Presidential Permit Application for the United States Department of Energy

10 CFR Section 205.320

Tande and Wheelock to Saskatchewan
230-kV Transmission Project
Basin Electric Power Cooperative

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative

Prepared by:

Basin Electric Power Cooperative
1717 East Interstate Ave.
Bismarck, North Dakota 58503

November 2023

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1 Introduction

Basin Electric Power Cooperative (Basin Electric) is applying to the U.S. Department of Energy (DOE) for a Presidential Permit to construct the Tande and Wheelock to Saskatchewan 230-kilovolt (kV) Transmission Project (Project). A Presidential Permit is required for the Project because it will cross the international border between North Dakota and Saskatchewan, Canada. The purpose of this application is to provide information to satisfy the requirements of 10 Code of Federal Regulations (CFR) Section 205.322.

The Project includes two new 230-kV electric transmission lines from existing substations in North Dakota (ND) to the Canadian Border. Saskatchewan Power Corporation (SaskPower), a generation and transmission provider in Saskatchewan, will construct transmission lines from the border to a new substation in Canada, approximately five miles north of the border. One circuit will be routed from the Wheelock substation near Ray, North Dakota, and the second circuit will be routed from the Tande substation near Tioga, ND. Each circuit will have a distinct and separate border crossing as shown in Figure 2 and Figure 5 near Crosby, North Dakota.

Southwest Power Pool (SPP) is the regional transmission organization that administers bulk electric transmission system reliability upgrades and generation interconnections in this area. SPP identified deficiencies in the transmission capability between the United States and Canada based on a request for additional transmission services from SaskPower.

The project was approved by the SPP Aggregate Transmission Service Study (ATSS) in 2022. The ATSS process is described in Appendix A. SPP provided Basin Electric an Approved Reliability Network upgrade notice. See Appendix B for a copy of the formal Notification to Construct (SPP-NTC-220722).

Basin Electric is the designated transmission owner for the upgrade in the United States, and SaskPower will complete the circuit within Canada. The project will provide export and import capabilities of up to 650 megawatts (MW), strengthening the local and regional electric system. Basin Electric will submit an application to transfer power at a later date as required per Part 205.300.

SaskPower has signed a 20-year agreement with SPP to expand the transmission line capacity between Saskatchewan and the United States. The increased capacity will enable the import and export of up to 650 MW. See Appendix C for copies of the executed transmission service agreements. The pricing and settlement agreement between SPP, SaskPower, and NorthPoint Energy Solutions, Inc. may be viewed at: saskatchewan power northpoint energy spp emergency energy pricing and settlement agreement.pdf

Basin Electric is an electric power generation and transmission cooperative headquartered in Bismarck, North Dakota. Basin Electric generates and transmits wholesale electricity to 141-member rural electric cooperatives located in a nine-state service area, serving three million customers on their respective systems.

Pursuant to Executive Order 10485, as amended by Executive Order 12038, Basin Electric submits this application for a Presidential Permit authorizing the construction, operation, maintenance, and connection of electric transmission facilities at the international border between the United States and Canada.

Table 1 provides a checklist of the requirements for a Presidential Permit Application that authorizes the construction, connection, operation, and maintenance of facilities for the transmission of electric energy at international boundaries along with the section(s) within this application that each requirement is addressed.

Table 1 Application for Presidential Permit Authorizing the Construction, Connection, Operation, and Maintenance of Facilities for Transmission of Electric Energy at International Boundaries: Requirements Checklist

Description		Section(s) Addressed
10 C.F.R. 205.322		
a) Information Regarding the Applicant		
a.1	Legal name of the applicant	2.1
a.2	Legal name of all partners	2.2
a.3	Name, title, address, and phone number of person to whom correspondence should be addressed	2.3
a.4	Whether the applicant or its transmission lines are wholly or in part owned by a foreign government or instrumentality therof; or whether the applicant has any agreement pertaining to such ownership by or assistance from any foreign government or instrumentality therof	2.4
a.5	List all existing contracts that the applicant has with any foreign government, or any foreign private concerns, relating to any purchase, sale or delivery of electric energy.	2.5
a.6	A showing, including a signed opinion of counsel, that the construction, connection, operation, or maintenance of the proposed facility is within the corporate power of the applicant, and that the applicant has complied with or will comply with all pertinent Federal and State laws;	2.6
b) Information regarding the transmission lines to be covered by the Presidential Permit		
b.i	A technical description providing the following information:	
b.i.a	Number of circuits, with identification as to whether the circuit is overhead or underground	3.1
b.i.b	the operating voltage and frequency; and	3.2
b.i.c	conductor size, type and number of conductors per phase	3.3
b.ii	If the proposed interconnection is an overhead line the following additional information must also be provided:	
b.ii.a	The wind and ice loading design parameters;	3.5
b.ii.b	a full description and drawing of a typical supporting structure including strength specifications;	3.6

b.ii.c	structure spacing with typical ruling and maximum spans	3.7
b.ii.d	conductor (phase) spacing; and	3.8
b.ii.e	the designed line to ground and conductor side clearances.	
b.iii	If an underground or underwater interconnection is proposed, the following additional information must also be provided:	NA
b.iii.a	Burial depth;	NA
b.iii.b	type of cable and a description of any required supporting equipment, such as insulation medium pressurizing or forced cooling; and	NA
b.iii.c	cathodic protection scheme. Technical diagrams which provide clarification of any of the above items should be included.	NA
b.2	A general area map with a scale not greater than 1 inch = 40 kilometers (1 inch = 25 miles) showing the overall system, and a detailed map at a scale of 1 inch = 8 kilometers (1 inch = 5 miles) showing the physical location, longitude and latitude of the facility on the international border. The map shall indicate ownership of the facilities at or on each side of the border between the United States and the foreign country. The maps, plans, and description of the facilities shall distinguish the facilities or parts thereof already constructed from those to be constructed.	4.1, 4.2
b.3	Applications for the bulk power supply facility which is proposed to be operated at 138 kilovolts or higher shall contain the following bulk power system information:	
b.3.i	Data regarding the expected power transfer capability, using normal and short time emergency conductor ratings;	5.1
b.3.ii	System power flow plots for the applicant's service area for heavy summer and light spring load periods, with and without the proposed international interconnection, for the year the line is scheduled to be placed in service and for the fifth year thereafter. The power flow plots submitted can be in the format customarily used by the utility, but the ERA requires a detailed legend to be included with the power flow plots;	5.2
b.3.iii	Data on the line design features for minimizing television and/or radio interference caused by operation of the subject transmission facilities;	5.3
b.3.iv	A description of the relay protection scheme, including equipment and proposed functional devices;	5.4
b.3v	After receipt of the system power flow plots, the ERA may require the applicant to furnish system stability analysis for the applicant's system.	5.5
c) Information regarding the environmental impacts shall be provided as follows for each routing alternative:		
c.1	Statement of the environmental impacts of the proposed facilities including a list of each flood plain, wetland, critical wildlife habitat, navigable waterway crossing,	6.3, 6.4, 6.5, 6.6, 6.7, 6.8

	Indian land, or historic site which may be impacted by the proposed facility with a description of proposed activities therein	
c.2	A list of any known Historic Places, as specified in 36 CFR part 800, which may be eligible for the National Register of Historic Places	6.7
c.3	Details regarding the minimum right-of-way width for construction, operation and maintenance of the transmission lines and the rationale for selecting that right-of-way width.	8.2
c.4	A list of threatened or endangered wildlife or plant life which may be located in the proposed alternative.	6.8
d) A brief description of all practical alternatives to the proposed facility and a discussion of the general environmental impacts of each alternative.		7.1, 7.2
e) The original of each application shall be signed and verified under oath by an officer of the applicant having knowledge of the matters therein set forth.		10

2 Applicant Information

2.1 Legal Name of the Applicant

The legal name of the Applicant is Basin Electric Power Cooperative.

Basin Electric Power Cooperative
1717 E Interstate Avenue
Bismarck, ND 58503

Basin Electric is an electric power generation and transmission cooperative, headquartered in Bismarck, North Dakota. Basin Electric generates and transmits wholesale electricity to 141-member rural electric cooperatives located in a nine-state service area, serving three million customers on their respective systems.

2.2 Legal name of all Partners

Basin Electric is the sole applicant for this permit.

2.3 Correspondence

Correspondence regarding this application should be addressed to the following:

Anine Merkens	Erin Dukart	Bob Nasset
Staff Counsel	Director, Environmental Services	Civil Engineering
Basin Electric	Basin Electric	Basin Electric
1717 E Interstate Ave	1717 E Interstate Ave	1717 E Interstate Ave
Bismarck, ND 58503	Bismarck, ND 58503	Bismarck, ND 58503
701.557.5080	701.557.5557	701.557.5673
amerkens@bepc.com	edukart@bepc.com	rnasset@bepc.com

2.4 Foreign Affiliations

The transmission facilities on the Canadian side of the border will be owned and operated by SaskPower.

Basin Electric is not owned wholly or in part by any foreign government.

2.5 Foreign Contracts related Purchase, Sale, or Delivery of Electric Energy

The applicant currently has an operation agreement with SaskPower and SPP for an existing 230-kV transmission line from the Tioga Substation to the Boundary Dam Substation.

The applicant has an existing agreement (supply and purchase contract) with Manitoba Hydro to purchase

up to 340 MW from 2023 to 2028. The terms of the agreement are confidential.

2.6 Counsel Opinion

See Appendix D for Basin Electric Counsel opinion that the construction, connection, operation and maintenance of the proposed facilities are within the corporate power of the applicant, and that the applicant has complied with or will comply with all pertinent Federal and State laws.

3 Transmission Line Technical Data

3.1 Number of Circuits

The proposed transmission project will include two separate single-circuit overhead transmission lines and two separate border crossings, as summarized below.

3.1.1 Wheelock to Saskatchewan 230-kV Transmission Line

Wheelock is an existing substation located near Ray, ND. The proposed alignment from the Wheelock Substation to the border is approximately 50 miles. The project scope includes adding a 230-kV terminal at the existing Wheelock substation. Basin Electric owns all 230-kV equipment and the 230/115-kV transformer; Mountrail-Williams Electric Cooperative owns the low side disconnect switch and all 115-kV equipment at the substation.

3.1.2 Tande to Saskatchewan 230-kV Transmission Line

Tande is an existing substation located near Tioga, ND. The proposed alignment from Tande Substation to the border is approximately 60 miles. The project scope includes adding a 230-kV terminal at the existing Tande substation. Tande Substation is owned by Basin Electric.

3.2 Operating Voltage and Frequency

The operating voltage for the Project will be 230-kv operating at 60 hertz (Hz).

3.3 Conductor Specifications

A conductor study will be performed during the detailed design phase to select the optimum conductor for the project. Table 2 summarizes the several conductor alternatives Basin Electric is evaluating. Conductor selection would not affect the transmission line route but may affect the distance between transmission structures (span length). Conductors suitable for longer span lengths would result if fewer structures installed along the route.

Table 2 Conductor Specifications

Conductor Name	Material Type	Quantity per Phase	Diameter (inches)	Unite weight (lbs/ft)
TS-Basin	Carbon Fiber Composite Core (CFCC)	1	1.315	1.4557
Cardinal	Aluminum Conductor Steel Supported (ACSS)	1	1.196	1.227
Drake	Aluminum Conductor Steel Reinforced (ACSR)	2 (bundled)	1.108 x 2	1.094 x 2

3.4 Optical Ground Wire Specifications

Basin Electric will utilize AFL Alumacore Optical Ground Wire, type AC-71/571, specification DNO-8077. The optical ground wire (OPGW) will protect the transmission line conductors from lightning events and provide a high-speed communications medium between inter-connecting facilities.

Construction of the OPGW will consist of 15 aluminum clad steel wires helically wrapped around a 3/8" aluminum tube containing three buffer tubes, each with 12 individual single-mode fibers.

The optical fibers comply with International Electrotechnical Commission (IEC) Standard 60793 and will be used for protection and control of the transmission line. At pre-determined locations based on transmission structure spacing and OPGW reel lengths, the fibers of successive reels will be fusion-spliced together to form a continuous fiber optic pathway. These fusion splices will be protected with an AFL Splice Enclosure located near the base of the transmission structure for maintenance purposes.

