APPLICATION TO THE PUBLIC UTILITIES COMMISSION OF THE STATE OF SOUTH DAKOTA FOR A FACILITY PERMIT

CROWNED RIDGE TRANSMISSION LINE AND NEW REACTIVE POWER COMPENSATION SUBSTATION

Crowned Ridge Wind, LLC

OCTOBER 27, 2017

Table of Contents

1.1 Executive Summary 2-1
1.2 Completeness Checklist 2-2
2.0 Description of the Nature and Location of the Project 2-8
2.1 The Project 2-9
3.0 Name of Owner, Manager, and Participants (ARSD 20:10:22:06; 20:10:22:07) 3-11
4.0 Purpose of the Transmission Facility (ARSD 20:10:22:08) 4-11
5.0 Estimated Cost of Facility (ARSD 20:10:22:09) 5-12
6.0 Demand for Transmission Facility (ARSD 20:10:22:10) 6-12
7.0 General Site Description (ARSDS 20:10:22:11) 7-12
8.0 Alternative Sites (ARSD 20:10:22:12) 8-13
8.1 Route Identification and Selection Process 8-17
8.2 Project Route 8-17
9.0 Environmental Information (ARSD 20:10:22:13) 9-17
10.0 Effect on Physical Environment (ARSD 20:10:22:14) 10-18
10.1 Existing Environment 10-18
10.1.1 Description of Land Forms 10-18
10.1.2 Geological Features and Constraints 10-19
10.1.3 Economic Deposits 10-20
10.1.4 Seismic Risks 10-20
10.1.5 Soils 10-20
10.1.6 Prime Farmland 10-21
10.2 Potential Impacts 10-21
10.2.1 Soils 10-22
10.2.2 Prime Farmland Impacts 10-22
10.2.3 Mitigation 10-23
11.0 Hydrology (ARSD 20:10:22:15) 11-24
11.1 Existing Environment 11-24
11.1.1 Rivers and Streams 11-24
11.1.2 Wetlands 11-25
11.1.3 Groundwater Resources 11-26
11.2 Potential Impacts 11-26

11.2.1 Rivers and Streams 11-26
11.2.2 Wetlands 11-26
11.2.3 Groundwater Resources 11-27
11.3 Mitigation 11-28
12.0 Effect on Terrestrial Ecosystems (ARSD 20:10:22:16) 12-28
12.1 Existing Environment 12-28
12.1.1 Methods 12-28
12.1.2 Terrestrial Vegetation and Wildlife Cover/Habitat Types 12-28
12.1.3 State and Federally Listed Plant Species 12-31
12.1.4 State and Federally Listed Terrestrial Wildlife 12-31
12.2 Potential Impacts 12-33
12.2.1 Prairie Butterflies Dakota Skipper (Federally Threatened) and Poweshiek Skipperling (Federally Endangered) 12-33
12.2.2 Northern Long-eared Bat (Federally Threatened) 12-34
12.2.3 Northern River Otter (State Threatened) 12-34
12.2.4 Bald Eagle and Golden Eagle (Protected under Bald and Golden Eagle Protection Act). 12-35
12.2.5 Osprey (State Threatened) 12-36
12.2.6 Piping Plover (Federally and State Threatened) 12-36
12.2.7 Red Knot (Federally Threatened) 12-36
12.2.8 Whooping Crane (Federally and State Endangered) 12-37
12.3 Mitigation 12-37
13.0 Effect on Aquatic Ecosystems (ARSD 20:10:22:17) 13-38
13.1 Existing Environment 13-38
13.1.1 State and Federally Listed Aquatic Wildlife 13-39
13.2 Potential Impacts 13-40
13.2.1 Northern Redbelly Dace (State Threatened) 13-40
13.2.2 Blacknose Shiner (State Endangered) 13-40
13.2.3 Topeka Shiner (Federally Endangered) 13-40
13.3 Mitigation 13-41
14.0 Land Use (ARSD 20:10:22:18) 14-41
14.1 Current Land Use 14-41

14.1.1 Existing Environment 14-41
14.1.2 Potential Impacts 14-42
14.1.3 Mitigation 14-42
14.2 Displacement 14-43
14.2.1 Existing Environment 14-43
14.2.2 Potential Impacts 14-43
14.2.3 Mitigation 14-44
14.3 Noise 14-44
14.3.1 Existing Environment 14-44
14.3.2 Potential Impacts 14-45
14.3.3 Mitigation 14-46
14.4 Satellite, Cellular, Radio, TV, and GPS Reception 14-46
14.4.1 Existing Environment 14-47
14.4.2 Potential Impacts 14-47
14.4.3 Mitigation 14-47
14.5 Aesthetics 14-48
14.5.1 Existing Environment 14-48
14.5.2 Potential Impacts 14-48
14.5.3 Mitigation 14-48
15.0 Local Land Use Controls (ARSD 20:10:22:19) 15-49
16.0 Water Quality (ARSD 20:10:22:20) 16-49
16.1 Existing Environment 16-49
16.2 Potential Impacts 16-49
16.3 Mitigation 16-49
17.0 Air Quality (ARSD 20:10:22:21) 17-50
17.1 Existing Environment 17-50
17.2 Potential Impacts 17-51
17.3 Mitigation 17-51
18.0 Time Schedule (ARSD 20:10:22:22) 18-52
19.0 Community Impact (ARSD 20:10:22:23) 19-52
19.1 Socioeconomic and Community Resources 19-52
19.1.1 Existing Environment 19-52

