts to groundwater resources as there are no SSAs or wellhead protection areas within the Proposed Route right-of-way. If shallow depths to groundwater resources are identified during geotechnical investigations, specialty structures requiring wider, but shallower, excavation for foundations may be used. Big Bend will continue to work with the landowners to identify springs and any additional wells near the Project.

5.5.3 Soils

Soil characteristics along the Application Route were assessed using the USDA Soil Survey Geographic Database (SSURGO) (Soil Survey Staff, 2020). The SSURGO database is a digital version of the original county soil surveys developed by Natural Resources Conservation Service (NRCS) for use with GIS. It provides the most detailed level of soils information for natural resource planning and management.

5.5.3.1 Soil Characteristics

The SSURGO data shows that the various soil types crossed by the Proposed Route right-of-way are clay loam or loamy and range from poorly drained to well-drained. Big Bend reviewed SSURGO data to identify prime farmland, farmland of statewide importance, wind or water erodible soils, hydric soils, soils with revegetation concerns, and soils prone to compaction. Table 5.5-2 presents the total acres of each of these soil characteristics that are within the Proposed Route right-of-way.

Table 5.5-2
Summary of Soil Characteristics within the Proposed Route Right-of Way

Soil Characteristics	Acres	Percent
Prime Farmland [1]	291.2	97%
Farmland of Statewide Importance [2]	7.5	3%
Wind Erodible [3]	0	0%
Water Erodible [4]	1.3	0%
Hydric [5]	180.3	60%
Revegetation Concerns [6]	1.7	1%
Compaction-Prone [7]	256.9	86%
Total Right-of-Way Acres	**300.4**	

Note: Soils may have more than one characteristic.

1 Includes soils that meet the prime farmland or prime farmland if a limiting factor is mitigated.
2 Includes soils classified as farmland of statewide importance by SSURGO.
3 Includes soils in Wind Erodibility Group designation of 1 or 2.
4 Includes soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.
5 Includes soils that are classified as hydric by SSURGO.
6 Includes soils with a non-irrigated land capability classification of 4 or greater.
7 Includes soils in somewhat poor to very poor drainage classes with surface textures of clay loam and finer.

Of the soil characteristics included in Table 5.5-2, the characteristics most applicable for an assessment of the Project's potential to impact soils during construction and operation are prime farmland, farmland of statewide importance, and whether soils within the right-of-way are prone to compaction. Soils categorized as prime farmland and farmland of statewide importance are protected under the Farmland Protection Policy Act (FPPA) because of their value for agricultural production, and a significant or irreversible loss of these high-quality farmlands could have local economic impacts for the agricultural industry (see Section 5.5.3.2). Compaction-prone soils, particularly within agricultural fields, may require additional mitigation measures during construction to minimize compaction and/or additional protocols during restoration of Project workspaces.

Soils categorized as wind or water erodible may require additional mitigation measures to minimize the likelihood of soil migration outside of Project workspaces. Hydric soils are generally indicative of long periods of saturation or flooding during soil formation and can indicate wetland environments if vegetation and other hydrologic factors are present. Soils with revegetation concerns can indicate a need for additional mitigation measures during restoration to ensure revegetation of Project workspaces is successful. A minimal amount of wind- or water-erodible soils, and soils with revegetation concerns are within the Proposed Route right-of-way. Because of their relative scarcity within the right-of-way, these soil characteristics are not likely to influence the overall impact of the Project on soils. For this reason, these characteristics are not discussed further in this Application. A discussion of the amount of prime farmland, farmland of statewide importance, hydric soils and compaction-prone soils within the Proposed Route right-of-way is provided below.

5.5.3.2 Prime Farmland and Farmland of Statewide Importance

Prime farmlands are subject to protection under the FPPA. The intent of the FPPA is to protect high-quality farmland by minimizing the impact of federal programs on "the unnecessary and irreversible conversion of farmland to non-agricultural uses" (USDA NRCS, 2020). Protection under the FPPA extends to all lands that meet the criteria for prime farmland or prime farmland if a limiting factor is mitigated, regardless of whether the land is currently used for agricultural production.

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pasture, woodland, or other lands). Urbanized land and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating).

As shown in Table 5.5-2, 291.2 acres of soils crossed by the Proposed Route right-of-way are classified as "Prime Farmland." Of this 291.2 acres, 111.1 acres are prime farmland, 164.1 acres are prime farmland if drained and 16.0 acres are considered prime farmland if protected from flooding or not frequently flooded during the growing season. In addition, the 4.5 acres required for the Step-up Substation are classified as "Prime Farmland;" of which 2.8 acres are prime farmland and 1.7 acres are considered prime farmland if drained.

The NRCS also recognizes farmlands of statewide importance, which are defined as lands other than prime farmland that are used for production of specific high-value food and fiber crops (e.g., citrus, tree nuts, olives, fruits, and vegetables). Farmland of statewide importance is similar to prime farmland but with minor shortcomings such as greater slopes or less ability to store soil moisture. The methods for defining and listing farmland of statewide importance are determined by state agencies, typically in association with local soil conservation districts or other local agencies.

There are 7.5 acres of soils along the Proposed Route right-of-way that are classified as farmland of statewide importance. In total, only 1.7 acres of soils within the Proposed Route right-of-way do not have a special farmland designation.

5.5.3.3 Hydric Soils

Hydric soils are soils that are formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA NRCS, 2020). Also, soils in which the hydrology has been artificially modified are hydric if the soil, in an unaltered state, was hydric. Some soils designated as hydric have phases that are not hydric depending on water table, flooding, and ponding characteristics. A combination of hydric soil, hydrophytic vegetation, and hydrologic properties define wetlands as described in the *National Food Security Act Manual* (Soil Conservation Service, 1994).

There are 180.3 acres of soils within the Proposed Route right-of-way that are classified as hydric.

5.5.3.4 Compaction-Prone Soils

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils. Construction equipment traveling over wet soils could disrupt the soil structure, reduce pore space, increase runoff potential, and cause rutting. The degree of compaction depends on moisture content and soil texture. Fine-textured soils with poor internal drainage that are moist or saturated during construction are the most susceptible to compaction and rutting.

Soils classified as having somewhat poor to very poor drainage classes and surface textures of clay loam and finer are considered to have a high potential for compaction.

There are 256.9 acres of compaction prone soils within the Proposed Route right-of-way.