The aluminum clad steel wires of the optical ground wire will protect the transmission line conductors from a lightning strike by the OPGW being installed at the top of the transmission structure and thereby being most susceptible to a direct strike. In this event, the OPGW has a short circuit rating of 95 kiloamperes squared second [$(kA)^2$*sec] to quickly and safety get this energy to ground without damaging the transmission structure or the transmission lines.

The OPGW specifications are included in Appendix E.

3.5 Wind and Ice Loading Parameters

Project construction and design will meet the requirements of the National Electrical Safety Code (NESC) for the Heavy Loading District, Basin Electric, U.S. Department of Agriculture (USDA) Rural Utilities Service (RUS) design criteria, and other applicable local or national building codes. The Heavy Loading District refers to those areas (including North Dakota) that are subject to severe ice and wind loading.

Table 3 summarizes the wind and ice load cases and parameters for structure design Basin Electric utilizes.

Table 3 Wind and Ice Loading Design Parameters

Structure Loading Requirements							
	Overload Factor						
LOAD CASE	Vertical	Transverse	Tension	Ice Diameter (inches)	Wind Pressure (pounds per square foot)	Temp (°F)	Wire Condition
NESC Heavy	1.5	2.5	1.65	0.5	4 PSF	0°	Initial
Extreme Wind	1.1	1.1	1.1	0.0	31 PSF	60°	Final
Extreme Ice	1.1	1.1	1.1	1.25	0 PSF	0°	Initial
Ice & Wind	1.1	1.1	1.1	0.5	9.2 PSF	15°	Initial
Camber	1.0	1.0	1.0	0.0	2 PSF	40°	Final
Broken Wire	1.0	1.0	1.0	0.0	4 PSF	60°	Final
Stringing	1.5	1.5	1.5	0.0	4 PSF	0°	Initial

3.6 Typical Supporting Structures

Basin Electric is proposing to use self-supporting steel monopole structures in a delta-configuration as shown in Figure 1.

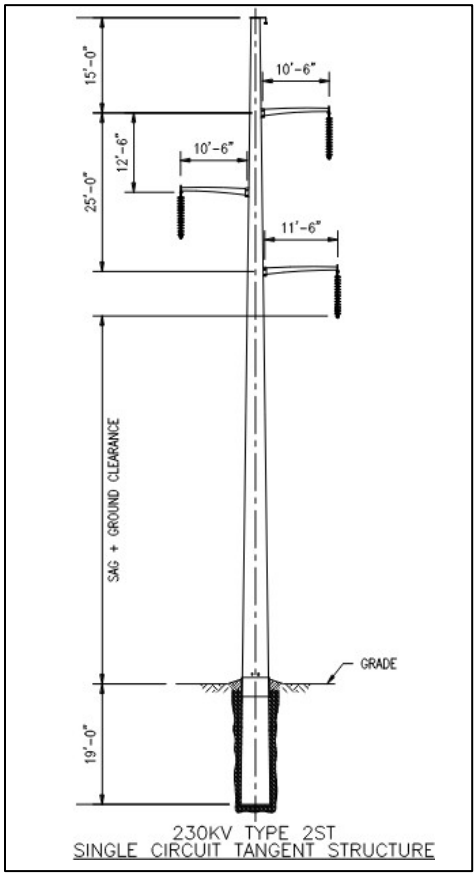

Figure 1 Single Circuit Tangent Structure Schematic Drawing

The single-pole structures will range in height from approximately 70 feet to 115 feet with an average of 95 feet, depending on the required span distances between structures and area topography.

Tangent structures (< 3-degree line angle) will be directly embedded. Angle structures will be installed on drilled concrete piers.

The single-pole structures will be designed to support three conductors and an overhead OPGW. The OPGW will provide lightning suppression and fiber optic communications between the project substations for systems control. Structure loading design will be based on National Electrical Safety Code Heavy Loading Criteria and meet requirements of American Society of Civil Engineers Manual 74, Guidelines for Electrical Transmission Line Structure Loading.

Material of coil and plate for the steel structure fabrications will meet ASTM A572 Grade 65. Non-structural steel elements will be in accordance with ASTM A36. Structural bolts will be in accordance with ASTM F3125 Grade A325. Galvanized finish will be per ASTM-123.

Structures will be designed and fabricated according to the following standards:

- American Society of Civil Engineers, Manual No. 48, Design of Steel Transmission Pole Structures.
- American Institute of Steel Construction, Steel Construction Manual, 13th Edition.
- American Society for Testing and Materials, various standards.
- American Welding Society, Structural Welding Code, AWS D1.1.
- American Concrete Institute, Building Code Requirements for Structural Concrete, ACI 318.

3.7 Structure Spacing and Span Information

Span length will be a function of electrical ground clearances, structure height, and right-of-way (ROW) width. ROW needs for the project are described further in Section 8.

The span between structures will typically range from 700 to 1,100 feet and average approximately 900 feet. Depending on topography; taller structures may be used for crossing existing distribution and transmission lines, where unusual terrain exists, or to avoid exclusion areas.

3.8 Conductor Phase Spacing

Conductor spacing at the structure will be a minimum of 25 feet vertically for phases on the same side. Structure arms will be a minimum of 11 feet-6 inches.

3.9 Line to Ground and Conductor Clearances

Minimum conductor clearance is measured at the point of greatest conductor sag and closest proximity to the ground. The transmission line will be constructed with clearances that exceed standards set by NESC. Minimum conductor height will be 26 feet over agricultural land, 28 feet over rural roads, and 30 feet over paved highways.

Table 4 summarizes the minimum design clearances that Basin Electric will evaluate under all considered operating conditions.

Table 4 Minimum Design Clearances Summary

Object (Under)	Feet
230-kV Conductor	16.0
115-kV Conductor	13.0
69-kV Conductor	12.0
Distribution (<69-kV Conductor)	12.0
Overhead ground wire	12.0
Communication Line	12.0
Paved Road	30.0
Rural Gravel Road	28.0
Railroad	38.0
Waterways, Lakes, Ponds, Rivers	34.0
Ground	26.0

Basin Electric also evaluates side clearance to ensure the conductor blowout is within the project ROW width (Section 8.2).

For line crossings, the wire condition should be evaluated at maximum temperature operating conditions over 60°F Final and the Heavy Ice Condition over 0°F Initial.

3.10 Communications

Communications between Basin Electric and SaskPower will be through OPGW detailed in Section 3.4. The transmission lines to the Tande and Wheelock substations will each contain OPGW, and Basin Electric will leverage existing fiber in between these two substations to provide redundant and diverse pathways for all communications needs.

The information exchanged over the OPGW will be exclusively for the protection and control of the transmission line. This may include but is not limited to relay protection, metering needs, and Supervisory Control and Data Acquisition (SCADA) requirements which are to be determined.

The remaining unused fibers, or dark fiber, will be used as spares in the event of a fiber break and communications for tele-protection equipment needs would be restored as soon as possible. Dark fiber will not be leased to outside persons, corporations, entities, or other utilities for their own business needs. In addition, Basin Electric and SaskPower will not be transmitting any corporate and/or network data to one another other than those exclusively for the protection of the transmission line.

4 Project Location Map

4.1 Tande to Saskatchewan

The Tande Substation is in Mountrail County, and the proposed border crossing is located in Divide County. Route alternatives include areas within Williams County, Divide County and Burke County. A map of preliminary routes and the proposed study area is shown in Figure 2, with the border crossing shown in Figure 3. The existing 230-kV Tande Substation will require the expansion of the transmission bus bay and the necessary circuit breakers (i.e., a terminal addition), disconnect switches, grounding switches, and protection and control equipment to support the addition of the 230-kV connection. No expansion of the substation fence is anticipated, and all upgrades would be constructed within the current substation footprint. The general arrangement of the Tande substation is shown in Figure 4.