19.1.2 Impacts and Mitigation 19-55
19.2 Agriculture 19-56
19.2.1 Existing Environment 19-56
19.2.2 Impacts and Mitigation 19-57
19.3 Transportation 19-57
19.3.1 Existing Environment 19-58
19.3.2 Impacts and Mitigation 19-58
19.4 Cultural Resources 19-58
19.4.1 Existing Environment 19-59
19.4.2 Current Level III Survey for Cultural Resources and Architectural History Survey 19-61
19.4.3 Avoidance of Potential Impacts 19-62
19.4.4 Mitigation 19-62
20.0 Employment Estimates (ARSD 20:10:22:24) 20-63
21.0 Future Additions and Modifications (ARSD 20:10:22:25) 21-63
22.0 Transmission Facility Layout and Construction (ARSD 20:10:22:34) 22-63
22.1 Route Clearing 22-63
22.2 Transmission Construction Procedures 22-64
22.2.1 Equipment Delivery and Transportation 22-64
22.2.2 Excavation, Foundations, and Structure Erection 22-64
22.2.3 Transmission Line Conductor Stringing 22-64
22.2.4 Access Roads 22-65
22.3 Restoration Procedures 22-65
22.4 Maintenance Procedures 22-65
23.0 Information Concerning Transmission Facilities (ARSD 20:10:22:35) 23-66
23.1 Configuration of Towers 23-67
23.2 Conductor Configuration 23-69
23.3 Proposed Transmission Site and Major Alternatives 23-69
23.4 Reliability and Safety 23-69
23.4.1 Transmission Line Reliability 23-69
23.4.2 Safety 23-69
23.4.3 Electric and Magnetic Fields 23-70
23.4.4 Stray Voltage 23-75

23.4.5 Farming Operations, Vehicle Use, and Metal Buildings Near Power Lines 23-76
23.4.6 ROW 23-76
23.4.7 Necessary Clearing Activities 23-76
23.4.8 Underground Transmission 23-77
24.0 List of Potential Permits (ARSD 20:10:22:05) 24-77
25.0 Additional Information in Application (ARSD 20:10:22:36) 25-79
26.0 Testimony And Exhibits (ARSD 20:10:22:39) 26-79
27.0 Applicant's Verification 27-81
28.0 References 28-82

List of Exhibits

Exhibit 1 Map of Transmission Line

Exhibit 2 Map Book

Exhibit 3 Wider Area View of Project

Exhibit 4 Map of State and Federal Lands

Exhibit 5 Topography

Exhibit 6 Quaternary Surficial Geology

Exhibit 7 Bedrock Geology

Exhibit 8 Water Resources

Exhibit 9 Aquifers

Exhibit 10 Land Cover

List of Appendices

Appendix A Location Description

Appendix B MISO Studies and Agreements

Appendix C Agency Correspondence

Appendix D Soils information

Appendix E Cultural Survey, Level 1

Appendix F Transmission Structure Drawings for Single Circuit Line

Appendix G Transmission Structure Drawings Double Circuit Line

1.1 Executive Summary

Crowned Ridge Wind, LLC (the Applicant), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC (NEER),[1] proposes to construct a new reactive power compensation substation and an approximately 34-mile 230-kilovolt (kV) generation tie line that will connect two 300 megawatt (MW) wind projects (Crowned Ridge Wind (CRW) and Crowned Ridge Wind II (CRW II)) to the Big Stone South Substation owned by Otter Tail Power Company[2] (together the new reactive power compensation substation and 34-mile generation tie line is the Project). The generation tie line will be located in Codington and Grant Counties, South Dakota, while the new reactive compensation substation will be located in Grant County.

The Application sets forth single circuit and double circuit transmission design options for the Project. At this time, both the single and double circuit design options are under consideration. The studies that will determine whether the Applicant selects the single circuit or double circuit option will be completed within approximately 120 days of the submission of this Application. Once the studies are complete, the Applicant will file a statement in the docket explaining which option – single circuit or double circuit – has been selected for the Project.