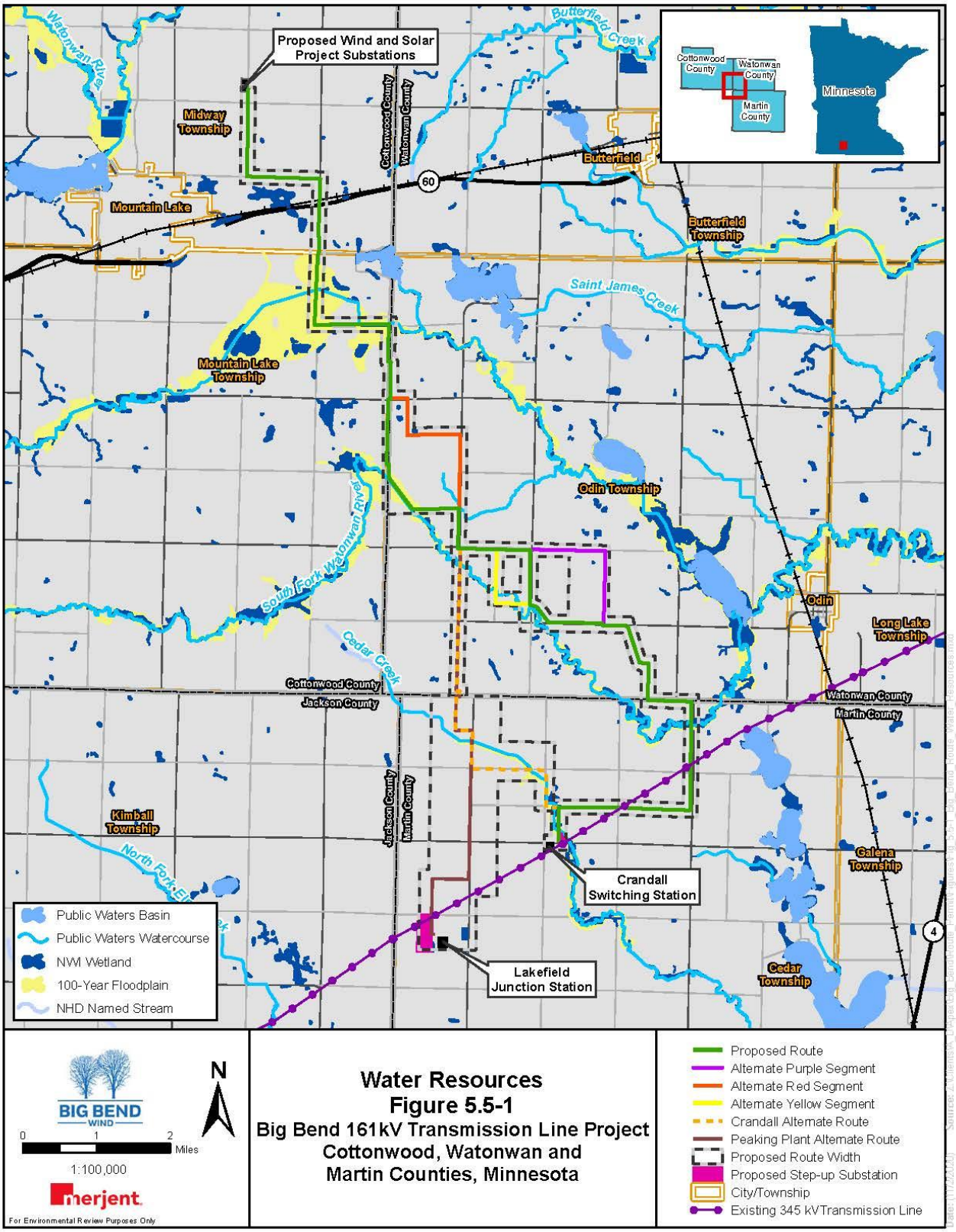
5.5.3.5 Impacts and Mitigation

During construction of the Project, a small portion of prime farmland will be temporarily taken out of agricultural production for temporary workspace associated with erecting structures along the right-of-way. As discussed in Section 5.3.1, the footprint of each structure measures approximately 3 feet in diameter and will not have a meaningful effect on the availability of prime farmland within the state of Minnesota or within Cottonwood, Watonwan, and Martin Counties. During construction of the Project, soil compaction and localized soil erosion may occur during clearing and grading of work areas. In addition, potential soil impacts may result from the excavation, stockpiling, and redistribution of soils. Big Bend will implement measures to reduce soil compaction and will commit to decompaction of soils during restoration of Project workspaces. Impacts to soils would be temporary and minor, and would be mitigated through the proper use and installation of BMPs, such as minimizing the number of vehicles and protection and maintenance of topsoil, during right-of-way clearing and generation tie line construction. Big Bend will also develop a Stormwater Pollution Prevention Plan (SWPPP) that complies with MPCA rules and guidelines; implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion during construction.

Landowners will be compensated accordingly for any localized crop damage and soil compaction that may occur. Refer to Section 5.3.1 for additional information related to agricultural impacts.

5.5.4 Surface Waters and Floodplains

Based on the U.S. Geological Survey (USGS) watershed mapping (by 8-digit Hydrologic Unit Codes), the Proposed Route crosses 14.7 miles in the Blue Earth watershed and 3.1 miles of the Blue Earth Watershed (north to south). Major rivers in the Project Study Area are the Watonwan River and the South Fork of the Watonwan River (refer to Figure 5.5-1). Potential impacts on primary water resources, where anticipated along the Proposed Route, and applicable mitigation, are discussed in the sections that follow.


Proposed Wind and Solar Project Substations
Watonwan River
Butterfield Creek
Midway Township
Cottonwood County
Watonwan County
Butterfield
Mountain Lake
Butterfield Township
Saint James Creek
Mountain Lake Township
Odin Township
South Fork Watonwan River
Odin
Long Lake Township
Cedar Creek
Cottonwood County
Jackson County
Watonwan County
Martin County
Kimball Township
Jackson County
Martin County
North Fork
Galena Township
Crandall Switching Station
Lakefield Junction Station
Cedar Township
Cottonwood County
Watonwan County
Martin County
Minnesota
Public Waters Basin
Public Waters Watercourse
NWI Wetland
100-Year Floodplain
NHD Named Stream
BIG BEND WIND
0 1 2 Miles
1:100,000
N
For Environmental Review Purposes Only
Water Resources
Figure 5.5-1
Big Bend 161kV Transmission Line Project
Cottonwood, Watonwan and
Martin Counties, Minnesota
Proposed Route
Alternate Purple Segment
Alternate Red Segment
Alternate Yellow Segment
Crandall Alternate Route
Peaking Plant Alternate Route
Proposed Route Width
Proposed Step-up Substation
City/Township
Existing 345 kVTransmission Line

5.5.4.1 Lakes, Rivers, Streams, and Ditches

Section 404 of the Clean Water Act (CWA) prohibits any discharge of dredged or fill materials into jurisdictional waters of the United States without a permit from the U.S. Army Corps of Engineers (USACE). Some of the rivers and streams crossed by the Project may be jurisdictional waters of the United States. Navigable waters are defined by 33 CFR Part 329 as those waters that are subject to the ebb and flow of the tide and/or are presently used, have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Navigable waters are designated by the USACE and regulated under Section 10 of the Rivers and Harbors Act of 1899. Impacts to jurisdictional waters and transmission line crossings of navigable waters both require permits from the USACE.

Big Bend reviewed the USGS National Hydrography Dataset (NHD) waterbody data, MNDNR lake data, and MNDOT basemap lake delineations to assess the presence of lakes along the Route. The USGS NHD and USGS 7.5-minute quadrangle maps were reviewed to assess the presence of streams and rivers classified as perennial and intermittent.

In Minnesota, rivers, streams, and lakes may be designated as Public Waters (Minn. Stat. § 103G.005, subd. 15). These waters are listed in the PWI and meet the criteria set forth in Minn. Stat. § 103G.005, subd.15. A license from the MNDNR is required to cross PWI waters with an electric transmission line (Minn. Stat. § 84.415) and a permit from the MNDNR is required to alter the course, current, or cross-section of any PWI water pursuant to the Minnesota Public Waters Work Permit Program (Minn. Stat. § 103G.245, subd. 1(2)). The MNDNR PWI was reviewed to identify Public Waters crossed by the Proposed Route.

Certain surface waters are designated as trout streams or lakes by the State of Minnesota, according to Minn. Stat. § 6264.0050. No designated trout streams or lakes are crossed by the Proposed Route.

Table 5.5-3 provides a summary of waterbodies crossed by the Proposed Route. These are also displayed on Figure 5.5-1.

Table 5.5-3
Waterbodies Crossed by the Proposed Route

Waterbody Feature	No. of Crossings
Number of Stream and River Crossings by Right-of-Way	6
Number of PWI Stream and River Crossings by Right-of-Way	4
Number of PWI Basins within Right-of-Way	0
Number of Shallow Lakes within Right-of-Way	0

The Proposed Route right-of-way crosses four waterbodies a combined total of six times (i.e., Judicial Ditch No. 1 is crossed three times; refer to Appendix C). Two of the waterbodies are perennial (South Fork of the Watonwan River and Cedar Creek), one is a canal/ditch (Judicial Ditch No. 1), and one is an unnamed intermittent stream. All four of these waterbodies are PWI watercourses. There are no PWI basins or MNDNR-designated shallow lakes crossed by the Proposed Route. Three of the waterbodies crossed by the Proposed Route are listed as impaired on the 303(d) list; these waterbodies are discussed further in Section 5.5.4.2.

Impacts and Mitigation

The Project will have minor, mostly short-term effects on surface water resources. Big Bend will design the Project to minimize or avoid impacts on surface water resources to the extent feasible. The Project will be designed to span surface water resources where practicable and to minimize the number of structures in surface water resources where these resources cannot be spanned.

Big Bend will work with the MNDNR to ensure all proper licenses and approvals are obtained for PWI watercourse crossings by the Project. Through the license approval process, Big Bend and the MNDNR will determine the appropriate mitigation measures for PWI watercourse crossings. Other mitigation measures for the crossing of streams, rivers, and ditches are discussed in Section 5.5.4.2.

Big Bend will obtain a National Pollutant Discharge Elimination System (NPDES) permit from the MPCA for construction of the Project. As noted, Big Bend will also develop a SWPPP that complies with MPCA rules and guidelines. All waterways crossed will be maintained for proper drainage through the use of temporary culverts or other temporary crossing devices, according to BMPs and permit requirements. If tree removal is required along waterways, trees will be cut so that the root system is not disturbed to retain bank stability. Sediment barriers, if deemed necessary, will be used along waterways and slopes during construction to protect from soil erosion and sedimentation. Additionally, if new access roads for vehicles and equipment are required, access roads will be selected to avoid disturbance to stream banks. No permanent impacts to surface water resources are anticipated.