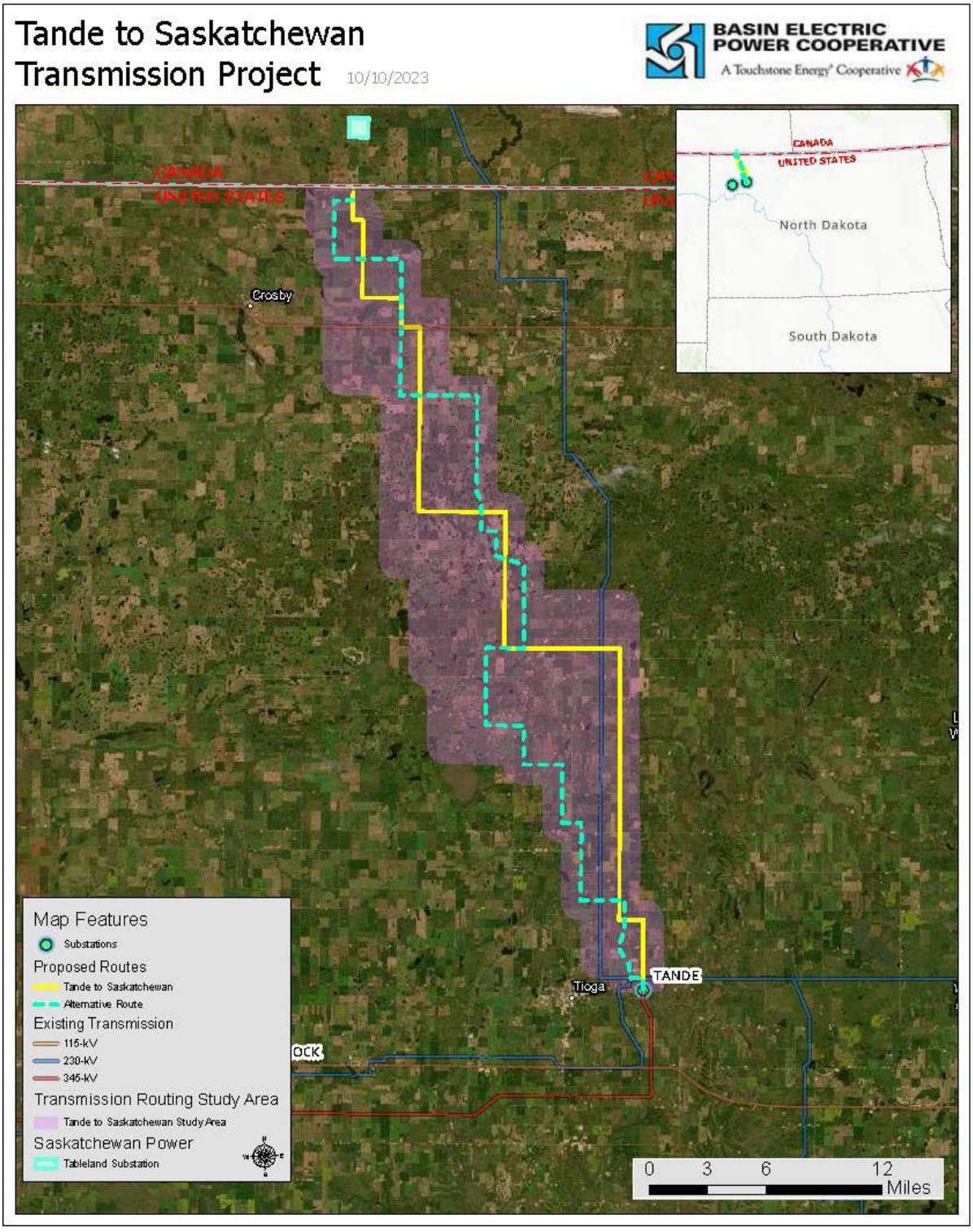

Figure 2 Tande to Saskatchewan Project Map

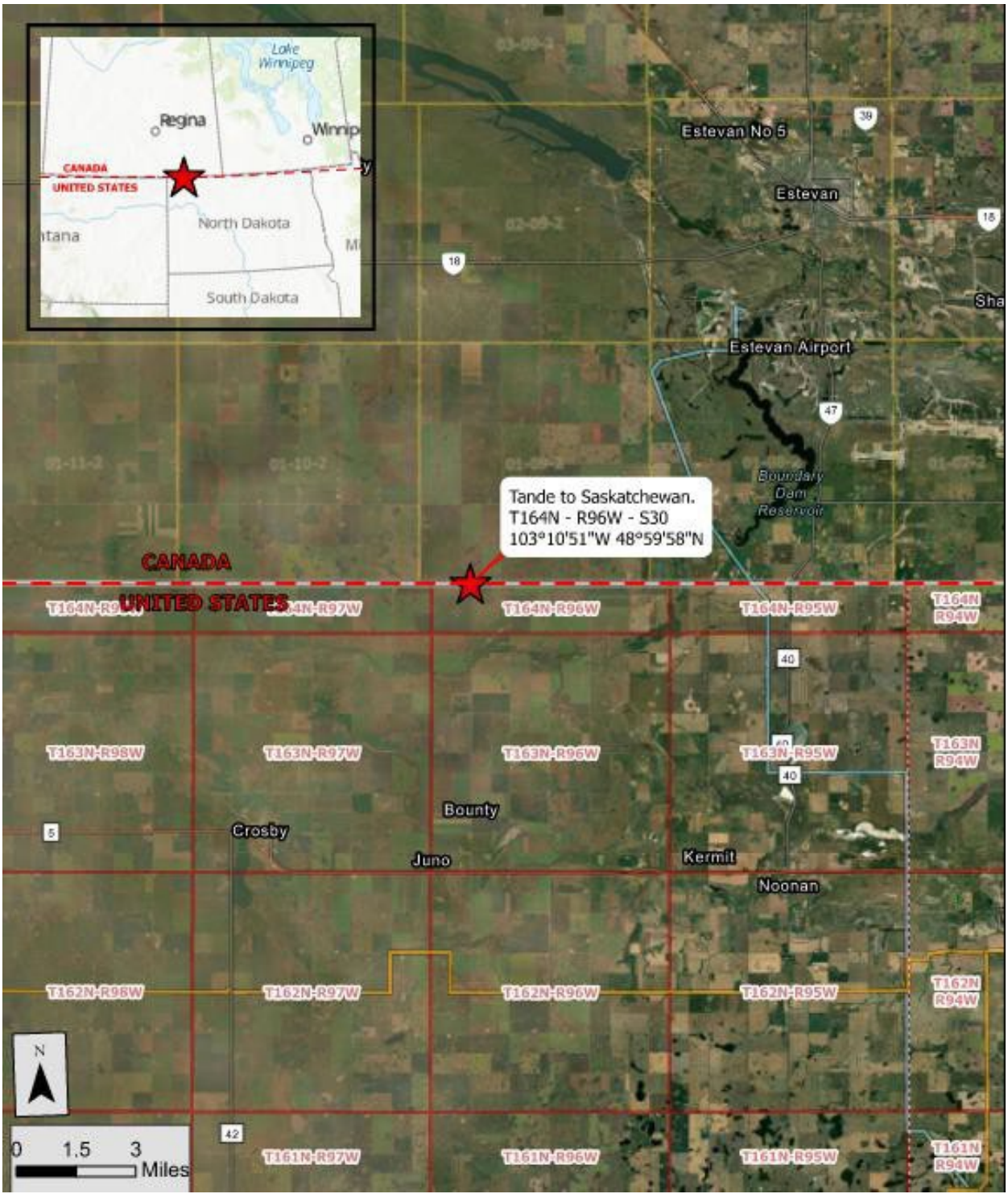

Figure 3 Tande to Saskatchewan Border Crossing Location

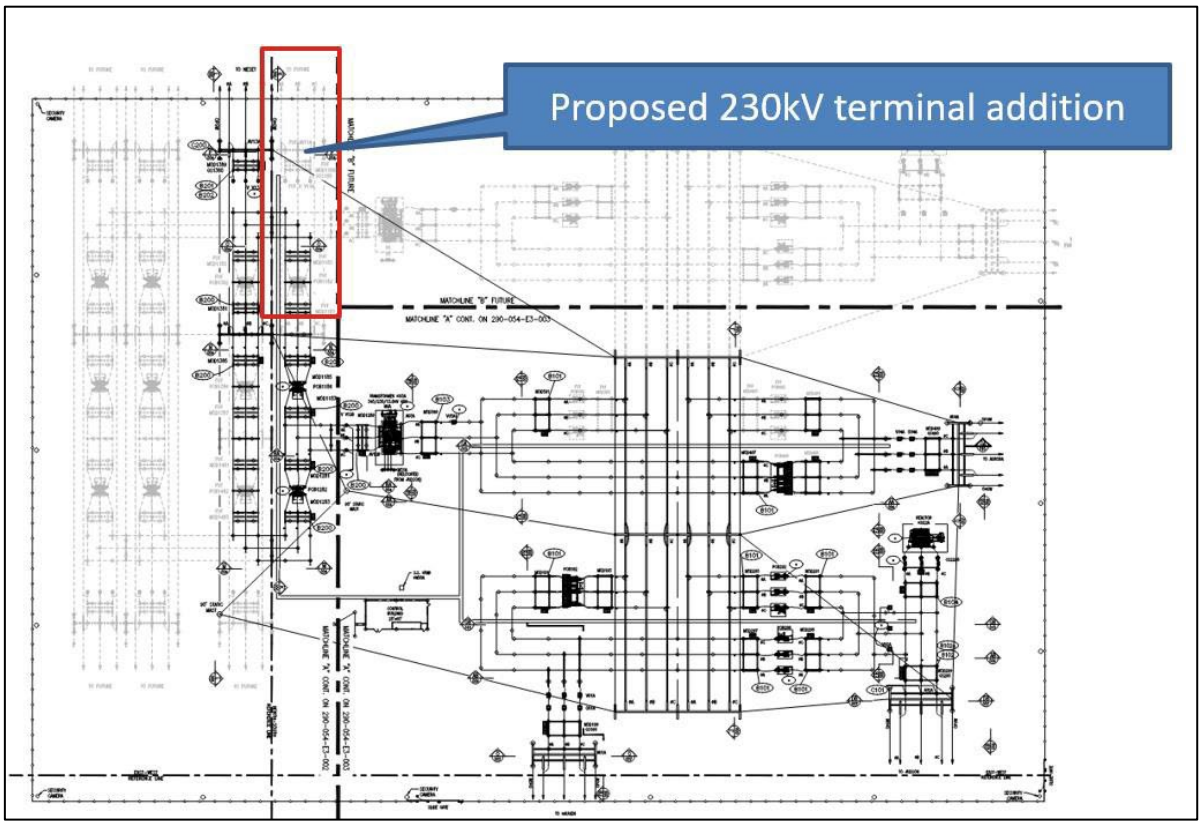

Figure 4 Tande Substation General Arrangement

4.2 Wheelock to Saskatchewan

The Wheelock Substation is located within Williams County, and the proposed border crossing is located in Divide County. All route alternatives and the study area are within Williams County and Divide County. A map of preliminary routes and proposed study area is shown in Figure 5, with the border crossing shown in Figure 6. The existing 230-kV Wheelock Substation will require the expansion of the transmission bus bay and the necessary circuit breakers (i.e., a terminal addition), disconnect switches, grounding switches, and protection and control equipment to support the addition of the 230-kV connection. No expansion of the substation fence is anticipated, and all upgrades would be constructed within the current substation footprint. The general arrangement of the Wheelock substation is shown in Figure 7.