CRW has executed a power purchase agreement (PPA) with Northern States Power (NSP) to sell NSP the full output of CRW, while CRW has entered into a purchase and sale agreement (PSA) under which it will permit and construct CRW II, and, thereafter, transfer the plant to NSP at the commercial operations date. The commercial operation dates for the CRW and CRW II are projected to be December 31, 2019.

On July 6, 2017, the Minnesota Public Service Commission approved NSP's Petition for Approval of the Acquisition of Wind Generation from the Company's 2016-2030 Integrated Resource Plan, which included a PPA with CRW and the acquisition of CRW II. NSP's PPA with CRW and the associated acquisition of CRW II are currently under consideration at the North Dakota Public Utilities Commission.[3]

The Applicant has worked closely with federal and state agencies, landowners, and tribal and local governments to design the route and siting of the transmission line. The Applicant will

[1] NEER through its affiliated entities is the world's largest generator of renewable energy from the wind and sun. Affiliates of NEER also own approximately 8,500 circuit miles of high-voltage transmission lines or generation ties and 770 of substations in North America.

[2] Later in 2017 or early 2018, separate applications for Facility Permits will be filed to construct CRW and CRW II, and a Facility Permit for an approximately 14 mile transmission line to connect CRW II to the collector substation associated with CRW.

[3] *Northern States Power Advance Prudence – 1550 MW Wind Application,* North Dakota Public Service Commission, Case No. PU-17-120.

continue this collaborative process throughout the development, construction and operation phases of the Project.

1.2 Completeness Checklist

Consistent with South Dakota Codified Law (SDCL) 49-1-8 and Administrative Rules of South Dakota (ARSD) 20:10:13:01(1), Table 1 sets forth the Commission filing requirements with an identification of where the requirement is addressed in this Application.

Table 1. Completeness Checklist

SDCL	ARSD	Required Information	Location in Application
49-41B-11(1)	20:10:22:06	**Names of participants required.** The application shall contain the name, address, and telephone number of all persons participating in the proposed facility at the time of filing, as well as the names of any individuals authorized to receive communications relating to the application on behalf of those persons.	3.0
49-41B-11(7)	20:10:22:07	**Name of owner and manager.** The application shall contain a complete description of the current and proposed rights of ownership of the proposed facility. It shall also contain the name of the project manager of the proposed facility.	3.0
49-41B-11(8)	20:10:22:08	**Purpose of facility.** The applicant shall describe the purpose of the proposed facility.	4.0
49-41B-11(12)	20:10:22:09	**Estimated cost of facility.** The applicant shall describe the estimated construction cost of the proposed facility.	5.0
49-41B-11(9)	20:10:22:10	**Demand for facility.** The applicant shall provide a description of present and estimated consumer demand and estimated future energy needs of those customers to be directly served by the proposed facility. The applicant shall also provide data, data sources, assumptions, forecast methods or models, or other reasoning upon which the description is based. This statement shall also include information on the relative contribution to any power or energy distribution network or pool that the proposed facility is projected to supply and a statement on the consequences of delay or termination of the construction of the facility.	6.0
49-41B-11	20:10:22:11	**General site descriptions.** The application shall contain a general site description of the proposed facility including a description of the specific site and its location with respect to state, county, and other political subdivisions; a map showing prominent features such as cities, lakes and rivers; and maps showing cemeteries, places of historical significance, transportation facilities, or other public facilities adjacent to or abutting the plant or transmission site.	7.0
49-41B-11(6);34A-9-7(4)	20:10:22:12	**Alternative sites.** The applicant shall present information related to the selection of the proposed site for the facility, including the following: (1) The general criteria used to select alternative sites, how these criteria were measured and weighed, and reasons for selecting these criteria; (2) An evaluation of alternative sites considered by the applicant for the facility;	8.0

SDCL	ARSD	Required Information	Location in Application
		(3) An evaluation of the proposed plant or transmission site and its advantages over the other alternative sites considered by the applicant, including a discussion of the extent to which reliance upon eminent domain powers could be reduced by use of an alternative site, alternative generation method, or alternative waste handling method.	
49-41B-11(11); 49-41B-22(2)	20:10:22:13	**Environmental information.** The applicant shall provide a description of the existing environment at the time of the submission of the application, estimates of changes in the existing environment which are anticipated to result from construction and operation of the proposed facility, and identification of irreversible changes which are anticipated to remain beyond the operating lifetime of the facility. The environmental effects shall be calculated to reveal and assess demonstrated or suspected hazards to the health and welfare of human, plant and animal communities which may be cumulative or synergistic consequences of siting the proposed facility in combination with any operating energy conversion facilities, existing or under construction. The applicant shall provide a list of other major industrial facilities under regulation which may have an adverse effect of the environment as a result of their construction or operation in the transmission site or siting area.	9.0-19.0
49-41B-11(11); 49-41B-22(2)	20:10:22:14	**Effect on physical environment.** The applicant shall provide information describing the effect of the proposed facility on the physical environment. The information shall include: (1) A written description of the regional land forms surrounding the transmission site or through which the transmission facility will pass; (2) A topographic map of the transmission site or siting area; (3) A written summary of the geological features of the or transmission site using the topographic map as a base showing the bedrock geology and surficial geology with sufficient cross-sections to depict the major subsurface variations in the siting area; (4) A description and location of economic deposits such as lignite, sand and gravel, scoria, and industrial and ceramic quality clay existent within the transmission site; (5) A description of the soil type at the transmission site; (6) An analysis of potential erosion or sedimentation which may result from site clearing, construction, or operating activities and measures which will be taken for their control; (7) Information on areas of seismic risks, subsidence potential and slope instability for the transmission site; and (8) An analysis of any constraints that may be imposed by geological characteristics on the design, construction, or operation of the proposed facility and a description of plans to offset such constraints.	10.0
49-41B-11(11); 49-41B-22(2)	20:10:22:15	**Hydrology.** The applicant shall provide information concerning the hydrology in the area of the proposed plant or transmission site and the effect of the proposed site on surface and groundwater. The information shall include:	11.0