5.5.4.2 Water Quality

Under the CWA, states have the primary responsibility for establishing, reviewing, and revising water quality standards, which consist of the designated uses of a waterbody, the numerical values or narrative water quality criteria necessary to protect those designated uses, and an antidegradation policy per 40 CFR §§ 131.10 - 131.12 and 131.4.

Under Section 303(d) of the CWA, states are required to assess all waters of the state to determine if they meet water quality standards, list waters that do not meet standards and update the list biannually, and conduct total maximum daily load (TMDL) studies to set pollutant-reduction goals needed to restore waters to the extent that they meet water quality standards for designated uses. The list, known as the 303(d) list, is based on violations of water quality standards. The majority of impairments to surface waters in the Project Study Area are caused by agricultural sources (dissolved oxygen, fecal coliform, Escherichia coli). The MPCA has jurisdiction over determining 303(d) waters in the State of Minnesota.

Table 5.5-4 summarizes waterbodies crossed by the Proposed Route that are listed by the MPCA Inventory of Impaired Waters, and their impairments. The Minnesota Statewide Mercury TMDL addresses mercury in waterbodies throughout Minnesota (MPCA, 2007). The TMDL attributes 99 percent of mercury load to Minnesota's lakes and streams to atmospheric deposition and attributes none to the operation of electric transmission lines.

Table 5.5-4
Impaired Waterbodies Crossed by the Application Alignment

Waterbody Name	Impairment	No. of Crossings
Judicial Ditch No. 1	Fishes bioassessments	3

Table 5.5-4
Impaired Waterbodies Crossed by the Application Alignment

Waterbody Name	Impairment	No. of Crossings
Watonwan River, South Fork	Aquatic macroinvertebrate bioassessments, fishes bioassessments, Escherichia coli	1
Cedar Creek	Dissolved oxygen, fecal coliform	1

Section 401 of the CWA grants state agencies the authority to require projects that discharge to jurisdictional waters to obtain a Water Quality Certification and comply with state and federal water quality regulations. The MPCA is granted the authority to implement Section 401 regulations.

The MPCA is the agency charged with classifying waterbodies in Minnesota. Consistent with the requirements of the CWA, the MPCA has established water quality standards, including the identification of beneficial uses of the state's waters, numeric standards and narrative criteria, and non-degradation protections for high-quality or unique waters. Minnesota advances the CWA's presumption that a waterbody should attain healthy aquatic life and recreation uses, and groups the waters of the state into one or more of the following seven designated use classifications per Minn. R. Ch. 7050.0140:

- Class 1 waters, domestic consumption
- Class 2 waters, aquatic life and recreation
- Class 3 waters, industrial consumption
- Class 4 waters, agriculture and wildlife
- Class 5 waters, aesthetic enjoyment and navigation
- Class 6 waters, other uses and protection of border waters
- Class 7 waters, limited resource value waters

The waterbodies crossed by the Proposed Route are defined by default in Minn. R. Ch. 7050.0430 as Class 2B (aquatic warm water community) and 3C (industrial consumption).

Minnesota designates some surface waters as outstanding resource value waters (ORVWs) because of their exceptional qualities. As specified in Minnesota Rules, wild, scenic, and recreational river segments comprise a part of the definition of ORVWs. The Proposed Route does not cross any ORVWs.

Impacts and Mitigation

Construction of the proposed transmission line could potentially impact water quality. Rivers, streams, and ditches crossed by the Proposed Route are narrow enough to be spanned with normal spacing of the structures so that all structures can be placed outside of these features. Short-term, minor, Project-related water quality impacts may occur during the construction of the Project even though mitigation measures will be implemented to prevent sedimentation. These impacts would be associated with the soils from areas disturbed during construction being washed by stormwater into adjacent waters during rainstorm events. Increased turbidity and localized sedimentation of the stream bottom may occur from the runoff. If any of these events occur, however, these impacts would be temporary and would not significantly alter water quality

conditions due to the minimal soil disturbance that is expected to occur in any one location during construction of the Project.

Mitigation measures will be implemented to prevent or minimize surface water impacts that could affect water quality. The MPCA, through the NPDES under the CWA, regulates construction activities that may impact stormwater runoff. An NPDES permit is required for construction activity disturbing: 1) one acre or more of soil; 2) less than one acre of soil, but part of a "larger common plan of development or sale" that is greater than one acre; or 3) less than one acre of soil, but that the MPCA determines poses a risk to water resources.

Big Bend will apply for an NPDES permit from the MPCA and will develop an SWPPP that will identify BMPs to be implemented during construction to minimize erosion and sedimentation impacts to surface waters. Erosion and sedimentation abatement measures, for example, would be employed to decrease impacts to the hydrology of the Project Study Area. No fueling or maintenance of vehicles or application of herbicides would occur within 100 feet of streams, ditches, and waterways to protect against introduction of these materials into surface or groundwater systems. Materials such as fuels, lubricants, paints, and solvents required for construction would be stored away from surface water resources according to appropriate regulatory standards. Any spills or leaks would be cleaned up immediately and leaking equipment removed from the area for proper maintenance.

5.5.4.3 Floodplains

A floodplain is flat, or nearly flat, land adjacent to a river or stream that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which includes areas covered by the flood but which do not experience strong current. Floodplains function to prevent damage by detaining debris, sediment, water, and ice. The Federal Emergency Management Agency (FEMA) delineates floodplains and determines flood risks in areas susceptible to flooding. The base flood that FEMA uses, known as the 100-year flood, has a one percent chance of occurring each year.

At the state level, the MNDNR oversees the administration of the state floodplain management program by promoting and ensuring sound land use development in areas to promote the health and safety of the public, minimize loss of life, and reduce economic losses caused by flood damages. The MNDNR also oversees the national flood insurance program for the state of Minnesota. Floodplains are also regulated at the local level for each county. Associated ordinances allow for utility transmission lines as a conditional use for floodway and floodplain districts.

The Proposed Route right-of-way crosses 41.2 acres of FEMA-designated 100-year floodplain areas in Cottonwood, Watonwan, and Martin Counties. This represents about 14 percent of the Proposed Route's total right-of-way. FEMA-designated 100-year floodplain areas are associated primarily with waterbodies along the Proposed Route such as Judicial Ditch No. 1, the South Fork of the Watonwan River, and Cedar Creek. In addition, about 0.9 acre of the Step-up Substation is within a 100-year floodplain associated with Cedar Creek. There are no 500-year floodplain areas crossed by the Proposed Route or within the Step-up Substation site. Floodplains are also displayed on Figure 5.5-1.

Impacts and Mitigation

The Project may require up to 20 transmission line structures to be placed within FEMA-designated 100-year floodplain areas. The placement of transmission line structures in floodplains is not anticipated to alter the flood storage capacity of the floodplain based on the minimal size of individual transmission line structures. As described in Section 2.5, the final footprint of the Step-up Substation will be approximately three acres. As such, Big Bend will avoid siting this facility within the floodplain area. Big Bend will work with Cottonwood, Watonwan, and Martin Counties to permit any structures in floodplains.

5.5.5 Wetlands

Wetlands are areas with hydric (wetland) soils, hydrophilic (water-loving) vegetation, and wetland hydrology (inundated or saturated much of the year). Wetlands are part of the foundation of water resources and are vital to the health of waterways and communities that are downstream. Wetlands detain floodwaters, recharge groundwater supplies, remove pollution, and provide fish and wildlife habitat. Wetlands are also economic drivers because of their key role in fishing, hunting, agriculture, and recreation. Wetlands vary widely due to differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors.

The U.S. Fish and Wildlife (USFWS) National Wetlands Inventory (NWI), as updated by the MNDNR, was reviewed to assess the presence of wetlands along the Route (refer to Appendix C). Wetland complexes and small isolated wetlands are scattered throughout the Project Study Area. Some of these wetlands are riverine wetlands associated with the South Fork of the Watonwan River. Emergent wetlands are present in depressions on till plains, lake plains, floodplains, and seeps in the Project vicinity. Wetlands are displayed on Figure 5.5-1.

Big Bend also reviewed MNDNR PWI wetlands and State-protected calcareous fens (a unique wetland feature); there no records of PWI wetlands or calcareous fens along the Proposed Route. Table 5.5-5 summarizes the wetland impacts associated with the Proposed Route's right-of-way.