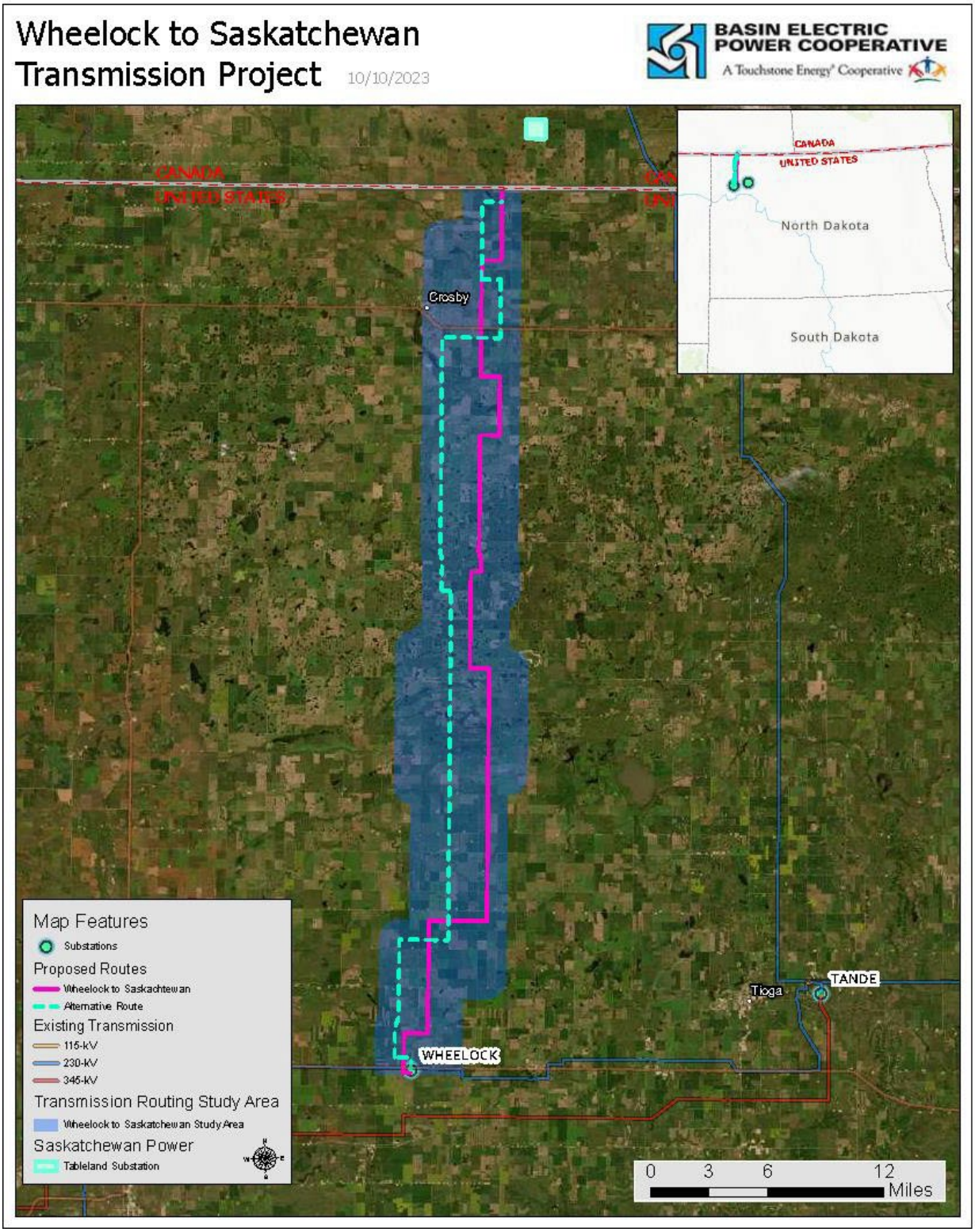

Figure 5 Wheelock to Saskatchewan Project Map

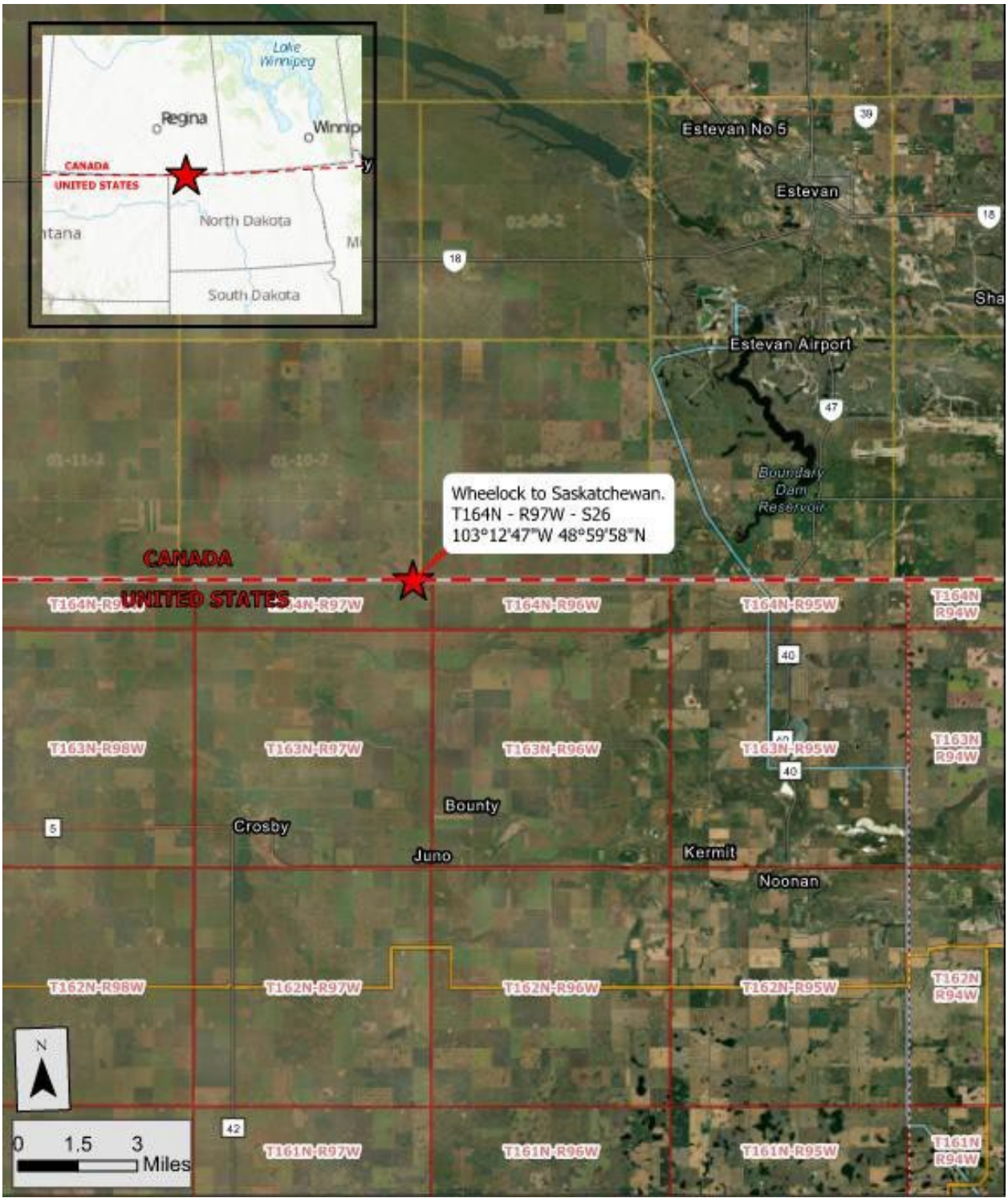

Figure 6 Wheelock Border Crossing Location

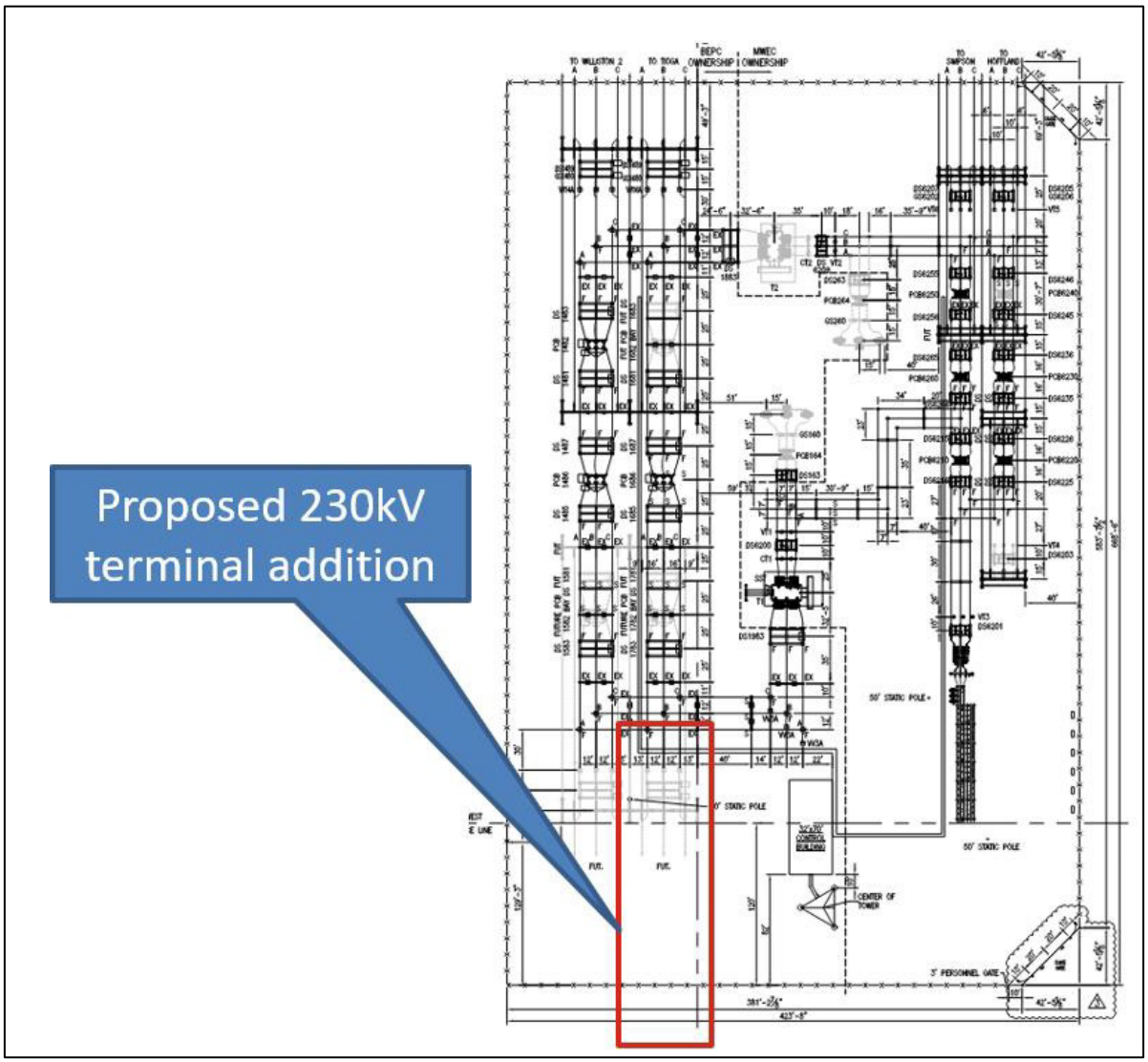

Figure 7 Wheelock Substation General Arrangement

4.3 Tableland Switching Station

From the proposed border crossings, each circuit will continue north to a new proposed substation owned and operated by SaskPower called Tableland Switching Station. SaskPower will be constructing this substation independently from the proposed Basin Electric transmission lines.

To interconnect an upcoming 100 MW Solar IPP project in the Estevan area, SaskPower will construct a new 230-kV Tableland Switching Station south of Estevan, Saskatchewan. This station will be located in the 12-mile-by-12-mile study area. This switching station will be connected to the SaskPower transmission system to transmit this power by sectionalizing the existing 230-kV double-circuit transmission line between Boundary Dam and Rowatt Switching Stations. To improve its grid system reliability and stability, SaskPower is also planning to install two Static Var Systems (SVSs) at this new Station. All these facilities have been shown in the attached single line drawing (Appendix F). June 30, 2026 is the proposed in-service date (ISD) of this system reinforcement work including new Tableland Switching Station.

5 Bulk Power System Information

5.1 Power Transfer Capability

Basin Electric is evaluating different conductor options for the for the project. Table 5 lists the normal and emergency ratings.

Table 5 Conductor Rating Summary

Conductor Name	Summer Rating (Normal/ Emergency), megavolt ampere (MVA)	Winter Rating (Normal/ Emergency), MVA
TS-Basin	838 / 892	931 / 1004
Cardinal	677 / 763	761 / 831
Drake	656 / 771	993 / 1060

Normal ratings are available continuously, while emergency ratings are available for short term scenarios (<30 minutes).

5.2 System Power Flow

The application requests information regarding system power flow plots for the applicant's service area. See Appendix G for the summary.

5.3 Operations and Interference

The corona-induced broadband electromagnetic radiation (EMR) from transmission lines can produce interference with some communications signals if there is an overlap in the signal and EMR frequencies. Broadband corona EMR discharge typically occurs in the frequency spectrum from below 100 kilohertz (kHz) to approximately 1,000 megahertz (MHz), which overlaps with the frequencies used for AM and FM radio and some television signals.

Existing telephone and fiber optic cables within the transmission line ROW will be located in the field by the respective utility companies prior to construction to ensure that impacts to telephone and fiber optic cables will be avoided.

With sufficient corona activity, some radio and television interference can be noticeable; however, the radio sound generated by a transmission line is very low in power and interference is generally only experienced in very close proximity to the transmission line. These effects are most pronounced directly underneath the line conductors and decrease with distance from the transmission line. The level of interference with reception of a radio signal also depends on the relative locations of the radio transmitter, the radio receiver, and the transmission line. A transmission line that is directly between a radio transmitter and a listener's receiver may be more likely to interfere with that listener's reception, whereas a transmission line behind or beside the listener in relation to the transmitter will not necessarily cause interference depending on the radio receiver's antenna.

As digital signal processing has been integrated into television and radio receivers, the potential interference impact of corona-generated radio sound has been further reduced. Moreover, the advent of cable and satellite television service, and the federally mandated conversion to digital television broadcast in June 2009 have greatly reduced the occurrence of corona-generated interference. Newer digital television receivers are equipped with systems to filter out interference.

5.4 Relay Protection Scheme

The proposed relay protection scheme entails the implementation of redundant line relays, specifically SEL-411Ls, to ensure reliable and robust protection. These relays are designed to safeguard the power system against various types of faults and abnormalities.

One of the key features of this scheme is the inclusion of phase and ground step distance protection (ANSI Device number 21). This protection functionality enables the relays to accurately measure the distance to the fault location based on phase and ground parameters. By analyzing these values, the relays can rapidly identify and isolate faults, allowing for timely intervention and fault clearance.

To facilitate fast and efficient communication between the relays, a high-speed permissive overreaching/underreaching transfer trip PUTT/POTT scheme will be employed. This scheme will enable the relays to exchange information over fiber-optic communication channels. This high-speed communication mechanism ensures that relay signals reach their intended destinations swiftly, reducing response times and enhancing overall system reliability.

Additionally, the relay protection scheme incorporates directional ground-time overcurrent (51G/67) protection. This functionality enables the relays to detect and respond to ground faults by measuring the current flow and its direction. By accurately assessing the fault conditions, the relays can activate protective measures, such as tripping breakers, to mitigate the impact of ground faults on the power system.

The scheme includes backup loss of potential overcurrent protection. This backup mechanism acts as a secondary layer of defense by monitoring potential transformers (PTs) and initiating protective actions when abnormalities are detected. It provides an additional level of protection in case the primary protection measures experience any failures or malfunctions.

The relay protection scheme also utilizes switch-on-to-fault (SOTF) protection to enable rapid tripping of the circuit breaker in the presence of a fault during power line energization. In this scenario, SOTF allows for the circuit breaker to be switched on without delay, even if a fault condition persists on the line. The primary purpose of SOTF is to ensure immediate isolation of the faulted section by triggering the circuit breaker to trip without any time delay. By bypassing the normal time delays, SOTF enhances the system's ability to swiftly respond to faults, minimizing potential damage and improving the overall reliability of the protection scheme.

Lastly, the relay protection scheme incorporates Direct Transfer Trip (DTT) functionality, enabling the direct and coordinated transfer of trip signals between the local and remote relays. DTT ensures

synchronized and swift tripping actions, minimizing the impact of faults and preventing cascading failures. DTT improves fault isolation, system response, and overall reliability of the protection scheme.

In summary, the proposed relay protection scheme combines various protective features and equipment, including redundant line relays (SEL-411Ls), phase and ground step distance protection (21), high-speed communication via SEL Mirrored Bit over fiber, directional ground-time overcurrent (51G/67) protection, backup loss of potential overcurrent, SOTF protection, and DTT. Together, these elements form a comprehensive and robust system to safeguard the power network from faults and ensure the reliability of the electrical infrastructure.

5.5 System Stability Analysis

Basin Electric will provide additional system stability analysis if requested by the Grid Development Office (GDO). While there is no stand-alone system stability analysis, the load analyses conducted by SPP and the information included in Appendix A and Appendix F is included to meet the general intent of this requirement.

6 Environmental Impacts

6.1 General

Preliminary information on potential macro-level environmental impacts is provided in the following sections. Basin Electric understands detailed environmental analyses of specific routes will be conducted with DOE oversight during a subsequent environmental review process.