SDCL	ARSD	Required Information	Location in Application
		(1) A map drawn to scale of the plant or transmission site showing surface water drainage patterns before and anticipated patterns after construction of the facility; (2) Using plans filed with any local, state, or federal agencies, indication on a map drawn to scale of the current planned water uses by communities, agriculture, recreation, fish, and wildlife which may be affected by the location of the proposed facility and a summary of those effects; (3) A map drawn to scale locating any known surface or groundwater supplies within the siting area to be used as a water source or a direct water discharge site for the proposed facility and all offsite pipelines or channels required for water transmission; (4) If aquifers are to be used as a source of potable water supply or process water, specifications of the aquifers to be used and definitions of their characteristics, including the capacity of the aquifer to yield water, the estimated recharge rate, and the quality of ground water; (5) A description of designs for storage, reprocessing, and cooling prior to discharge of heated water entering natural drainage systems; (6) If deep well injection is to be used for effluent disposal, a description of the reservoir storage capacity, rate of injection, and confinement characteristics and potential negative effects on any aquifers and groundwater users which may be affected.	
49-41B-11(11);49-41B-22(2)	20:10:22:16	**Effect on terrestrial ecosystems**. The applicant shall provide information on the effect of the proposed facility on the terrestrial ecosystems, including existing information resulting from biological surveys conducted to identify and quantify the terrestrial fauna and flora potentially affected within the transmission site, or siting area; an analysis of the impact of construction and operation of the proposed facility on the terrestrial biotic environment, including breeding times and places and pathways of migration; important species; and planned measures to ameliorate negative biological impacts as a result of construction and operation of the proposed facility.	12.0
49-41B-11(11);49-41B-22(2)	20:10:22:17	**Effect on aquatic ecosystems**. The applicant shall provide information of the effect of the proposed facility on aquatic ecosystems, and including existing information resulting from biological surveys conducted to identify and quantify the aquatic fauna and flora, potentially affected within the transmission site, or siting area, an analysis of the impact of the construction and operation of the proposed facility on the total aquatic biotic environment and planned measures to ameliorate negative biological impacts as a result of construction and operation of the proposed facility.	13.0
49-41B-11(11) 49-41b-22(2)	20:10:22:18	**Land use.** The applicant shall provide the following information concerning present and anticipated use or condition of the land: (1) A map or maps drawn to scale of the transmission site identifying existing land use according to the following	14.0

SDCL	ARSD	Required Information	Location in Application
		classification system: (a) Land used primarily for row and nonrow crops in rotation; (b) Irrigated lands; (c) Pasturelands and rangelands; (d) Haylands; (e) Undisturbed native grasslands; (f) Existing and potential extractive nonrenewable resources; (g) Other major industries; (h) Rural residences and farmsteads, family farms, and ranches (i) Residential; (j) Public, commercial, and institutional use; (k) Municipal water supply and water sources for organized rural water systems; and (l) Noise sensitive land uses; (2) Identification of the number of persons and homes which will be displaced by the location of the proposed facility; (3) An analysis of the compatibility of the proposed facility with present land use of the surrounding area, with special attention paid to the effects on rural life and the business of farming; and (4) A general analysis of the effects of the proposed facility and associated facilities on land uses and the planned measures to ameliorate adverse impacts.	
49-41B-11; 49-41B-28	20:10:22:19	**Local land use controls**. The applicant shall provide a general description of local land use controls and the manner in which the proposed facility will comply with the local land use zoning or building rules, regulations or ordinances. If the proposed facility violates local land use controls, the applicant shall provide the commission with a detailed explanation of the reasons why the proposed facility should pre-exempt the local controls. The explanation shall include a detailed description of the restrictiveness of the local controls in view of existing technology, factors of cost, economics, needs of parties, or any additional information to aid the commission in determining whether a permit may supersede or preempt a local control pursuant to SDCL.49-41B-28.	15.0
49:41B-11	20:10:22:20	**Water quality.** The applicant shall provide evidence that the proposed facility will comply with all water quality standards and regulations of any federal or state agency having jurisdiction and any variances permitted.	16.0
49-41B-11;49-41B-22	20:10:22:21	**Air quality.** The applicant shall provide evidence that the proposed facility will comply with all air quality standards and regulations of any federal or state agency having jurisdiction and any variances permitted.	17.0
49-41B-11(3)	20:10:22:22	**Time schedule**. The applicant shall provide estimated time schedules for accomplishment of major events in the commencement and duration of construction of the proposed facility.	18.0
49-41B-11(#); 49-41B-22	20:10:22:23	**Community impact**. The applicant shall include an identification and analysis of the effects the construction, operation, and	19.0