Table 5.5-5
Wetlands Crossed by the Route

Wetland Feature	Total (acres)
Right-of-Way Acres	300.4
Total Wetlands in the Right-of-Way	3.4
Freshwater Emergent Wetlands in Right-of-Way	2.7
Riverine Wetlands in Right-of-Way	0.7
Number of PWI Wetlands Crossed by Right-of-Way	0
Number of Poles in Wetlands Based on Preliminary Pole Spacing and NWI data[1]	2

[1] Pole spacing is representative and assumes the Project minimum of 600 feet where the right-of-way is 100 feet wide and 800 feet where the right-of-way is 150 feet wide; final pole spacing may vary from this estimate and would likely result in fewer poles overall as changes to final design are incorporated. Pole spacing will range from approximately 600-800 feet in the 100-foot right-of-way and 800-1,100 feet in the 150-foot right-of-way.

There are 3.4 acres of NWI-mapped wetlands within the Proposed Route right-of-way (Appendix C). None of the wetlands crossed by the Proposed Route are PWI wetlands. Based on minimum pole spacing and NWI wetlands, two structures would be placed in wetlands.

Based on the NLCD land cover data used in Section 5.2.9.1 (Land Use), there are approximately 0.6 acre of emergent herbaceous wetland in the five-acre Step-up Substation. However, based on wetland-specific desktop data (NWI), there are no mapped wetlands within the Step-up Substation area.

5.5.5.1 Impacts and Mitigation

Prior to construction, Big Bend will conduct a wetland delineation to confirm wetland boundaries along the Proposed Route, Wind and Solar Project Substations, and the Step-up Substation. Wetlands located in the right-of-way will be spanned and placement of structures within wetlands will be avoided to the extent practicable, including the two structures preliminarily located in NWI-mapped wetlands. Where it is not possible to span a wetland, Big Bend identified several mitigation strategies to minimize impacts to wetlands including:

- Scheduling construction during frozen conditions where practicable, or use of construction mats where not practicable;
- Use of all-terrain construction equipment that is designed to minimize soil impact in damp areas;
- Use of the shortest route to the pole location in the wetland; and
- Assembling structures in upland areas, when feasible, before they are brought to the site for installation.

Wetlands impacted by construction will be restored as required by the USACE. Any mitigation required will be determined through consultation with USACE. Big Bend will obtain all appropriate permits and approvals from the USACE, MNDNR, local government unit(s), and watershed districts (if necessary) for any actions determined to occur in wetlands. Big Bend may coordinate wetland permitting for the transmission line with the Wind Project.

Wetlands can be also be impacted by soil erosion and sediment deposition during construction. Sedimentation and ground disturbance in wetlands can make them more susceptible to establishment of invasive plant species, such as reed canary grass, which would adversely impact wetland function by reducing vegetative biodiversity and altering wildlife habitat.

5.5.6 Flora

The Proposed Route is in the Minnesota River Prairie subsection of the North Central Glaciated Plains Section in the Prairie Parkland Province, as defined by the ECS of Minnesota (MNDNR, n.d.-a). Vegetation in the Minnesota River Prairie subsection prior to European settlement was generally tallgrass prairie with scattered wetlands (MNDNR, 2020a). Dominant grasses in upland tallgrass prairie included big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), sideoats grama (*Bouteloua curtipendula*), and little bluestem (*Schizachyrium scoparium*) (MNDNR, 1988). The subsection was also characterized by areas of wet prairies with bluejoint grass (*Calamagrostis canadensis*), prairie cordgrass (*Spartina pectinata*), and sedges (*Carex spp.*). Riparian and floodplain forests comprised of silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides*), elm (*Ulmus spp.*), and willow (*Salix spp.*) occurred along the Minnesota River and other streams (MNDNR, 1988; MNDNR, 2020a).

Current land use in the Minnesota River Prairie subsection is now dominated by agriculture, primarily active row crop fields with some pasture, as described in Section 5.3.1. Other current land uses include small amounts of forest, wetlands, open water, and developed areas. Grassland-prairie complexes are typically privately owned and grazed. Few areas of pre-settlement vegetation such as native prairie and floodplain forest remain. Suitable habitat for protected and at-risk plant species may be present in these areas of remnant pre-settlement vegetation (MNDNR, 2006). These areas are typically associated with a managed land such as a WMA, an existing conservation easement, and/or are identified as SOBS.

Refer to section 5.3.1 for more information on CRP, CREP, and RIM easements crossed by the Proposed Route. Section 5.6.1 discusses SOBS as they relate to the Proposed Route.

5.5.6.1 Impacts and Mitigation

The acreage of each land cover type crossed by the Proposed Route is provided in Section 5.2.9.1 (refer to Table 5.2-4). Impacts on flora for the transmission line will primarily be associated with cultivated crop areas; see Section 5.3.1 for a discussion of impacts and mitigation measures that would be used in cropland and pasturelands. Other impacts to flora may be related to wind breaks, woodlots, fence rows, and other landscape features.

Construction of the Project will result in short-term adverse impacts on existing vegetation, including localized physical disturbance and soil compaction. Construction activities, such as site preparation and installation of structures, are anticipated to impact approximately 0.1 to 0.5 acres of vegetation per structure. Construction activities involving establishment and use of access roads, staging, and stringing areas would also have short-term impacts on vegetation by concentrating surface disturbance and equipment use.

Construction would also result in long-term impacts on vegetation by permanently removing vegetation at each structure and within portions of the right-of-way that are currently dominated by forest or other woody vegetation. Big Bend would permanently convert forested areas and shrub lands to low-stature vegetation by clearing woody vegetation throughout the entire right-of-way where it occurs. Impacts to woody-dominated vegetation could be minimized by prudent routing to avoid areas where this vegetation type occurs.

Construction of the Project could lead to the introduction or spread of invasive species and noxious weeds. Construction activities that could potentially lead to the introduction of invasive species include ground disturbance that leaves soils exposed for extended periods, introduction of topsoil contaminated with weed seeds, vehicles importing weed seed from a contaminated site to an uncontaminated site, and conversion of landscape type, particularly from forested to open settings.

The primary means of mitigating impacts to flora is to avoid flora, particularly trees, through prudent routing. Mitigation can be achieved, in part, by using existing infrastructure rights-of-way (e.g., roadway, transmission line) such that tree removal is minimized. Mitigation can also be accomplished by spanning plant communities. Wooded areas along the Proposed Route consist of isolated rows of trees that are used as shelter belts or wind breaks along the edges of agricultural fields or surrounding farmsteads and in riparian areas along waterbodies. Big Bend made every effort to develop a Route and Application Alignment that minimizes tree clearing.

Impacts to flora can also be mitigated by a number of other strategies, including (1) placement of the alignment and of specific structures to avoid trees and other tall-growing species, (2) leaving

or replanting compatible plants at the edge of the transmission line right-of-way, (3) limiting vehicle traffic to roads along the right-of-way, and (4) avoiding the introduction of invasive species and noxious weeds on equipment or through seeds or mulches.

Potential impacts due to invasive species and noxious weeds can be mitigated by:

- Revegetating disturbed areas using weed-free seed mixes and using weed-free straw and hay for erosion control;
- Removal of invasive species/noxious weeds via herbicide and manual means; and
- Cleaning and inspecting construction vehicles to remove dirt, mud, plant, and debris from vehicles prior to arriving at and leaving construction sites.

5.5.7 Fauna

The wildlife species that inhabit the Project vicinity are typical of those found in agricultural and grassland-prairie complexes. Wildlife species that occur in wetland and floodplain or riparian forest may also be present in the Project vicinity. Species adapted to agricultural landscapes that likely occur in the Project vicinity are listed in Table 5.5-6 (MNDNR, 2020c).

Table 5.5-6
Wildlife Species Common to the Project Study Area

Common Name	Scientific Name
Mammals	
Red fox	*Vulpes vulpes*
Virginia opossum	*Didelphis virginiana*
Striped skunk	*Mephitis mephitis*
White-tailed deer	*Odocoileus virginianus*
White-tailed jackrabbit	*Lepus townsendii*
Eastern cottontail	*Sylvilagus floridanus*
Raccoon	*Procyon lotor*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Coyote	*Canis latrans*
Birds	
Wild turkey	*Meleagris gallopavo*
Ring-necked pheasant	*Phasianus colchicus*
Mourning dove	*Zenaida macroura*
Western meadowlark	*Sturnella neglected*
Bobolink	*Dolichonyx oryzivorus*
Eastern bluebird	*Sialia sialis*
Field sparrow	*Spizella pusilla*
Reptiles and Amphibians	
Great Plains toad	*Anaxyrus cognatus*
Northern leopard frog	*Lithobates pipiens*
Plains garter snake	*Thamnophis radix*
Fish	

Table 5.5-6 Wildlife Species Common to the Project Study Area	
Common Name	**Scientific Name**
White sucker	*Catostomus commersonii*
Bullhead	*Ameiurus spp*.
Channel catfish	*Ictalurus punctatus*
Long-nose gar	*Lepisosteus osseus*
Source: MNDNR, 2020c	

Migratory birds are protected by the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S. Code [USC] 703-712). The MBTA prohibits taking, killing, possession, transportation, and importation of migratory bird and their eggs, parts, and nests. Additionally, the Bald and Golden Eagle Protection Act (16 USC 668-668d) prohibits taking or possession of and commerce in bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), either alive or dead, or any egg, nest, or part of eagles.