The Study Areas for identifying environmental impacts vary slightly by resource, with corridor widths ranging from approximately 2.7 to 12 miles; the corridors encompass various route alternatives for the Tande to Saskatchewan and Wheelock to Saskatchewan transmission lines. Western EcoSystems Technology, Inc. (WEST) completed desktop assessments of biological and wildlife resources while Metcalf Archaeological Consultants, Inc. (Metcalf) conducted desktop cultural resources reviews. Field studies will be undertaken during the subsequent environmental review process once the proposed routes become better defined. The WEST studies are included as Appendix H (Tande to Saskatchewan) and Appendix I (Wheelock to Saskatchewan). The Metcalf studies are included as Appendix J and Appendix K.

To the extent practicable, Basin Electric plans to avoid or minimize impacts to sensitive areas, i.e., transmission line would span wetlands and poles would be positioned to avoid cultural resources. Site-specific avoidance and minimization measures will be applied during the detailed routing process.

6.2 Land Use

6.2.1 Tande to Saskatchewan Land Use

6.2.1.1 General

The Study Area for the Tande to Saskatchewan portion of the project ranges from 2.7 to 12.0 miles wide and contains approximately 187,217.8 acres. Basin Electric's preferred route, located within the Study Area, is approximately 61.7 miles in length. A 125-feet-wide ROW is centered on the preferred route and encompasses approximately 899.1 acres.

6.2.1.2 Ownership, Easements and Encumbrances

Nearly all (approximately 97%) of the land within the Tande to Saskatchewan Study Area is privately owned (Table 6). Twenty-five parcels, each a portion of the Divide County Waterfowl Production Area (WPA) or the Williams County WPA, are owned by the federal government under administration by the USFWS. School trust land, managed by the North Dakota Department of Trust Lands (NDDTL), is also present within the Study Area. The preferred route does not cross any state or federally owned land; accordingly, 100% of the ROW is privately owned.

Table 6 Land Ownership in the Tande to Saskatchewan Study Area

Land Ownership	Acreage within Study Area	Percent of Study Area	Acreage within Project ROW	Percent of Project ROW
Private	181,599.4	97.0%	899.1	100%
Federal	2,132.6	1.1%	0	0%
State of ND	3,494.8	1.9%	0	0%
Total	**187,217.8**	**100%**	**899.1**	**100%**

Source: reference (1)

The USFWS administers lands including wetland and grassland easements within the Study Area. These easements are agreements between landowners and the USFWS to protect wetlands and grasslands that are vital wildlife habitat; the USFWS does not own land encumbered by these easements. The USFWS owns the perpetual rights to certain wetland basins within wetland easements. These wetland basins may not be burned, drained, filled, or leveled without authorization under a Special Use Permit from the USFWS. In contrast, the upland portions of wetland easements may be developed without a permit as long as the wetland basins are avoided. Development or disturbance of grassland easements also requires a Special Use Permit authorization from the USFWS. There are 154 USFWS easements within the Study Area (reference (1)). The ROW crosses many parcels encumbered by wetland easements; until detailed routing is complete, however, it is unknown if any of the wetland basins would be impacted. The ROW does not include any areas encumbered by grassland easements.

Conservation Reserve Program (CRP) lands are administered by the Farm Service Agency (FSA) through the USDA. In exchange for yearly compensation, CRP lands are removed from agriculture production and planted with species that will improve environmental quality and health, with a long-term goal of establishing valuable land cover to improve water quality, prevent soil erosion, and reduce the loss of wildlife habitat. Individual CRP parcels are subject to privacy laws between each landowner and the FSA. While it is likely that CRP lands are present in the Study Area and ROW, those parcels cannot be readily identified until discussions with individual landowners begin.

6.2.1.3 Land Cover

The Study Area is located in rural North Dakota in an area predominantly comprised of cultivated land, hayfields, pasturelands, and grasslands. Accordingly, much of the Study Area is utilized for agriculture supporting both livestock grazing and crops. Wooded areas are generally limited to shelterbelts between fields, windbreaks surrounding farmsteads, and small parcels adjacent to drainages and wetlands. Oil and gas wells and associated energy development infrastructure are also located throughout the Study Area.

The WEST assessment (Appendix H) focused on identifying wetlands, grasslands, potential threatened and endangered species habitat, and developed land. The Study Area was also reviewed for North Dakota State Trust Lands as well as federally owned lands and easements. In preparing the assessment, WEST used datasets including U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI), U.S. Geological Service (USGS) National Hydrology Dataset (NHD), USFWS Designated Critical Habitat Layer, USFWS Dakota Skipper Known Range Layer, USFWS Easement Layer, North Dakota Game and Fish

Department (NDGF) Native Prairie and Woodlands Layer, along with National Agriculture Imagery Program (NAIP) 2022, 2021, and 2020 imagery. The assessment identified land uses and habitat types that are within the Study Area, within the ROW, and crossed by the preferred route.

The WEST assessment included five distinct land use classifications: wetlands, broken (historically cultivated) grasslands, unbroken (native) grasslands, trees, and developed land. The developed land classification includes land that is currently cultivated or used for other infrastructure such as oil and gas pads, roadways, residential areas, cemeteries, etc. Wetlands were identified as areas containing NWI and/or NHD features. Grasslands areas were classified as either broken or unbroken, using aerial imagery along with the NDGDF Native Prairie Layer to distinguish classifications.

Table 7 shows developed land is the predominant land cover classification mapped within the Study Area, comprising approximately 121,317.9 acres or about 64.8%. Broken grassland is the next largest land use classification, comprising approximately 26,343.5 acres or about 14.1% of the Study Area. Unbroken grasslands (23,854.6 acres or about 12.7%), wetlands (13,929.9 acres or about 7.4%), and trees (1,771.7 acres or about 1.5%), follow in overall abundance. Mapped land use classification for the ROW is similar to the Study Area. Developed land is the largest type at 609.1 acres and 67.7%. Broken grassland is next largest at 175.7 acres (19.5%), followed by unbroken grassland covering 68.4 acres (7.6%). Wetlands and trees are the smallest land use classifications within the ROW at 32.2 acres (3.4%) and 13.7 acres (1.5%) respectively.

Table 7 Land Cover Tande to Saskatchewan Study Area

Land Ownership	Acreage within Study Area	Percent of Study Area	Acreage within Project ROW	Percent of Project ROW
Developed (cultivated, etc.)	121,317.9	64.8%	609.1	67.7%
Broken Grasslands	26,343.5	14.1%	175.7	19.5%
Unbroken Grasslands	23,854.6	12.7%	68.4	7.6%
Wetlands	13,929.9	7.4%	32.2	3.4%
Trees	1,771.7	0.9%	13.7	1.5%
Total	**187,217.6**	**99.9% [1]**	**899.1**	**99.7% [1]**

Notes: Source: reference (1)
[1] Percentages do not total 100% due to rounding.

6.2.2 Wheelock to Saskatchewan Land Use

6.2.2.1 General

The Study Area for the Wheelock to Saskatchewan portion of the project ranges from 4.9 to 6.8 miles wide and contains approximately 157,541.6 acres. Basin Electric's preferred route, located within the Study Area, is approximately 54.7 miles in length. A 125-feet-wide ROW is centered on the preferred route and encompasses approximately 829.4 acres.

6.2.2.2 Ownership, Easements and Encumbrances

Nearly all (approximately 98.4%) of the land within the Wheelock to Saskatchewan Study Area is privately owned (Table 8). Four parcels, each a portion of the Divide County WPA, are owned by the federal government under administration by the USFWS. School trust land, managed by the NDDTL, is also present within the Study Area. While percentages vary slightly, ROW ownership is similar to ownership in the larger Study Area.

Table 8 Land Ownership in Wheelock to Saskatchewan Study Area

Land Ownership	Acreage within Study Area	Percent of Study Area	Acreage within Project ROW	Percent of Project ROW
Private	154,964.4	98.4%	806.7	97.3%
Federal	331.0	0.2%	3.8	0.5%
State of ND	2,246.2	1.4%	18.9	2.3%
Total	**157,541.6**	**100%**	**829.4**	**100%**

Source: reference (2)

The USFWS administers lands including wetland and grassland easements within the Study Area. These easements are agreements between landowners and the USFWS to protect wetlands and grasslands that are vital wildlife habitat; the USFWS does not own land encumbered by these easements. The USFWS owns the perpetual rights to certain wetland basins within wetland easements. These wetland basins may not be burned, drained, filled, or leveled without authorization under a Special Use Permit from the USFWS. In contrast, the upland portions of wetland easements may be developed without a permit as long as the wetland basins are avoided. Development or disturbance of grassland easements also requires a Special Use Permit authorization from the USFWS. There are 129 USFWS easements within the study area (reference (2)). The ROW crosses many parcels encumbered by wetland easements; until detailed routing is complete, however, it is unknown if any of the wetland basins would be impacted. The ROW borders, but does not impact, a grassland easement area located in Divide County.

CRP lands are administered by the FSA through the USDA. In exchange for yearly compensation, CRP lands are removed from agriculture production and planted with species that will improve environmental quality and health, with a long-term goal of establishing valuable land cover to improve water quality, prevent soil erosion, and reduce the loss of wildlife habitat. Individual CRP parcels are subject to privacy laws between each landowner and the FSA. While it is likely that CRP lands are present in the Study Area and ROW, those parcels cannot be readily identified until discussions with individual landowners begin.

6.2.2.3 Land Cover

The Study Area is located in rural North Dakota in an area predominantly comprised of cultivated land, hayfields, pasturelands, and grasslands. Accordingly, much of the Study Area is utilized for agriculture supporting both livestock grazing and crops. Wooded areas are generally limited to shelterbelts between fields, windbreaks surrounding farmsteads, and small parcels adjacent to drainages and wetlands. Oil and gas wells and associated energy development infrastructure are also located throughout the Study Area.

The WEST assessment (Appendix I) focused on identifying wetlands, grasslands, potential threatened and endangered species habitat, and developed land. The Study Area was also reviewed for North Dakota State Trust Lands as well as federally owned lands and easements. In preparing the assessment, WEST used datasets including USFWS NWI, USGSNHD, USFWS Designated Critical Habitat Layer, USFWS Dakota Skipper Known Range Layer, USFWS Easement Layer, NDGF Native Prairie and Woodlands Layer, along with NAIP 2022, 2021, and 2020 imagery. The assessment identified land uses and habitat types that are within the Study Area, within the ROW, and crossed by the preferred route.

The WEST assessment included five distinct land use classifications: wetlands, broken (historically cultivated) grasslands, unbroken (native) grasslands, trees, and developed land. The developed land classification includes land that is currently cultivated or used for other infrastructure such as oil and gas pads, roadways, residential areas, cemeteries, etc. Wetlands were identified as areas containing NWI and/or NHD features. Grasslands areas were classified as either broken or unbroken, using aerial imagery along with the NDGDF Native Prairie Layer to distinguish classifications.

Table 9 shows developed land is the largest land cover classification mapped within the Study Area, comprising approximately 125,682 acres or about 80%. Broken grassland is the next largest land use classification, comprising approximately 13,258 acres or about 8.4% of the Study Area. Unbroken grasslands (9,605 acres or about 6.1%), wetlands (8,116 acres or about 5.2%), and trees (874 acres or less 1%), follow in overall abundance. Mapped land use classification for the ROW is similar to the Study Area. Developed land is the largest type at 634.84 acres and 76.5%. Broken grassland is next largest at 99.8 acres (12%), followed by unbroken grassland covering 62.94 acres (7.6%). Wetlands and trees are the smallest land use classifications within the ROW at 30.2 acres (3.7%) and 1.52 acres (<1%) respectively.

Table 9 Land Cover Wheelock to Saskatchewan Study Area

Land Ownership	Acreage within Study Area	Percent of Study Area	Acreage within Project ROW	Percent of Project ROW
Developed (cultivated, etc.)	125,682	79.8%	634.8	76.5%
Broken Grasslands	13,258	8.4%	99.8	12.0%
Unbroken Grasslands	9,605	6.1%	62.9	7.6%
Wetlands	8,116	5.2%	30.2	3.7%
Trees	874	0.5%	1.5	0.2%
Total	**157,541.6**	**100%**	**829.4**	**100%**

Source: reference (2)

6.3 Floodplains

6.3.1 Tande to Saskatchewan Floodplains

The White Earth River, Long Creek, small drainages, and wetlands are found within the Study Area. Due to the Study Area's rural location, the Federal Emergency Management Agency (FEMA) has not developed flood rating maps for the area (references (3); (4); (5); (6)).