SDCL	ARSD	Required Information	Location in Application
		maintenance of the proposed facility will have on the anticipated affected area including the following: (1) A forecast of the impact on commercial and industrial sectors, housing, land values, labor market, health facilities, energy, sewage and water, solid waste management facilities, fire protection, law enforcement, recreational facilities, schools, transportation facilities, and other community and government facilities or services; (2) A forecast of the immediate and long-range impact of property and other taxes of the affected taxing jurisdictions; (3) A forecast of the impact on agricultural production and uses; (4) A forecast of the impact on population, income, occupational distribution, and integration and cohesion of communities; (5) A forecast of the impact on transportation facilities; (6) A forecast of the impact on landmarks and cultural resources of historic, religious, archaeological, scenic, natural, or other cultural significance. The information shall include the applicant's plans to coordinate with the local and state office of disaster services in the event of accidental release of contaminants from the proposed facility; and (7) An indication of means of ameliorating negative social impact of the facility development.	
49-41B-11	20:10:22:24	**Employment estimates.** The application shall contain the estimated number of jobs and a description of job classifications, together with estimated annual employment expenditures of the applicants, the contractors, and the subcontractors during the construction phase of the proposed facility. In a separate tabulation, the application shall contain the same data with respect to the operating life of the proposed facility, to be made for the first ten years of commercial operation in one-year intervals. The application shall include plans of the applicant for utilization and training of the available labor force in South Dakota by categories of special skills required. There shall also be an assessment of the adequacy of local manpower to meet temporary and permanent labor requirements during construction and operation of the proposed facility and the estimated percentage that will remain within the country and the township in which the facility is located after construction is completed.	20.0
49-41B-11(5)	20:10:22:25	**Future additions and modifications**. The applicant shall describe any plans for future modification or expansion of the proposed facility or construction of additional facilities which the applicant may wish to be approved in the permit.	21.0
49-41B-11	20:10:22:34	**Transmission facility layout and construction**. If a transmission facility is proposed, the applicant shall submit a policy statement concerning the route clearing, construction and landscaping operations, and a description of plans for continued right-of-way maintenance, including stabilization and weed control.	22.0
49-41B-11(2)(11)	20:10:22:35	**Information concerning transmission facilities**. If a transmission	23.0

SDCL	ARSD	Required Information	Location in Application
		facility is proposed, the applicant shall provide the following information as it becomes available to the applicant: (1) Configuration of the towers and poles, including material, overall height and width, (2) Conductor configuration and size, length of span between structures, and number of circuits per pole or tower, (3) The proposed transmission site and major alternatives as depicted on overall photographs and land use culture maps, (4) Reliability and safety; (5) Right-of-way or condemnation requirements; (6) Necessary clearing activities; and (7) If the transmission facility is placed underground, the depth of burial, distance between access points, conductor configuration and size, and number of circuits.	
49-41B-7; 49-41B-22	20:10:22:36	**Additional information in application**. The applicant shall also submit as part of the application any additional information necessary for the local review committees to assess the effects of the proposed facility pursuant to SDCL 49-41B-7. The applicant shall also submit as part of its application any additional information necessary to meet the burden of proof specified in SDCL 49-41B-22.	25.0
	20:10:22:37	**Statement required describing gas or liquid transmission line standards of construction.** The applicant shall submit a statement describing existing pipeline standards and regulations that will be followed during construction and operation of the proposed transmission facility.	Not applicable
	20:10:22:38	**Gas or liquid transmission line description.** The applicant shall provide the following information describing the proposed gas or liquid transmission line: (1) A flow diagram showing daily design capacity of the proposed transmission facility. (2) Changes in flow in the transmission facilities connected to the proposed facility; (3) Technical specifications of the pipe proposed to be installed, including the certified maximum operating pressure, expressed in terms of pounds per square inch gauge (psig); (4) A description of each new compressor station and the specific operating characteristics of each station; and (5) A description of all storage facilities associated with the proposed facility.	Not applicable
	20:10:22:05	**List of Permits.** The application for a permit for a facility shall contain a list of each permit that is known to be required from any other governmental entity at the time of the filing. The list of permits shall be updated, if needed, to include any permit the applicant becomes aware of after filing the application. The list shall state when each permit application will be filed. The application shall also list each notification that is required to be made to any other governmental entity.	24.0
	20:10:22:39	Upon the filing of an application pursuant to SDCL 49-41B-11, an	26