During March 2018, 2019, and 2020, Big Bend conducted aerial surveys for bald eagle nests within 10 miles of the Big Bend Wind Project boundary; the survey area for the Wind Project varied with the various Project boundaries in these three years. However, the 2018 survey area included the Proposed Route and surveys in 2019 and 2020 included most of the Proposed Route. No bald eagle nests are located with a mile of the Proposed Route. Additionally, the MNDNR maintains records of documented bald eagle nests in the state's Natural Heritage Information System (NHIS). Based on a review of the data, there are no records of bald eagle nests within one mile of the Proposed Route. It should be noted that since the bald eagle was delisted in 2007, MNDNR has not routinely updated the NHIS data with more current bald eagle nest records (that is, the NHIS database is not a comprehensive list of all eagle nests).

Key bird habitats in the United States are designated by The National Audubon Society (NAS) as Important Bird Areas (IBAs). The goal of IBAs is to ensure that bird populations persist by identifying and conserving significant habitats. In Minnesota, 57 IBAs have been identified (NAS, 2016). The Application Alignment does not cross any IBAs. The nearest IBA to Application Alignment, the Des Moines River IBA, is approximately 10 miles southwest of the Application Alignment; it is a state priority IBA that includes approximately 38 miles of the Des Moines River, and forms an important corridor of native habitats through an otherwise heavily cultivated portion of Minnesota (NAS, 2013 and 2016).

5.5.7.1 Impacts and Mitigation

Big Bend conducted a constraints analysis during the routing process to assess potential impacts to sensitive resources, including wildlife habitat (refer to Section 3.1). Where possible, Big Bend designed the Proposed Route to avoid these resources. Given that the majority of the land use along Proposed Route is cultivated cropland, Big Bend anticipates that the potential impacts on wildlife and wildlife habitat during construction and maintenance of the Project will be minimal. In addition, most impacts on wildlife habitat would be temporary with the exception of any necessary tree clearing. Potential impacts on wildlife during construction would be primarily related to temporary disturbance and displacement; wildlife may be acclimated to human activity due to the agricultural activity within the Project vicinity.

During operation of the proposed 161 kV transmission line, no electrocution risk to perching birds would apply, given the size and clearances associated with this voltage (Avian Power Line Interaction Committee [APLIC], 2006). The potential for bird collision with the overhead transmission line would depend on the line's location. Avian collision risk may be greater for certain at-risk species (e.g., waterfowl, waterbirds) during certain behaviors such as flushing, courtship displays, and aerial displays, potentially increasing risk if birds are distracted. Collision risk may increase if a power line bisects daily movement corridors (such as between roost, feeding, or nesting areas).

No electrocution risk applies to the 161 kV transmission line (APLIC, 2006).To reduce the potential for avian collisions or exposure during line operation, the Project will implement applicable measures to either increase overhead shield wire visibility or avoid bisecting concentrated bird use areas for at-risk species, if warranted. These measures will follow the appropriate suggested practices outlined by APLIC's collision manual (APLIC, 2012).

5.6 Rare and Unique Natural Resources

5.6.1 Natural Resource Sites

Big Bend reviewed the Proposed Route for sites that have been specially designated as having notable natural resources. Natural resource sites designated by the State of Minnesota include SOBS, Native Plant Communities (NPCs), native prairie, railroad right-of-way prairie, WMAs, MNDNR Scientific and Natural Areas, and state parks. Sites with notable natural resource value designated by the federal government include NWRs, wilderness areas, national wild and scenic rivers, national forests, Waterfowl Protection Areas, and grassland and wetland easements.

MNDNR's Minnesota Biological Survey (MBS) assesses Minnesota landscapes for NPCs, rare animals, rare plants, and animal communities through desktop review and follow-up field survey. Based on this assessment, MBS designates and assigns rankings to SOBS, based on landscape context, NPC, and occurrence of rare species populations. The MBS groups and ranks SOBS for each of Minnesota's ECS subsections for the purpose of designating and cataloguing the state's most notable examples of NPCs and rare species. There are four ranks for SOBS: outstanding, high, moderate, and below (MNDNR, 2009). The Proposed Route crosses one SOBS ranked as moderate, Cedar 2-3 in Martin County (3.69 acres within the Proposed Route right-of-way).

The MNDNR has also classified NPCs within the state using plant species, soils, and other site-specific data from vegetation plots. The current NPC classification covers most of the wetland and terrestrial vegetation in the state and was completed in 2003. It is a six-level hierarchical classification that accounts for vegetation structure and geology, ecological processes, climate and paleohistory, local environmental conditions, canopy dominants, substrate, and environmental conditions (Aaseng et al., 2011). Based on a review of the MNDNR's NPC data, two NPC's are crossed by the Proposed Route; both are Dry Hill Prairie (Southern) Type. Both of these NPC's are also recorded in the MNDNR native prairie data (2.8 acres within the Proposed Route) and are associated with the moderate SOBS described above. The Proposed Route does not cross any mapped railroad right-of-way prairie.

WMAs are described in Section 5.2.8. There are no WMAs crossed by the Proposed Route. The nearest WMA to the Proposed Route is Fossum WMA, approximately 0.3-mile northeast of the Proposed Route.

The Proposed Route does not cross other natural resource sites. Figure 5.6-1 depicts natural resource sites along the Proposed Route.

5.6.2 Threatened and Endangered Species

Big Bend reviewed the USFWS Information for Planning and Conservation (IPaC) website for the federal endangered and threatened species, candidate species, and designated critical habitat that may occur in the vicinity of the Proposed Route (USFWS, 2020a). Big Bend also reviewed the MNDNR's NHIS for documented occurrences of federal- and state-listed species within one mile of the Proposed Route Application Alignment (MNDNR, 2020d). Although these reviews do not represent a comprehensive survey, they provide information on the potential presence of protected species and habitat within the vicinity of the Proposed Route (refer to Table 5.6.1). Big Bend requested NHIS information from MNDNR for the Project Area and one-mile buffer on September 28, 2020. A copy of this request is included in Appendix F.

Table 5.6-1
Federal and State-Listed Species Potentially Present Within One Mile of the Proposed Route Application Alignment

Common Name	Scientific Name	Habitat	Status [1]		Source
			State [2]	Federal [3]	
Mammals					
Northern long-eared bat	*Myotis septentrionalis*	In winter, hibernates in caves and mines. In fall, swarms in forested areas surrounding hibernation sites. During late spring and summer, forages and roosts in upland forests (USFWS, 2018)	SC	T	USFWS
Amphibian					
Great Plains toad	*Anaxyrus cognatus*	Agricultural areas and in tiny remnant prairies and grasslands; breeding sites consist of highly ephemeral shallow water-filled prairie depressions with little or no emergent vegetation (MNDNR, 2018a)	SC	N/A	MNDNR
Insects					
Poweshiek skipperling	*Oarisma poweshiek*	Remnants of native prairie; wet to dry native prairie (MNDNR, 2018b)	E	E	MNDNR
Abbreviated underwing	*Catocala abbreviatella*	Dry to mesic prairies and savanna communities where leadplant occurs (MNDNR, 2018c)	SC	N/A	MNDNR
Phlox moth	*Schinia indiana*	Native upland prairie habitat (MNDNR, n.d.-b)	SC	N/A	MNDNR
Plants					
Prairie bush clover	*Lespedeza leptostachya*	Dry to mesic prairies with gravelly soils (USFWS, 2019)	T	T	USFWS
Sullivant's milkweed	*Asclepias sullivantii*	Undisturbed wet and mesic tallgrass prairies (MNDNR, n.d.-c).	T	N/A	MNDNR

Table 5.6-1
Federal and State-Listed Species Potentially Present Within One Mile of the Proposed Route Application Alignment

Common Name	Scientific Name	Habitat	Status [1]		
			State [2]	Federal [3]	Source

[1] E = Endangered, T = Threatened, SC = Special Concern
[2] MNDNR, 2020d, based on NHIS records within one mile of the Proposed Route
[3] USFWS, 2020a, based on county occurrence of federally listed species

5.6.2.1 Federally listed species

According to the USFWS IPAC website, two federally listed species may occur in the vicinity of the Proposed Route: northern long-eared bat and prairie bush clover. Both species are listed as federally threatened. Based on the USFWS IPaC review, no federally endangered species, candidate species, or designated critical habitat have potential to occur.