6.3.2 Wheelock to Saskatchewan Floodplains

The Little Muddy River, Long Creek, small drainages, and wetlands are found within the Study Area. Due to the Study Area's rural location, FEMA has not developed flood rating maps for the area (references (4); (6)).

6.4 Wetlands

The Project is located within the Prairie Pothole Region. Prairie potholes (*i.e.*, isolated emergent wetlands and freshwater ponds) are scattered throughout the Study Area. Intermittent drainages associated with the White Earth and Little Muddy Rivers are also present in the Study Area. These wetlands and intermittent drainages may be under the jurisdiction of the U.S. Army Corps of Engineers (USACE) and may require additional permitting if impacted by project construction. Basin Electric would avoid impacts to wetlands to the extent practicable and would seek appropriate permits and authorizations as applicable.

The WEST desktop assessments identified wetlands and waterbodies within the Study Area (Appendix H and Appendix I). USFWS National Wetlands Inventory data and the USGS NHD were used to identify potential surface waters within the Study Area (references (7); (8)). The data have been used to evaluate route alternatives and as a precursor for field delineations.

6.5 Navigable Waterways

The USACE Omaha District's website lists six Section 10 waters in North Dakota, including the Missouri River (includes Lake Sakakawea and Lake Oahe), Yellowstone River, James River, Bois de Sioux River, Red River of the North, and Upper Des Lacs Lake. The project alternatives do not cross any of these Section 10 navigable waterways identified by the USACE Omaha District.

North Dakota also regulates navigable lakes and streams at the state level and refers to these as sovereign lands. There are no state-identified sovereign lands in the Study Area

6.6 Indian Lands

Based on a review of public land ownership records, the project alternatives do not cross or impact any Indian Lands, including Indian Reservations or Indian Trust Land.

6.7 Historic Places

Generally, both proposed transmission lines are located in the Garrison and the Souris River Study units, as defined in the North Dakota State Historic Preservation Office's (ND SHPO) state comprehensive plan archeological component. However, as the potential routes are separated by several miles at times, they have been evaluated individually for historic and cultural resources. Subsequent studies and effects determinations will be directed and determined by DOE through the agency's Section 106 of the National Historic Preservation Act of 1966 (NHPA) consultation process.

6.7.1 Tande to Saskatchewan

Metcalf conducted a Class I Literature Review for the Project, included as Appendix J. The Class I report contains sensitive information and may not be shared in the public document. A Class III pedestrian survey will be conducted of the project's areas of potential effect (APE) under DOE's direction.

6.7.1.1 Class I Literature Review

The Class I Literature Review search revealed that 337 cultural resources and 35 Cultural Heritage Sites have been recorded in the Study Area. These resources consisted of 64 precontact sites, 169 precontact site leads, 13 precontact isolated finds, 19 post-contact sites, 8 post-contact site leads, 6 post-contact isolated finds, 21 architectural sites, 23 architectural site lead, 12 multi-component sites containing both pre- and post-contact materials, and 9 multi-component sites containing both architecture and post-contact materials.

Out of theses 337 cultural resources, only one has been determined eligible for inclusion on the National Register of Historic Places (NRHP). This is the entirety of the Burlington Northern Santa Fe Railroad Site (32MN00083). The majority of this railroad is still in operation in North Dakota, and only the site as a whole is considered eligible. Individual working crossings are considered non-contributing elements. The project is not expected to impact that site, as pole locations can avoid the site.

The locations of the 35 Cultural Heritage Sites within the file search area have been recorded by Traditional Cultural Specialists and are considered sacred sites/locations. These sites will be avoided.

The manuscript files search revealed that 110 cultural resources reviews for projects have been conducted in the search area. These projects consist of 32 related to oil/gas development, 20 related to borrows, 19 related to electric, 9 related to wind, 9 related to road/highway construction, 6 related to water/waterlines, 6 related to archaeological investigations, 3 related to archaeological site testing, 3 related to telecommunications, 2 related to railroads and 1 related to a bridge project.

6.7.2 Wheelock to Saskatchewan

Metcalf conducted a Class I Literature Review for the Project, included as Appendix K. The full Class I report contains sensitive information may not be shared in the public document. A Class III pedestrian survey will be conducted of the project's APE under DOE's direction.

6.7.2.1 Class I Literature Review

The Class I Literature Review search revealed that 102 cultural resources have been recorded in the search area. These resources consisted of 6 precontact sites, 47 precontact site leads, 5 precontact isolated finds, 11 post-contact sites, 4 post-contact site leads, 6 post-contact isolated finds, 15 architectural sites, 6 architectural sites with historic components, and 2 multi-component sites containing both pre- and post-contact materials.

Out of theses 102 cultural resources, five have been determined eligible for inclusion on the NRHP; all five of these sites are historic architectural. The towers of the proposed project are not expected to impact any

of the sites as a whole. There will be minimal visual impact to two of the sites. The manuscript files search revealed that 44 cultural inventories have been conducted in the search area. These projects consist of 16 related to oil/gas development, 7 related to borrows, 7 related to road/highway construction, 5 related to archaeological investigations, 3 related to water/waterlines, 3 related to electric, 2 for wind, and 1 for telecommunications.

6.8 Wildlife

The USFWS administers the Endangered Species Act (ESA), which mandates protection of species federally listed as threatened and endangered and their associated habitats. An endangered species is a species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is a species that is likely to become endangered in the foreseeable future. Critical habitat for these species can be designated if that habitat includes specific areas that are occupied by a species at the time of listing or unoccupied areas that are considered essential to the conservation of a species. Candidate species receive no statutory protection from the USFWS unless they are formally listed; however, it is in the spirit of the ESA to consider measures to minimize impacts to these species. North Dakota does not have a state threatened and endangered species list; however, it recognizes those federally listed under the ESA.

The USFWS Information for Planning and Conservation (IPaC) tool indicated that six threatened, candidate or endangered species could potentially occur within the Study Area (Table 10) (reference (9)).

Table 10 Threatened, Candidate and Endangered Species

Common Name	Scientific Name	Status	Critical Habitat
Northern long-eared bat	*Myotis septentrionalis*	Threatened	No designated critical habitat.
Piping plover	*Charadrius melodus*	Threatened	The Project is outside the designated critical habitat.
Red knot	*Calidris canutus rufa*	Threatened	No designated critical habitat.
Whooping crane	*Grus americana*	Endangered	The Project is outside the designated critical habitat.
Dakota skipper	*Hesperia dacotae*	Threatened	The Project is outside the designated critical habitat.
Monarch Butterfly	*Danaus plexippus*	Candidate	No designated critical habitat.

Source: reference (9)

6.8.1 Northern Long-Eared Bat

The northern long-eared bad (NLEB) roosts in trees during the spring, summer, and fall. The species prefers large, contiguous tracks of upland forested habitat during the summer residency period. Natural roosting habitats in the Study Area are limited to individual trees and wind breaks. NLEB do not undertake long-distance seasonal migrations between summer and winter ranges but do undertake shorter distance movements between summer roosts and winter hibernacula. These seasonal movements are generally between 35 miles and 55 miles, but may be substantially longer in some areas, perhaps as great as 168 miles. Information on habitat use during migration is limited, but individuals in transit are likely to use foraging habitats at least part of the time. NLEB spend winter hibernating in caves and mines. There are

no known wintering hibernacula within North Dakota, the closest likely being in the Black Hills of South Dakota or in caves in Minnesota.

The Study Area and all of North Dakota is within the NLEB range (reference (10)). The NLEB has been identified in a few forested habitats in North Dakota including the Turtle Mountains, and the riparian corridors of the Little Missouri River and Missouri River. Occurrences of the NLEB are uncertain in North Dakota. White-nose syndrome (WNS) currently remains the predominant threat to the species. North Dakota is included in the current extent of the WNS zone per the Final Rule (88 Federal Register [FR] 4908 [January 26, 2023]; reference (11)). With the Final Rule reclassifying the northern long-eared bat as endangered, incidental take of the species is prohibited.

6.8.2 Piping Plover

Critical habitat has been federally designated for the piping plover in North Dakota mainly along the shores of the Missouri River and wildlife refuge areas. No designated critical habitat is located within the Study Area.

6.8.3 Red Knot

There are no stopover sites consistently used by red knots in North Dakota. The entire state of North Dakota is within the possible range of the red knot (reference (12)).

6.8.4 Whooping Crane

A 200-mile wide migration corridor has been delineated for this population that contains 95 percent of all verified sightings. Spring migration occurs primarily in April and May whereas fall migration occurs primarily in October and November (reference (13)). Stopover habitat during migration includes a variety of croplands with roosting occurring in shallow, freshwater inland wetlands. The Project is located within the USFWS-defined 75% occurrence frequency band of the whooping crane migration corridor (reference (14)). This entire corridor area includes a swath of the central U.S. and extends from southcentral North Dakota along the Missouri River to northwest North Dakota through Burke, Divide, Mountrail and Williams Counties.

6.8.5 Dakota Skipper

The Dakota skipper, a prairie obligate species, requires nectar-producing native flowers and native grasses. Historically, Dakota skippers have been associated with relatively low, wet, prairie-dominated, high-quality, tall grass prairie habitat (Type A habitat). Researchers have found that Dakota skippers also use upland mixed grass prairie that is relatively dry and includes ridges and hillsides (Type B habitat (reference (15)). These habitats often have small inclusions of areas with species more commonly typified with tall grass prairie. Larvae require grass components of mixed-grass prairie that include bluestem grasses (*Andropogon spp.*) and needlegrasses, while adults require nectar sources; therefore, suitable prairie mus include nectar producing forbs. These forbs may include purple coneflower (*Ecninacea purpurea*), blue bells (*Campanula rotundifolia*), blanket flower (*Gaillardia aristata*), wood lily (*Lilium philadelphicum*), or other species that are in bloom during the adult life cycle of the Dakota skipper

(reference (16)). The Project and the Study Area are within the USFWS's current known range of the species. The nearest designated critical habitat to the Study Area is 20 miles away.

6.8.6 Monarch Butterfly

The monarch butterfly (*Danaus plexippus*) is currently a candidate for listing under the ESA, and a listing decision is currently anticipated in 2024. Candidate species do not receive statutory protections under the ESA, but are reevaluated annually for listing priority, and, therefore, are likely to be listed in the future.

The species occurs throughout the Great Plains and much of North America. Monarchs prefer open habitats with flowering plants and lay their eggs exclusively on milkweeds (*Asclepias spp.*), which the larvae feed on until pupation (reference (17)). Monarch butterflies will breed in North Dakota during the summer and migrate south to Mexico for the winter; eventually, the butterflies will make their way back to North Dakota during spring migration. Suitable habitat, including wetlands, roadsides with common milkweed, and upland grassland habitat with flowering species, was observed during the field survey. Much of the herbaceous habitat is rangeland used for livestock grazing or grasslands in roadside ditches. Due to the presence of suitable habitat, it is possible for this species to occur within the Survey Corridor.

6.9 Other Wildlife Considerations

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act (BGEPA). The BGEPA protects bald and golden eagles throughout their range in the United States. Although it does not designate critical habitat, BGEPA protects individual eagles and nests from disturbance.

6.9.1 Bald Eagle

Bald eagles may occur in North Dakota as breeders, winter residents, migrants or year-round residents. In North Dakota the key nesting areas and primary range are the Missouri River system including Lake Sakakawea, the Heart River, Cannonball River, Sheyenne River, Red River, Souris River, and the Devils Lake basin. Bald eagles can also nest in areas not considered traditional nesting habitat such as small stands of large cottonwood trees completely surrounded by cropland or grassland. The Study Area is located within the secondary range of the key nesting areas (reference (12)).

During the non-breeding season bald eagles will concentrate near large bodies of water where the water remains unfrozen and will roost up to 20 miles from foraging sites, depending on abundance of prey (Buehler 2000). The largest large body of water within the primary range nearest the Study Area is the Missouri River which is located approximately 14 miles south of the southern end of the Study Area.

6.9.2 Golden Eagle

Golden eagles may occur in North Dakota as breeders, winter residents, migrants or year-round residents (reference (12)). Golden eagles are most commonly associated with open and semi-open habitats such as shrublands, grasslands, woodland-brushlands, and coniferous forests as well as in farmland and riparian habitats. In North Dakota the golden eagle primary range for nest site selection is along the badlands and

Lake Sakakawea breaks. The Study Area is located outside of the range for nest site selection. Golden eagles in North Dakota nest mainly west of the Missouri River (reference (12)).