SDCL	ARSD	Required Information	Location in Application
		applicant shall also file all data, exhibits, and related testimony which the applicant intends to submit in support of its application. The application shall specifically show the witnesses supporting the information contained in the application	

2.0 Description of the Nature and Location of the Project

The Project will consist of a new reactive power compensation substation in Grant County and approximately 34 miles of single or double-circuit 230 kV transmission line located in Codington and Grant Counties, South Dakota. The Project is required to connect the proposed CRW and CRW II with the Big Stone South 230 kV Substation located near Big Stone, South Dakota. The Project Construction Easement refers to the 150-foot (ft.) right-of-way (ROW) that is typically 75 ft. on each side of the transmission line centerline. The Project Study Area includes a 1-mile-wide corridor (0.5 mile on each side of the Project centerline).

Single Circuit Option

With respect to the single circuit option, the Applicant proposes to use tubular steel transmission structures (also referred to as poles) with a height of approximately 120 ft. There is also a potential for a few double-pole angle and deadened structures. The Project will have average spans between poles of 600 to 1,000 ft., although the spans will vary depending on geological or engineering constraints identified during final design.

The temporary impacts for the construction of the Project will occur within the Project Construct Easement and the approximately 2,500 square ft. per pole temporary laydown areas. Stringing locations at specific intervals along the Project route will require a larger temporary easement of approximately 40,000 square ft. (0.9 acre) per location.

The Project's permanent impacts will be approximately 75 square ft. per pole. The Project is expected to span wetlands and waterways wherever feasible, thereby minimizing direct impacts on these areas. Also, the Applicant is working with landowners on their preferences for the placement of poles to minimize farming impacts.

The single circuit option includes a reactive power compensation substation to be located east of the Big Stone South Substation. The substation will require approximately 12 acres of land. The purpose of this substation is to assist in the delivery of energy from CRW and CRW II to the Big Stone South Substation with minimal transmission losses. The reactive power compensation substation will be constructed, maintained and operated by the Applicant. The reactive power compensation substation will contain a series capacitor bank along with shunt capacitor banks.

Double Circuit Option

With respect to the double circuit option, the Applicant proposes to use tubular steel transmission structures with a height of approximately 140 ft. The double circuit option will require multi-pole angle and dead-end structures. The Project will have average spans of 600 to 1,000 ft. between poles, although the spans will vary depending on geological or engineering constraints identified during final design. The Project Construction Easement would be the same as the single circuit option: 150 ft. wide, 75 ft. either side of the Project centerline.

Similar to the single circuit option, the poles will be placed inside private land leased to the Applicant and generally will be placed along public road ROW consistent with county setback requirements for county roads. The Project's permanent impacts will be approximately 75 square ft. per pole. The Project is expected to span wetlands and waterways wherever feasible, thereby minimizing direct impacts on these areas. Also, the Applicant is working with landowners on their preferences for the placement of poles to minimize farming impacts.

The Project's temporary and permanent impacts under the double circuit option are essentially the same as set forth above for the single circuit option, with the diameter of the single circuit structure being typically less than 10 ft. and the double circuit structure less than 12 ft.

The double circuit option includes a reactive power compensation substation to be located east of the Big Stone South Substation and will require approximately 12 acres of land. The purpose of this substation is to assist in the delivery of energy from CRW and CRW II to the Big Stone South Substation with minimal losses. The reactive power compensation substation will be constructed, maintained and operated by the Applicant. The reactive power compensation substation will contain capacitor banks.

Under both the single and double circuit options, the Applicant does not anticipate significant deviations from the proposed route described in this Application, and the Applicant will work within the Project Study Area identified in the Application. The Applicant will make the appropriate filing for any deviation outside the 1-mile corridor.

2.1 The Project

The Project is located in Codington and Grant Counties. See **Exhibit 1** for a Project Overview and **Exhibit 2** for an aerial view of the Project. **Exhibits 1** and **2** and the below description are equally applicable to the single and double circuit option.