Northern Long-eared Bat

The northern long-eared bat is a medium-sized bat that is 3.0 to 3.7 inches in length with a wingspan of 9 to 10 inches. The species' name is due to its relatively long ears compared to other members of the genus Myotis. In winter, northern long-eared bats hibernate in mines and caves in areas with high humidity, constant temperatures, and no air currents. In summer, the species roosts alone or in colonies in live and dead trees under bark, in cavities, or in crevices. Males and non-reproductive females may roost in caves or mines in the summer. When they are not in hibernation, the species occurs in forested habitats, oftentimes near waterbodies. In Minnesota, the species typically begins hibernating in late August or September; they generally emerge from hibernation and begin their active season in May. Pups are born in June or July. When the young are able to fly, the maternity colonies disperse (MNDNR, 2018d; USFWS, 2015).

The northern long-eared bat was federally listed as "threatened" due to the threat from white-nose syndrome (WNS). Other sources of mortality that may further impact the species include loss of summer habitat, changes in the microclimate of the species hibernacula, and collisions with wind turbines (USFWS, 2015). This species is listed in the IPaC as potentially occurring in Cottonwood, Watonwan, and Martin Counties.

Prairie Bush Clover

The federally threatened prairie bush clover is a tallgrass prairie endemic native to the upper Mississippi River Valley. Its current range is limited to discrete locations in Minnesota, Illinois, Iowa, and Wisconsin (MNDNR, n.d.-d; USFWS, 2019). Also known as slender-leaved bush clover, the prairie bush clover has a leaf like a clover leaf with three leaflets. The plant has one or more stems typically between 9 to 18 inches tall. The species flowers in mid-July to early August, producing pale-pink flowers arranged loosely on an open spike (MNDNR, n.d.-d; USFWS, 2019).

Prairie bush clover occurs on dry-mesic prairies on north-, northeast- or northwest-facing slopes in southwestern Minnesota. Remaining occurrences of the species are generally restricted to remnant prairies. In Minnesota, most populations occur in prairies that were formerly or are currently pasture. The primary threat to the species has been habitat loss and destruction (MNDNR, n.d.-d; USFWS, 2019). Prairie bush clover is listed in the IPaC as potentially occurring in Cottonwood and Martin Counties.

5.6.2.2 State-listed species

State-listed species and state species of special concern with documented occurrences within one mile of the Application Alignment are shown in Table 5.6-1. One record of a state-listed endangered species (Poweshiek skipperling), one record of a state-listed threatened species (Sullivant's milkweed), and three records of state species of special concern (abbreviated underwing, Great Plains toad, and phlox moth) are documented within one mile of the Application Alignment. The Poweshiek skipperling record is crossed by the Application Alignment; the other records are all within one mile. Special status species, including species of special concern, do not have a legal or protected status but are tracked by the MNDNR. A brief summary of each of these species follows.

Poweshiek skipperling

A review of the MNDNR's NHIS identified a 1974 record of the Poweshiek skipperling crossed by the Application Alignment in Cottonwood County. This species is also federally listed as endangered; however, this species was not identified as potentially occurring within the vicinity of the Proposed Route based on USFWS IPaC review. Poweshiek skipperlings are small butterflies that occur in native tallgrass prairie habitat. Approximately four percent of tallgrass prairie habitat remains in the United States, and the majority of remaining parcels are small and isolated (USFWS, 2014). Based on the age of the record and the absence of the Poweshiek skipperling on the USFWS species list for the Project counties, the Poweshiek skipperling is not likely to occur along the Proposed Route. If individuals were present, they would be associated with the native prairie remnants. As noted in Section 5.6.1, there is approximately 2.8 acres of MNDNR-mapped native prairie within the Proposed Route in Martin County, nearly nine miles from the NHIS record in Cottonwood County.

Sullivant's milkweed

Sullivant's milkweed is a long-lived perennial. Flowers appear in mid-July and fruits mature in August (MNDNR, n.d.-c). Flowers are modified for insect pollination, drawing a large array of pollinators to this plant including bees, wasps, flies, moths, skippers, butterflies, beetles, and plant bugs. In Minnesota, this species is restricted to undisturbed wet and mesic tallgrass prairie. Most of the surviving Sullivant's milkweed plants in Minnesota are confined to prairie remnants that occur on railroad rights-of-way. Railroad companies have abandoned less profitable lines in an effort to reduce losses. These abandoned rights-of-way are frequently sold to adjacent landowners who incorporate them into farms for crop production (MNDNR, n.d.-c). As discussed in section 5.6.1, the Proposed Route crosses two prairie habitats; however, both are classified as Dry Hill Prairie, and do not fit the habitat requirements of the Sullivant's milkweed (i.e., wet and mesic prairie types).

Abbreviated underwing

The abbreviated underwing is a medium-large moth with a forewing length (base to apex) of approximately 0.8 to 0.9 inch (MNDNR, 2018c). The species is restricted to dry and mesic prairie and savanna habitats where leadplant (*Amorpha canescens*) grows. Sites in western Minnesota are relatively level to gently hilly mesic to dry prairies (MNDNR, 2018c).

Phlox moth

Adult phlox moth are small, with a forewing length (base to apex) of 0.31 to 0.39 inch (MNDNR, n.d.-b). The forewings are gray-violet with a patch of crimson near the base and a broad crimson band near the margin. The phlox moth was first documented in Minnesota in 1976, and has been found at only four other locations since then. In Minnesota, the phlox moth has been observed only in native upland prairie habitat. The crucial habitat feature is the presence of prairie phlox, the larval food plant (MNDNR, n.d.-b).

Great Plains toad

The Great Plains toad is large, measuring 4.5 inches for females and 3.7 inches for males (MNDNR, 2018a). In western Minnesota, it formerly occurred in the extensive dry tallgrass prairie and open grasslands but is now found primarily in agricultural areas and in tiny remnant prairies and grasslands. Breeding sites consist of highly ephemeral shallow water-filled prairie depressions with little or no emergent vegetation. Open habitats, sometimes associated with sandy soils, are preferred for overwintering (MNDNR, 2018a).

5.6.2.3 Impacts and Mitigation

Natural Resource Sites

Intersections of the Proposed Route with natural resource sites are minimal. The Proposed Route crosses one SOBS ranked as moderate, Cedar 2-3, which indicates that the site has been characterized as having records of rare species, NPCs that are moderately disturbed, or strong potential for recovery of NPCs or ecological processes.

The Proposed Route is collocated with a road at this SOBS crossing. Big Bend will maximize pole spacing in this area to span the sensitive area (approximately 1,100 feet). Additionally, Big Bend will install exclusion fencing and signage in this area to inform construction crews of the sensitive area and avoid access. Overall, given the small number of natural resource sites present along the Proposed Route and the quality of these sites, minimal adverse impacts to rare or sensitive resources are anticipated.

Big Bend will implement a vegetation-management plan that includes minimizing chemical use in sensitive areas by avoiding broadcast applications of herbicide and employing spot treatments for control of invasive species.

Federally Listed Species

The proposed Project may impact individual northern long-eared bats if clearing or construction occurs when the species is roosting, foraging, or raising pups in its summer habitat in June and July. In addition, northern long-eared bats may be disturbed during clearing or construction activities due to human presence or noise.

The USFWS published a Final Endangered Species Act (ESA) 4(d) rule for the northern long-eared bat on January 14, 2016. In the Final 4(d) rule, the agency limited prohibitions for the species to those that would protect the bat in WNS-affected geographic areas during the most vulnerable stages in the species' life history—specifically, during hibernation, spring staging, fall swarming, and pup rearing (USFWS, 2016). The Project's Application Route is located within the

USFWS-designated WNS Zone (USFWS, 2020b). Per the species' final 4(d) rule, within the WNS Zone, incidental take due to tree removal is prohibited as follows:

- If it occurs within 0.25 mile of a documented hibernaculum, or
- If it involves a documented maternity roost tree or other trees within 150 feet of the documented maternity roost tree during June or July.

In addition, all take within known hibernacula is prohibited (USFWS, 2016).