7 Project Alternatives

7.1 SPP Alternatives

Based on the SaskPower request for transmission access to SPP, an ATSS was performed to review options for transmission. See Appendix A for a summary of the SPP ATSS process. On May 11, 2022, SPP concluded that circuits from Wheelock and Tande to a new substation (Tableland Substation) in Canada would be needed to meet the requirements of the request, in Aggregate Facility Study SPP-2021-AG2.

Other options considered by SPP in the study were to construct two 345-kV circuits. One would be directed to a new substation near Wheelock on the existing 345-kV line, and the other circuit to a proposed substation near the existing 115-kv East Fork substation (Figure 8). 345-kV requires a wider ROW and larger structures. In addition, the proposed route lengths were longer than the 230-kV option to Wheelock and Tande. Therefore, the 345-kV option would have a higher cost and larger impacts and the 230-kV option was selected. See Figure 9 for the original 230-kV supporting figure. It should be noted that at the time of the Aggregate Transmission Study, a border crossing location had not yet been identified and the project assumed near an existing transmission crossing (Tioga-Boundary Dam 230-kV transmission line).

7.2 Basin Electric Alternatives

Because SPP's alternative evaluation process determined the number and voltage of the transmission lines, Basin Electric's range of alternatives is essentially limited to selecting the routes for the transmission lines. Basin Electric will evaluate route alternatives, considering the avoidance and minimization of impacts, minimizing line length and cost, and adhering to NDPSC corridor and route criteria. The routing process is discussed in greater detail in Section 8. Basin Electric will also evaluate conductor options, as discussed in Section 3.3.

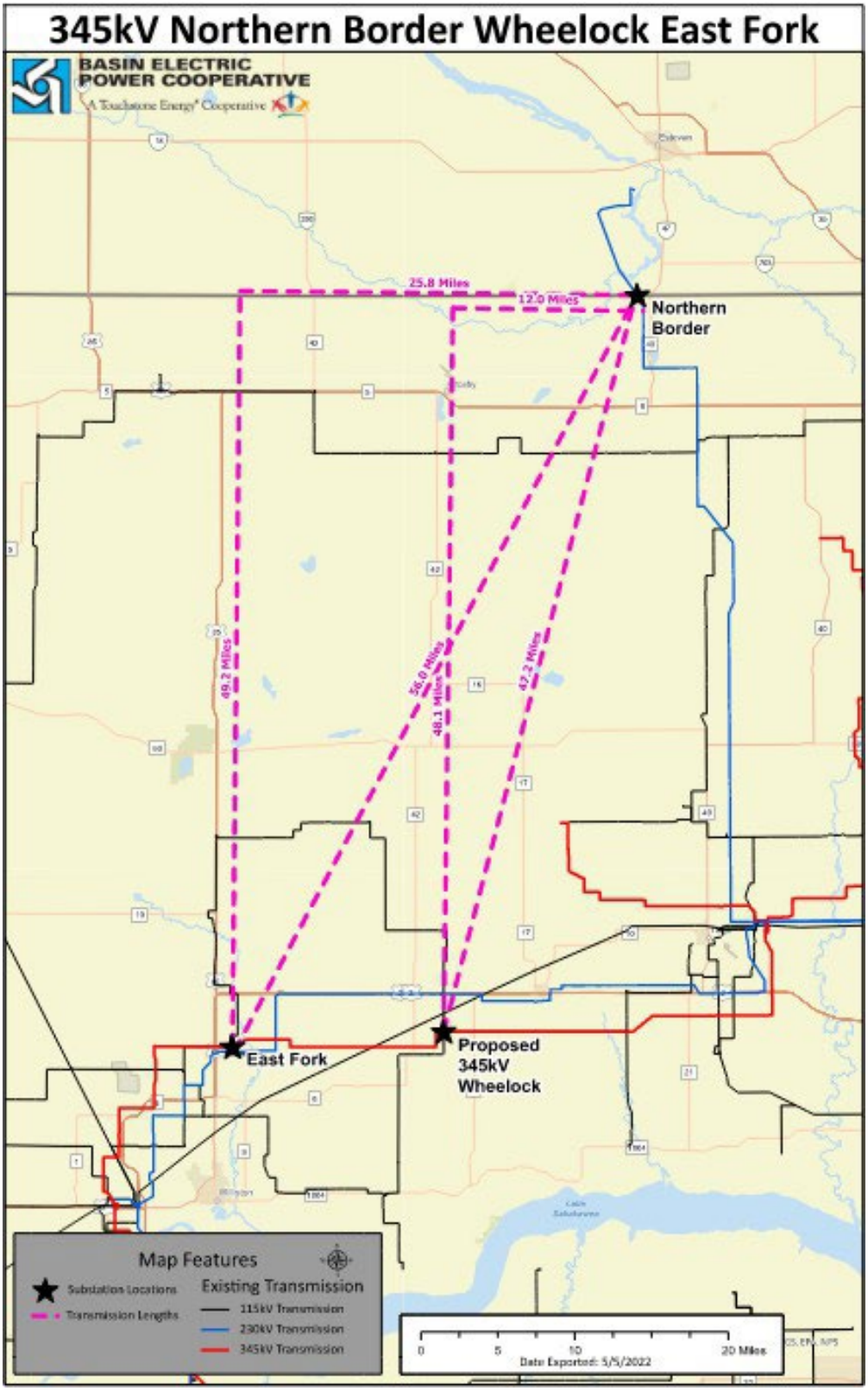

Figure 8 345-kV Alternative

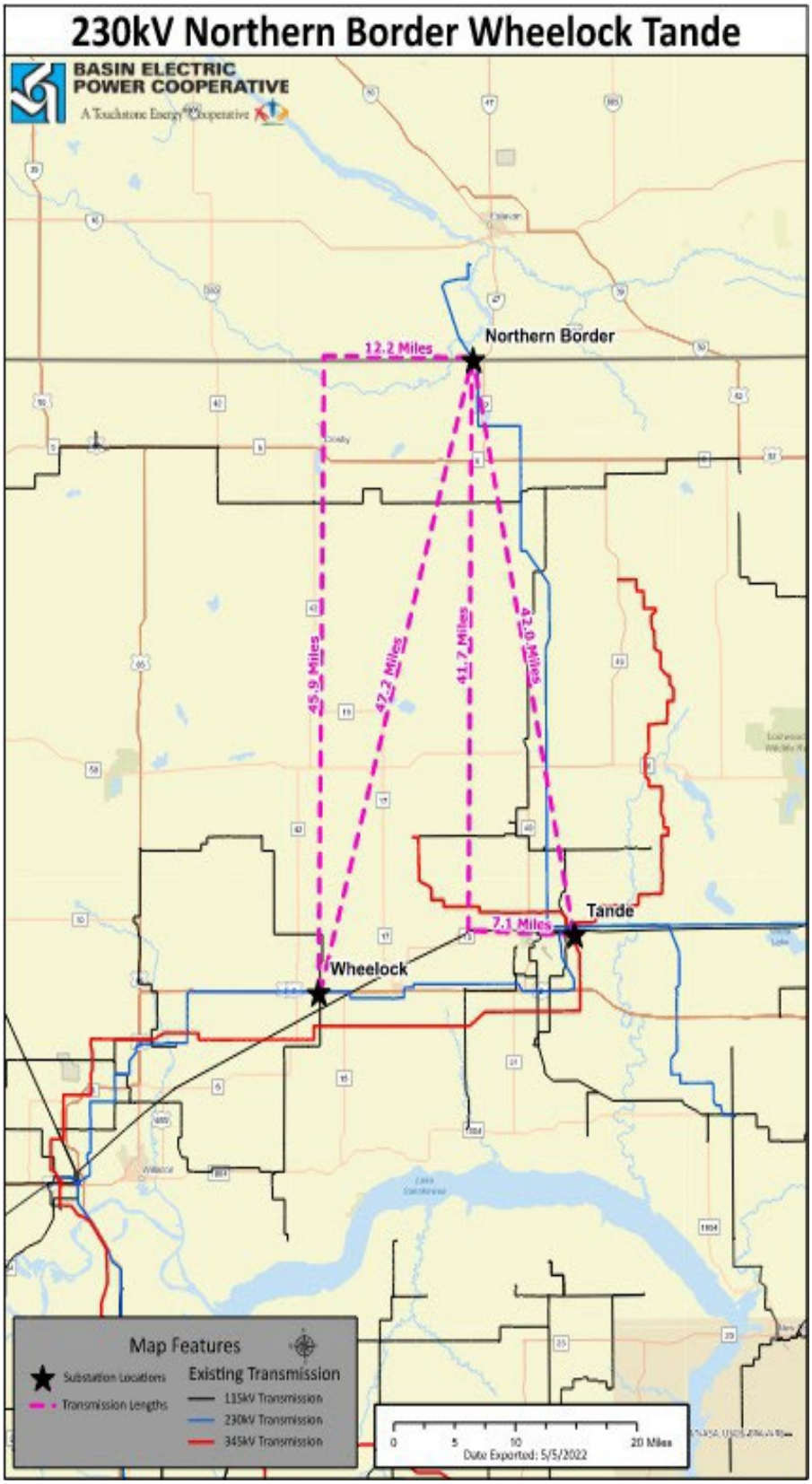

Figure 9 230-kV Alternative

8 Transmission Routing Process, ROW Acquisition, Construction, Operations and Maintenance

8.1 Routing Process

Basin Electric uses an iterative process to review the project area and select route alternatives. After identifying the proposed border crossing area and the interconnecting substations, Basin Electric identifies a large project study to gather and organize data that inform project routing criteria. For these projects, Basin Electric follows the routing criteria set forth in the North Dakota Public Service Commission (PSC) Route Corridor Certificate and Route Permit (Section 9.1).

Next, Basin Electric identifies potential transmission alignments that meet the PSC and other regulatory criteria and follow existing infrastructure and public land survey divisions. The team looks for route options that minimize challenging terrain and avoid excessive quantities of angle structures.

After compiling a series of initial route alternatives, Basin Electric ROW staff or authorized agents start a process to receive feedback from the public and potential affected landowners. Stakeholders include the landowners, area utility owners, the local rural electric cooperatives, and local agencies. Basin Electric also held public open house meetings on June 5, 2023 in Crosby, ND, and June 6, 2023 in Tioga, ND. During meetings with landowners, Basin Electric requests permission to conduct surveys and feedback from landowners on constraints and routing alternatives.

8.2 Right-of-way Details

Basin Electric utilizes a 125-foot wide ROW as a standard width for 230-kV transmission. ROW width is selected to contain wire blowout under all operating conditions. In some cases, longer span lengths may require a wider ROW and will be calculated on a case-by-case basis. Maximum ROW width is not anticipated to be greater than 150 feet. Structures are typically placed in the center of the ROW, unless design requirements dictate the need for a structure offset.

8.3 Construction

Construction sequencing would generally include site preparation followed by borehole excavation, structure assembly and erection, stringing, and ultimately operations and maintenance. Each of these processes are discussed in greater detail in the following sections.

8.3.1 Site Preparation

The Project ROW is relatively flat, and the need for structure site leveling is expected to be minimal. It is anticipated that at some structure locations, grading of small areas (up to 40 feet by 40 feet for crane and manlift landings) may be required to level the ground surface to allow the safe operation of construction equipment. Blading would be confined to the Project Corridor and would be accomplished using bulldozers or front-end loaders. Soil removed during leveling would be stockpiled and replaced following construction; special emphasis would be placed on salvaging topsoil to be used for reclamation. The ground would be re-graded to the approximate original contours and revegetated (rangeland) or tilled

(cropland) when the work is completed. Temporary disturbance to soils would be mitigated by returning the sites to grazing and farming unless other arrangements are made with the landowner in order to facilitate the long-term maintenance of the transmission line.

8.3.2 Borehole Excavation

Crews would use a truck-mounted auger or tracked vehicle equipped with a power auger to drill holes for the structures along the Project Corridor. Total disturbance at each structure location would vary depending on terrain and equipment; however, all disturbance would be confined to the Project Corridor.

Borings for the pole holes would have an average diameter of five feet and an average depth of 20 feet. The single-pole structure would be lowered by crane into the borehole, and the annulus around the structure would be backfilled with crushed granular material or excavated material as suitable. Surplus material (expected to total approximately 15 cubic yards [yd^3] at each tangent structure site) would be spread around the base of structure or hauled to an off-site location (i.e., area landfills) for disposal, in accordance with landowner agreements.