The Project begins at the 230kV high side of the collector substation for CRW, which is planned to be constructed southeast of 161st Street and 464th Avenue, approximately 4 miles south of South Shore, South Dakota.[4] From the CRW collector substation, the Project heads east and

[4] All mileage set forth are approximations.

turns north to cross 161st Street. After crossing 161st Street, the Project goes directly north for 1 mile, crosses 160th Street and turns 90 degrees to the east. The Project then heads east along 160th Street for 2.5 miles to properly avoid approximately 1 mile of grassland easements, then turns northeast just past 467th Avenue. This portion of the Project has been routed to avoid sensitive cultural resources and wetlands, running for 1.5 miles before crossing north of 159th Street. The Project continues to run northeast another 2.5 miles as it crosses 469th and 470th Avenues. It crosses Cemetery Road Street as it runs directly east for 1 mile and also crosses a railroad. The Project then runs northeast for 1 mile, turns directly east to cross 472nd Avenue and continues east for 0.5 mile. The Project then runs north for 1.5 miles to cross 156th Street. The Project then turns and runs east along 156th Street for 3 miles before turning northeast for 0.75 mile to avoid two local residences, then east for 1 mile to cross 477th Avenue. The project then turns north and continues along 477th Avenue for 1.7 miles before turning east and running 1 mile through open farm land to avoid another residence. The Project then crosses 478th Avenue, turns north and continues for 0.75 miles. After crossing 153rd Street, the Project turns northeast for 0.5 miles and then directly north for 0.75 miles to avoid two residences. The Project then turns east along 152nd Street for 0.5 mile, where it then turns north to run along the west side of 479th Avenue for 1 mile. The Project then turns east, remaining on the south side of 151st Street for approximately 2 miles to avoid the city of Milbank before crossing 151st Street and 481st Avenue and turning north for 0.75 miles. The Project then turns east to run along 150th Street for 2 miles. It then turns north and runs 3.5 miles along 483rd Avenue where transmission infrastructure has been strategically placed to avoid areas of sensitive cultural resources. The Project then banks to the northeast as it approaches Highway 12 and then runs east for 1 mile. The final 1.5 miles of the Project runs north to where the Project crosses Highway 12. The Applicant will coordinate with the existing transmission operators for any potential transmission line crossings needed before entering the Project's point of interconnection at the Big Stone South 230 kV Substation. **Appendix A** lists each section, township, and range crossed by the Project Study Area.

The Project contains three 200 MW interconnection queues. To date, CRW and CRW II have received signed Generation Interconnection Agreements (GIA) for up to 400 MW of interconnection, Midcontinent Independent System Operator (MISO) queue G736 and J442. The third interconnection anticipates receiving its final system impact study in December 2018, and executing a GIA during first quarter of 2019. The execution of the GIA will ensure that the needed transmission upgrades are completed so the transmission line may be connected to the Big Stone South Substation. **Appendix B** includes the MISO Agreements.

3.0 Name of Owner, Manager, and Participants (ARSD 20:10:22:06; 20:10:22:07)

The owner and manager of the proposed Project is Crowned Ridge Wind, LLC, a wholly-owned indirect subsidiary of NEER.

The contact persons for the owner and manager are:

Tyler Wilhelm
Associate Project Manager
Crowned Ridge Wind, LLC
700 Universe Boulevard
Juno Beach, Florida 33408
Tyler.Wilhelm@nexteraenergy.com
Office (561) 694-3193

Brian J. Murphy
Senior Attorney
NextEra Energy Resources, LLC
700 Universe Boulevard
Juno Beach, Florida 33408
Brian.J.Murphy@nee.com
Office (561) 694-3814

4.0 Purpose of the Transmission Facility (ARSD 20:10:22:08)

The purpose of the Project is to transfer electricity produced from the two 300 MW wind projects (CRW and CRW II) to the electrical grid for public consumption. As explained in the Executive Summary, the full output of the CRW and CRW II will be used by NSP, with NSP the owner of CRW II. The Project is expected to bring both short-term and long-term benefits to South Dakota. Short-term economic benefits will be derived from activities associated with construction of the Project. Local businesses will likely experience an increase in revenues from construction of the Project, and positive economic gains will result from increased spending on lodging, meals, and other consumer goods and services. In addition, economic benefits will be realized by participating landowners, who will receive payments from the Applicant in exchange for allowing the Project to cross their properties.

The Project will also provide benefits to the local economy in the form of property taxes and easement payments. Both wind farms associated with the Project would pay approximately $3 million per year in property taxes combined. The Applicant estimates the amount of sales/use tax associated with the construction of the Project is approximately $1 million to $1.5 million, which will increase the tax base for both Codington and Grant Counties.

5.0 Estimated Cost of Facility (ARSD 20:10:22:09)

The estimated construction cost of the proposed 34-mile transmission line and associated facilities, which is the 230 kV high-side of the CRW collector substation, is approximately $30 million for the single circuit option and $40 million for the double circuit option. The cost estimate of reactive power compensation substation associated with the single circuit option is approximately $8.5 million, while the cost estimate of reactive power compensation substation associated with the double circuit option is approximately $8 million.