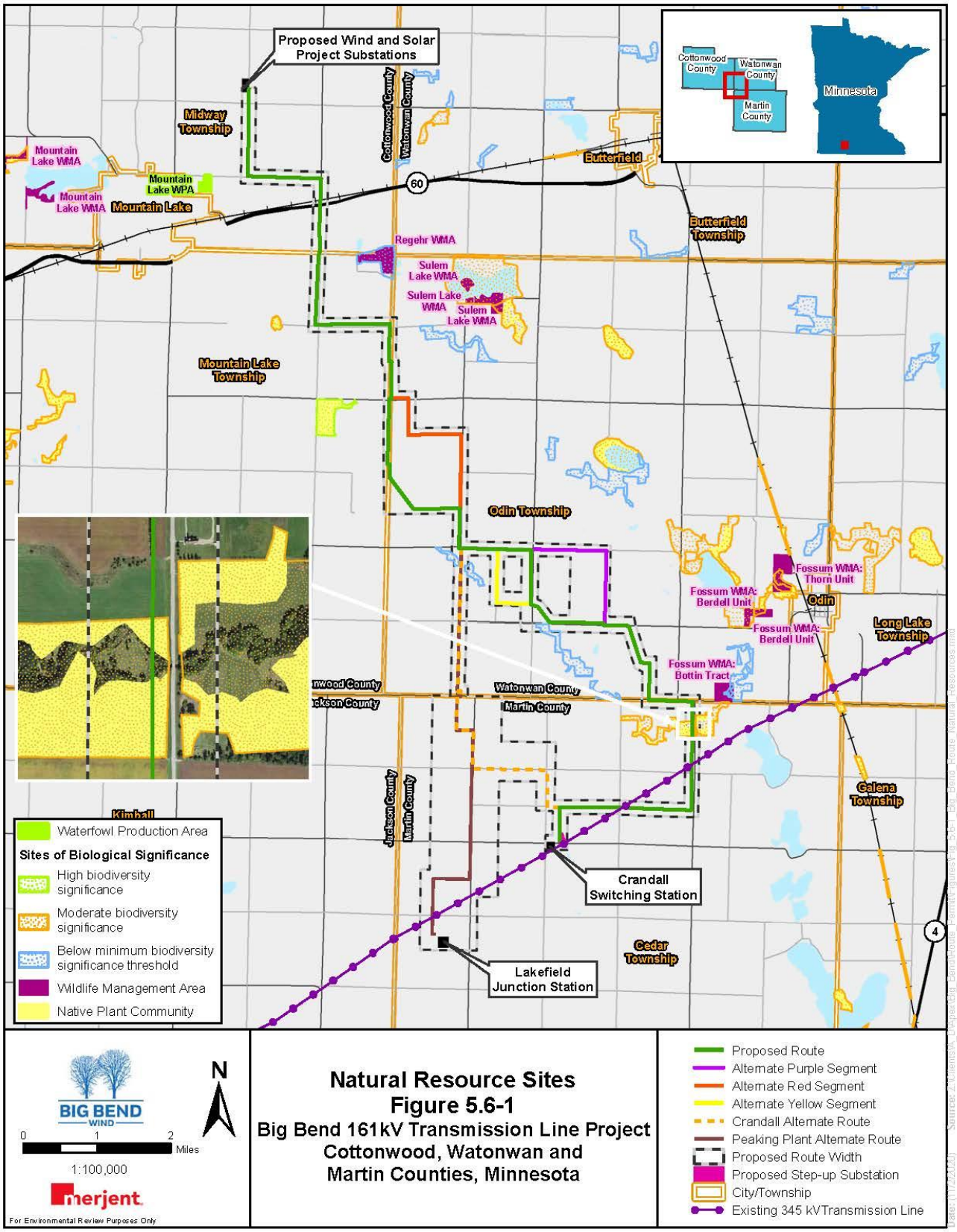
Records of documented hibernacula and roost trees are maintained in the MNDNR's NHIS. Based on a review of the NHIS data, Big Bend determined that there are no documented northern long-eared bat maternity roost trees within 150 feet or hibernacula within 0.25 mile of the Application Alignment. Big Bend will minimize tree removal to the greatest extent possible and focus any necessary tree removal to the winter months, as practicable.

As is discussed in section 5.6.1, two Native Plant Communities are crossed by the Proposed Route; both are Dry Hill Prairie (Southern) Type, and may provide suitable habitat for the prairie bush clover. Big Bend will span these NPCs to avoid impacts to these sensitive areas and potential suitable habitat for prairie bush clover.

State-Listed Species

Based on the Big Bend's NHIS review, one record of a state-listed endangered species (Poweshiek skipperling), one record of a state-listed threatened species (Sullivant's milkweed), and three records of state species of special concern (abbreviated underwing, Great Plains toad, and phlox moth) are documented within one mile of the Application Alignment. The state's designation as a species of special concern for the abbreviated underwing, phlox moth, and Great Plains toad does not afford protections under the Minnesota Endangered Species Statute (Minn. Stat., § 84.0895).

As is discussed in section 5.6.1, two NPCs are crossed by the Application Alignment; both are Dry Hill Prairie (Southern) Type, and may provide suitable habitat for the poweshiek skipperling, abbreviated underwing, and phlox moth. As described above, Big Bend will avoid pole placement in the SOBS/NPC community. Given the habitat requirements for the Great Plains toad, ample suitable habitat exists in the Proposed Route so no population impacts will occur. Suitable habitat for the Sullivant's milkweed is not present in the Proposed Route.


Proposed Wind and Solar Project Substations
Cottonwood County
Watonwan County
Midway Township
Mountain Lake WMA
Mountain Lake WPA
Mountain Lake WMA
Mountain Lake
60
Butterfield
Butterfield Township
Regehr WMA
Sulem Lake WMA
Sulem Lake WMA
Sulem Lake WMA
Mountain Lake Township
Odin Township
Fossum WMA: Thorn Unit
Fossum WMA: Berdell Unit
Odin
Fossum WMA: Berdell Unit
Long Lake Township
Fossum WMA: Bottin Tract
Watonwan County
Martin County
Jackson County
Martin County
Galena Township
Crandall Switching Station
Cedar Township
Lakefield Junction Station
4
Cottonwood County
Watonwan County
Martin County
Minnesota
Waterfowl Production Area
Sites of Biological Significance
High biodiversity significance
Moderate biodiversity significance
Below minimum biodiversity significance threshold
Wildlife Management Area
Native Plant Community
BIG BEND WIND
0
1
2
Miles
1:100,000
N
merjent
For Environmental Review Purposes Only
Natural Resource Sites
Figure 5.6-1
Big Bend 161kV Transmission Line Project
Cottonwood, Watonwan and
Martin Counties, Minnesota
Proposed Route
Alternate Purple Segment
Alternate Red Segment
Alternate Yellow Segment
Crandall Alternate Route
Peaking Plant Alternate Route
Proposed Route Width
Proposed Step-up Substation
City/Township
Existing 345 kVTransmission Line

6.0 FEDERAL AND STATE AGENCY, LOCAL GOVERNMENT, AND PUBLIC INVOLVEMENT

This section describes outreach efforts conducted by Big Bend and discusses pre-Application involvement by federal, state, and local agencies as well as the public information outreach campaign. Throughout the process, Big Bend provided opportunities for stakeholders and potentially affected landowners to participate in the routing process. This engagement provided Big Bend with valuable insight into landowner and public agency preferences regarding development of Project facilities. Copies of agency correspondence to date are provided in Appendix B.

6.1 Agency Involvement in Pre-application

As part of pre-Application efforts, Big Bend initiated its outreach campaign to public agencies through in-person meetings and Project notification letters. Many agencies, stakeholders, landowners, and interested parties, were contacted to gather feedback on the Project (refer to Table 6.1-1). This included meetings with the USFWS, MNDNR, and various township and county commissioners.

On September 3, 2020, Big Bend sent an informal Project introduction letter and map to federal, state (besides the MPUC), county, and local agencies and stakeholders with jurisdiction in the Project Study Area. Big Bend requested input from the federal and state agencies with respect to the resources under their jurisdiction as well as the identification of federal and state permits and/or approvals that may be potentially required for the Project. On October 16, 2019, Big Bend sent the Project notices to local units of government as required by Minn. Stat. § 216E.03(3a) (Appendix G).

On December 13, 2019, as part of the Notice Plan, Big Bend sent Project notification letters to landowners within the area reasonably likely to be affected by the proposed transmission line and LGUs. Both letters introduced preliminary details about the Project and provided information about the MPUC Certificate of Need and Route Permit review and approval process, including opportunities for public input. A follow-up Project notice was sent to landowners outside the initial notice area but within the revised notice area on September 9, 2020.