A number or structures would require reinforced concrete foundations consisting of a six-foot-diameter boring to an average depth of 20 feet. Approximately 20 yd^3 of surplus material would be either spread in the vicinity of the structure or disposed of in accordance with landowner agreements. Large volumes of excess soil would be disposed of at local landfills; landfills often seek sources of additional fill as cover for waste material. Disposal of waste material, including concrete spoil, would be in compliance with applicable regulations and would not include placement in wetlands or aquatic sites. Site-specific borehole diameters, depth, and the use of reinforced concrete foundations would be determined as part of geotechnical and engineering evaluations.

8.3.3 Structure Assembly and Erection

Structure components (i.e., structure segments, davit arms, hardware, insulators, and related materials) would be trucked to structure work site locations and assembled. Davit arms, insulators, and other appurtenances would be attached to the poles while on the ground at each structure location, within the Project Corridor. Erection crews would place the structure in the borehole (directly imbedded) or on reinforced concrete foundations (i.e., self-supporting angle point and dead-end structures) using cranes or large boom trucks. The structures would then be plumbed and the hole backfilled, as previously described.

8.3.4 Conductor Stringing and Tensioning

Following structure construction, crews would install the conductors and OPGW using conductor stringing sheave blocks and line pulling and tensioning equipment. The conductor and OPGW would be kept under tension during the stringing process to keep the conductor clear of the ground and obstacles that could damage the conductor and/or OPGW surfaces.

Pulling and tensioning sites are typically located at 10,000-foot intervals and at angle point structures. Sites along tangent structures are maintained within the Project Corridor, while those at angle points

typically are partially outside of the Project Corridor. Stringing equipment generally consists of wire pullers, tensioners, conductor reels, OPGW wire reels, and sheave blocks. About 10,000 feet of conductor and OPGW would be installed for each pull. After the conductor/ground wire is pulled for a section of line, it would be tightened or sagged to the required design tension in compliance with the NESC. The process would be repeated until all of the conductor and OPGW are pulled through all sheaves. Conductor stringing also requires access to each structure for securing the conductor to the insulators or OPGW to each structure once final line sag is established.

For public safety and property protection, temporary wooden guard structures would be used to provide support when stringing conductor and OPGW across existing power lines, roads, highways, railroads, and other linear obstacles. The structures wpi;d be removed when stringing is complete; the pole borings would be backfilled and the temporary support structure sites would be reclaimed. All temporary wooden guard structures would be installed within the Project Corridor.

8.3.5 Operations and Maintenance

Basin Electric's preventive maintenance program for transmission lines include aerial and ground inspections. Aerial inspections would be conducted at least two times each year. Ground patrols would be conducted annually for the first three or four years, and less frequently thereafter. Climbing inspections of structures will be conducted on a five-year cycle with every fifth structure inspected each year. Inspections and patrols would involve the use of vehicles in areas where there is suitable vehicle access.

Maintenance activities would include repairing damaged conductors, inspecting and repairing structures, replacing damaged and broken insulators, and tightening hardware.

Basin Electric would maintain any gates it initially installs and continually uses for access.

Basin Electric would remove trees that pose a clearance or safety problem to the operation of the transmission line. Specific requirements of the National Electric Reliability Council will be followed. This activity would be completed in accordance with the landowner easement.

Treatment of vegetation within the Project Corridors would include the selective removal of trees to prevent contact with the transmission line conductors. Disposal of cut trees and/or shrubs would be in a manner acceptable to the landowner and in accordance with applicable state waste management rules. The need for tree and/or shrub removal is expected to be minimal as areas with trees and/or shrubs are generally avoided when possible during detailed routing.

8.4 Tande to Saskatchewan

Based on the border crossing location identified for the Tande to Saskatchewan circuit (Figure 3), the majority of the Tande to Saskatchewan transmission line is expected to be constructed within Williams and Divide Counties, with a short segment within Mountrail County near the Tande Substation. Depending on the final transmission alignment, it is possible part of the transmission line may extend into Burke County.

8.5 Wheelock to Saskatchewan

Based on the border crossing location identified for the Wheelock circuit (Figure 6), the Wheelock to Saskatchewan circuit is expected to be constructed within Williams and Divide Counties.

9 Additional Permitting Requirements

9.1 Corridor Certificate and Route Permit (North Dakota Public Service Commission)

Requirements for the ND Corridor Certificate and Route Permit can be found in North Dakota Century Code Section 49-22-05.1. Table 11 and Table 12 summarize the North Dakota PSC exclusion and avoidance area criteria.

Table 11 North Dakota PSC Exclusion Area Criteria

Exclusion Area Criteria
Designated or registered national: parks; memorial parks; historic sites and landmarks; natural landmarks; monuments; and wilderness areas.
Designated or registered state: parks; historic sites; monuments; historical markers; archaeological sites; and nature preserves.
County parks and recreational areas; municipal parks; and parks owned or administered by other governmental subdivisions.
Areas critical to the life stages of threatened or endangered animal or plant species.
Areas where animal or plant species that are unique or rare to this state will be irreversibly damaged.
Areas within 1,200 feet of the geographic center of an intercontinental ballistic missile (ICBM) launch or launch control facility.
Areas within 30 feet on either side of a direct line between ICBM launch or launch control facilities to avoid microwave interference.

Table 12 North Dakota PSC Avoidance Area Criteria

Avoidance Area Criteria
Designated or registered national: historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.
Designated or registered state: wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands.
Historical resources which are not specifically designated as exclusion or avoidance areas.
Areas which are geologically unstable.
Within 500 feet of a residence, school, or place of business.
Reservoirs and municipal water supplies.
Water sources for organized rural water districts.
Irrigated land.
Areas of recreational significance which are not designated as exclusion areas.

In addition to the prescriptive exclusion and avoidance areas reviewed, the NDPSC selection and policy criteria guide and inform the agency's decisions on projects (Table 13 and Table 14). Selection criteria

generally emphasize the minimization of impacts to various environmental and social resources, while policy criteria allow the agency to provide preference to projects that utilize local resources and focus on conservation.

Table 13 North Dakota PSC Selection Criteria

Selection Criteria
The impact upon agriculture:
Agricultural production.
Family farms and ranches.
Land which the owner demonstrates has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation.
Surface drainage patterns and ground water flow patterns.
The impact upon:
Sound-sensitive land uses.
The visual effect on the adjacent area.
Extractive and storage resources.
Wetlands, woodlands, and wooded areas.
Radio and television reception, and other communication or electronic control facilities.
Human health and safety.
Animal health and safety.
Plant life.

Table 14 North Dakota PSC Policy Criteria

Policy Criteria
Location and design.
Training and utilization of available labor in this state for the general and specialized skills required.
Economies of construction and operation.
Use of citizen coordinating committees.
A commitment of a portion of the transmitted product for use in this state.
Labor relations.
The coordination of facilities.
Monitoring of impacts.
Utilization of existing and proposed rights of way and corridors
Other existing or proposed transmission facilities.

Table 15 lists the NDPSC decision-making process also includes several "factors to be considered." These factors discuss and evaluate both positive and adverse effects resulting from project development.

Table 15 North Dakota PSC Factors to be Considered

Factors to be Considered
Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment.
The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.
The potential for beneficial uses of waste energy from a proposed energy conversion facility.
Adverse direct and indirect environmental effects which cannot be avoided should the proposed site be designated.
Alternatives to the proposed site which are developed during the hearing process and which minimize adverse effects.
Irreversible and irretrievable commitments of natural resources should the proposed site be designated.
The direct and indirect economic impacts of the proposed facility.
Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.
The effect of the proposed site on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.
The effect of the proposed site on areas which are unique because of biological wealth or because they are habitats for rare and endangered species.
Problems raised by federal agencies, other state agencies, and local entities.

9.2 County Conditional Use Permits, Special Use Permits

The projects may require local conditional use permitting from the following counties:

- Williams
- Mountrail
- Burke
- Divide

Townships within the listed counties may have additional permitting requirements.

9.3 Potential Agency Permits and Approvals Required

Required permits depend on the final project layout and alignment. Table 16 lists potential permits that may be required for the projects.

Table 16 Summary of Potentially Applicable Permits/Approvals/Authorizations

Federal	
United States Army Corps of Engineers	Section 404 Permit
U.S. Environmental Protection Agency	Spill Prevention, Control, and Countermeasure Plan
U.S. Fish and Wildlife Service USFWS	Special Use Permit (Required for ROW on Grassland Easements)
State of North Dakota	
North Dakota Public Service Commission	Certificate of Site Compatibility and Route Permit Transmission Facility
North Dakota State Historic Preservation Office SHPO	Concurrence with effect determinations
North Dakota Department of Environmental Quality	National Pollutant Discharge Elimination System Permit: General Construction Storm Water
	401 Water Quality Certification
North Dakota Highway Patrol	Oversize/Overweight Permit
North Dakota Department of Transportation	Road Approach/Access Permit
	Utility Permit/Risk Management Documents
North Dakota State Water Commission	Drainage Permit
	Conditional or Temporary Permit for water appropriation
	Water Permit
North Dakota Department of Trust Lands NDDTL	Rights-of-Way Easement

10 Applicant Signature

The original of each application shall be signed and verified under oath by an officer of the applicant having knowledge of the matters therein set forth (Appendix L).

11 Qualifications of Contributors

Name	Responsibilities	Education and Experience
Basin Electric Power Cooperative		
Anine Merkens	Legal Counsel	B.S. Natural Resources Management J.D. Law Licensed to practice law in North Dakota 9 Years of experience
Bobby Nasset	Project Manager	B.S. Civil Engineering Registered Professional Engineer 15 Years of Experience
Erin Dukart	Environmental/Permitting	B.S. Biology 14 Years of Experience
Shane Vasbinder	Project Engineer	B.S. Civil Engineering Registered Professional Engineer 15 Years of Experience
Mike Murray	Right-of-Way	A.A. Business Administration B.S. Management SR/WA (Senior ROW designation) 26 Years of Experience
Jason Brekke	GIS Analyst	B.S. Geography 18 Years of Experience
Metcalf Archaeological Consultants, Inc.		
Damita Engel	Cultural Resource Inventory	B.A. Anthropology Master of Anthropology, Specialization in Cultural Resource 31 Years of Experience
Western EcoSystems Technology, Inc.		
Chad Tucker	Natural Resources Inventory and Report	B.S. Wildlife Fisheries Science 19 Years of Experience
Barr Engineering Co.		
Kevin Solie	Technical Review	B.S Geological Engineering M.S. Geology Registered Professional Engineer 32 Years of Experience
Shanna Braun	Technical Review	B.S. Natural Resources Management M.S. Water Resources Science 19 Years of Experience
Lisa Ungar	Technical Editing/Formatting	35 Years of Experience

12 Acronyms and Abbreviations

<	less than
APE	area of potential effect
ATSS	Aggregate Transmission Service Study
BGEPA	Bald and Golden Eagle Protection Act
CFR	Code of Federal Regulations
CRP	Conservation Reserve Program
DOE	U.S. Department of Energy
DTT	Direct Transfer Trip
EMR	electromagnetic radiation
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FSA	Farm Service Agency
GDO	Grid Development Office
Hz	hertz
IEC	International Electrotechnical Commission
IPaC	Information for Planning and Conservation
ISD	in-service date
kA^2/sec	kiloamperes squared per second
kHz	kilohertz
kV	kilovolt
MHz	megahertz
MW	megawatts
NAIP	National Agriculture Imagery Program
ND SHPO	North Dakota State Historic Preservation Office
ND	North Dakota
NDDTL	North Dakota Department of Trust Lands
NDGF	North Dakota Game and Fish Department
NDPSC	North Dakota Public Service Commission
NESC	National Electrical Safety Code
NHD	National Hydrology Dataset
NHPA	National Historic Preservation Act of 1966
NLEB	northern long-eared bad
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
OPGW	optical ground wire
PTs	potential transformers
ROW	right-of-way
RUS	Rural Utilities Service
SaskPower	Saskatchewan Power Corporation
SCADA	Supervisory Control and Data Acquisition

SOTF	switch-on-to-fault

SPP	Southwest Power Pool
SVS(s)	Static Var System(s)
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
WEST	Western EcoSystems Technology, Inc.
WNS	white-nose syndrome
WPA	Waterfowl Production Area
yd^3	cubic yards

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