A representative letter for each project notification mailing and responses received as of November 4, 2020 are included in Appendix B. Big Bend will continue to meet with township and county officials as the Project moves forward and will seek any necessary local permits. Table 7.1-1 identifies agencies and tribal government that were contacted through meetings or a notification letter and the date that the consultation was conducted. In many cases, coordination with agencies such as MNDNR, USFWS, SHPO occurred in conjunction with the Big Bend Wind Farm.

Table 6.1-1
Big Bend Agency Correspondence

Agency	Response Date (Type)
Federal	
U.S. Army Corps of Engineer, St. Paul District – Regulatory Branch	No response to date.
U.S. Army Corps of Engineer, Brainerd Office	No response to date.
U.S. Fish and Wildlife Service – Twin Cities Ecological Services Field Office	November 2017 December 2017 March and April 2019 October 1, 2020 (Agency response)
State	
Minnesota Historical Society – State Historic Preservation Office and Minnesota Office of the State Archaeologist	Ongoing
Minnesota Department of Natural Resources (MNDNR) – Energy Projects Review	November 2017 December 2017 February and April 2018 March and April 2019
MNDNR – Region 4 (Southern Region)	October 5, 2020
MNDNR – Natural Heritage Information System Review	No response to date.
Minnesota Department of Health	No response to date.
Minnesota Department of Agriculture	No response to date.
Minnesota Department of Transportation	No response to date.
Minnesota Department of Employment & Economic Development	No response to date.
Minnesota Pollution Control Agency – Southwest Region Office, Marshall Office	No response to date.
Minnesota Department of Public Safety	No response to date.
Minnesota Board of Water and Soil Resources	No response to date.
County	
Southwest Regional Development Commission	No response to date.
Cottonwood County – Planning and Zoning Department, Land Management	No response to date.
Cottonwood County Highway Department	September 9, 2020.
Watonwan County Planning and Zoning	No response to date.
Watonwan County Highway Department	No response to date.
Martin County Planning and Zoning	No response to date.
Martin County Highway Department	No response to date.
Local Government Units	
Midway Township	No response to date.
Mountain Lake Township	No response to date.
Odin Township	No response to date.
Cedar Township	No response to date.

6.2 Federal Agencies

6.2.1 U.S. Fish and Wildlife Service

Big Bend is coordinating with the USFWS as part of the Big Bend Wind and Red Rock Solar Projects. Big Bend initiated coordination with USFWS in November 2017 with a data request for known bat maternity roosts and hibernacula, eagle nests, and any other federally listed species known to occur in an assessment area that included the wind farm and transmission line. In December 2017, Big bend met with USFWS to evaluate the results of the Land-Based Wind Energy Guidelines Tier 1 and Tier 2 analyses and assess the Tier 3 study plan. Big Bend followed up in March and April 2019 to evaluate the results of the completed studies, some of which included the transmission line.

On October 1, 2020, USFWS provided a response indicating the federal agency relies on available web-based tools to provide initial technical assistance to project proponents. The letter further directed Big Bend to complete an IPaC for the project, which was completed and described in Section 5.6.

6.3 State Agencies

6.3.1 Minnesota State Historical Society – State Historic Preservation Office and Office of the State Archaeologist

Big Bend is coordinating with MNHS and SHPO as part of the Big Bend Wind and Red Rock Solar Projects. A detailed discussion of coordination with MNHS and SHPO to date is provided Big Bend's Site Permit Application (Docket No. IP7013/WS-19-619). As part of the coordination with MNHS and SHPO for the Wind and Solar Projects, and in coordination with Minnesota Department of Commerce – Energy Environmental Review and Analysis staff, Big Bend developed a plan for the Phase I Survey to identify previously unrecorded cultural resources. Although coordination with these groups has focused on the Wind and Solar Projects, Big Bend adopted the survey plan for this Transmission Line Project, as well. Coordination with MNHS and SHPO is ongoing.

6.3.2 Minnesota Department of Natural Resources

On October 5, 2020, the MNDNR provided comments on the Big Bend Transmission Line. The state wildlife agency's comments included a recommendation to submit a NHIS request, notation that public water crossings will require a Utility Crossing License from MNDNR, request for further coordination after a route is issued to determine placement for flight diverters near waterbody crossings, limiting stream crossings and avoiding in-stream work, avoiding native prairie remnants, minimizing impacts to wetlands, and implementing wildlife-friendly erosion controls.

6.4 County Agencies

6.4.1 Cottonwood County Highway Department

On September 9, 2020, the Cottonwood County Highway Department responded to the Project notification letter in support of the clean energy and positive economic impacts; the transmission line will be placed on private land rather than road right-of-way; and requested Big Bend work

with the appropriate road authority (township, county, or state) when placing transmission poles adjacent to road right-of-way.

7.0 REQUIRED PERMITS, APPROVALS, AND CONSULTATIONS

The Project will require various regulatory permits, reviews, and approvals. Table 7.0-1 provides a summary of the major permits, approvals, and consultations that may be required for the Project. All permits, licenses, approvals, or consultations which are required for the Project will be obtained in the applicable areas prior to construction beginning. Copies of agency correspondence to date are provided in Appendix B.

Table 7.0-1
Status of Potential Permits, Approvals, and Consultations

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
Federal		
U.S. Army Corps of Engineers (USACE), St. Paul District	Wetland Delineation Approvals	Wetland delineations will be completed prior to construction; Big Bend anticipates impacts will be within the either Nationwide Permit or Minnesota Regional General Permit thresholds.
	Jurisdictional Determination	
	Federal Clean Water Act Section 404	
U.S. Fish and Wildlife Service (USFWS)	Review for Threatened and Endangered Species	Based on coordination with USFWS, an incidental take permit is not anticipated for the Project.
State of Minnesota		
Minnesota Public Utilities Commission	Certificate of Need and Route Permit	Submitted concurrent with this Application.
Minnesota Pollution Control Agency (MPCA)	Section 401 CWA Water Quality Certification	Concurrent with Section 404, Clean Water Act– Big Bend will meet the Minnesota conditions.
MPCA	National Pollutant Discharge Elimination System Stormwater Permit	After the Route Permit is Ordered by the Commission, Big Bend will submit NPDES Permit application. The permit is required to be submitted within 30 days of the start of construction. The NPDES permit will cover the transmission line and wind project.
Board of Water and Soil Resources (BWSR)	Wetland Conservation Act approvals	Big Bend has conducted a desktop review of wetlands and potential impacts with the MNDNR update to NWI data. Based on this desktop data, the Project will fall under the impact threshold for either a Nationwide Permit or Minnesota Regional General Permit. Prior to construction, Big Bend will conduct wetland delineations to confirm wetland boundaries and impacts based on final design.
Minnesota Department of Natural Resources (MNDNR)	License to Cross Public Waters	After the Route Permit is issued by the Commission, Big Bend will submit its License to Cross Public Waters.
MNDNR	State Protected Species Consultations	NHIS request submitted September 28, 2020. Big Bend will continue coordinating with MNDNR.

Table 7.0-1
Status of Potential Permits, Approvals, and Consultations

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
Minnesota State Historic Preservation Office (SHPO)	Minnesota Statutes, Chapter 138 (Minnesota Field Archaeology Act and Minnesota Historic Sites Act)	Big Bend has coordinated with SHPO, conducted a literature review of the route segments, and avoided and previously identified archaeological sites within the right-of-way. Once a route is designated by the Commission, Big Bend will conduct surveys for previously unidentified cultural resources. Big Bend will coordinate with SHPO on the protocol and any potential mitigation.
Minnesota Department of Transportation (MNDOT)	Utility Permit on Trunk Highway Right-of-Way (Long Form No. 2525)	Big Bend will coordinate with MNDOT on crossing MN-60.
MNDOT	Driveway Access	To be obtained prior to construction.
MNDOT	Oversize/overweight permits	To be obtained prior to construction.
Local		
Board of Water and Soil Resources	Minnesota Wetland Conservation Act approvals	Big Bend has conducted a desktop review of wetlands and potential impacts with the MNDNR update to NWI data. Based on this desktop data, the Project will fall under the impact threshold for either a Nationwide Permit or Minnesota Regional General Permit. Prior to construction, Big Bend will conduct wetland delineations to confirm wetland boundaries and impacts based on final design
Cottonwood County Watonwan County Martin County	Floodplain Development permit	Big Bend will obtain a Floodplain Development Permit for structures placed within floodplains depending on the route/segments designated by the Commission
County, Township, City	Right-of-way/utility permits	Big Bend is coordinating with Cottonwood, Watonwan, and Martin Counties.
County, Township, City	Overwidth/overweight loads permits	To be obtained prior to construction.
County, Township, City	Road crossing permits	To be obtained prior to construction.
County, Township, City	Driveway/access permits	To be obtained prior to construction.

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