6.0 Demand for Transmission Facility (ARSD 20:10:22:10)

As explained in the Executive Summary, the need for the output of CRW and CRW II has been recognized by the Minnesota Public Utilities Commission and is under consideration by the North Dakota Public Service Commission. The output of CRW has been contracted to NSP, while NSP will own CRW II. Without the construction and operation of the Project, there is no transmission line and reactive power compensation substation to deliver power from CRW and CRW II to the transmission grid.

7.0 General Site Description (ARSDS 20:10:22:11)

The Project crosses portions of Grant and Codington Counties. **Exhibits 1** and **2** display the Project from CRW to the Big Stone South 230 kV Substation and depict county lines, city and town locations, major waterbodies, and roadways. Figures showing other features such as cemeteries, places of historical significance, and rivers are referred to in the resource sections. **Appendix A** provides the location of the Project by township, range, and section. Should modifications to the Project as a result of permitting, engineering design, and land rights occur, all such changes would occur in the Project Study Area. **Exhibit 3** provides a wider area view of the Project, including the location of CRW and CRW II in relation to a new transmission line that will connect CRW II to the collector substation at CRW, and shows how both CRW and CRW II are delivered to the transmission gird by the Project.

8.0 Alternative Sites (ARSD 20:10:22:12)

The information provided in Section 8.0 is applicable to both the single and double circuit options.

General Criteria

The Applicant's development of a proposed transmission route and consideration of alternative routes involved the application of the following criteria:

- Minimizing total length between the collector substation and the Big Stone South Substation;
- Minimizing impact to human settlements;
- Minimizing impacts to the environment, aesthetics, wetlands, grasslands, agriculture, and threatened and endangered species;
- Minimizing crossings of existing infrastructure and county roads;
- Maximizing the paralleling of existing ROW where possible;
- Ability to secure land rights through landowner communication and land leasing efforts;
- Suitable site-specific conditions (including land use constraints);
- Avoidance of sensitive cultural resources; and
- Availability of effective transmission access and adequate transmission capacity.

Based on feedback from local government officials and landowners, additional criteria were added to refine the design of the proposed route and consideration of alternatives:

- Locating the transmission line and associated infrastructure outside of county ROW per the requests of both Grant and Codington counties to avoid unnecessary impacts to existing infrastructure within ROW;
- Locating the transmission line and associated infrastructure as close as reasonably possible to existing ROW with the approval from Grant and Codington counties for conductor blowout;
- Utilizing quarter section lines to minimize impacts to agricultural fields and farming operations where paralleling existing ROW is not practical;
- Avoiding diagonal routing across agricultural fields, wherever possible; and
- Locating the transmission line and associated infrastructure to accommodate for the future development of a proposed transmission line in Grant County.

Evaluation of Alternative Routes and the Advantage of Proposed Route over Alternatives

The proposed route set forth in **Exhibits 1** and **2** is the most consistent with above-described general criteria, including the feedback and input received from local governments and landowners. For example, the proposed route is the shortest viable route from the collector substation to the Big Stone South Substation, using angles that parallel existing infrastructure

and ROW where possible. The proposed route also accommodates the feedback received from the Counties, which requested that the Project be placed outside of their ROW. The proposed route also minimizes routing across agricultural fields and, instead, runs along landowner boundaries and quarter section lines as much as possible. It was further designed to minimize the impact on human settlements and the environment. In addition, it only crosses county highways 20, 12 and 15 once. The proposed route also parallels existing transmission corridors for 4.5 miles, which reduces aesthetic impacts to areas that do not have existing transmission infrastructure. Major water crossings and potential impacts to wetlands and protected species have also been minimized.

Optimization of the proposed route included consideration of alternative routing options. For instance, the transmission line path from the new substation location originally went south to Troy and would have added 2.4 miles to the line and four turning structures. This alternative direction would eventually have required the alternative route to revert back north to the currently proposed transmission corridor due to having high concentration of wetland and grassland easements as well.

Both alternatives routes would have to consider crossing approximately 3.4 to 7 miles of contiguous wetland/grassland easements running in a north/south direction and a range of approximately 1-5 miles in the east/west direction. These constraints were mitigated by the currently proposed route, which parallels 160th street, where grassland/wetland easements are not highly concentrated.

There are two alternative routing paths: a northern route turning east and eastern route turning north. Those routes, however, when compared to the North-by-Northeast proposed route forth in **Exhibits 1** and **2** do not satisfy the above the general criteria considerations as well as the proposed route.

Northern Route Turning East:

The Project could have followed a Northern Route initially before heading east. This route would have initially followed County Road 32/10 and headed towards the town of South Shore. The first concern with this route was its proximity to the Punished Woman and Round lakes, and the visual impacts to that area. Additionally, just to the southeast of those lakes are a significant amount of wetlands.

This alternate route is not preferred for the following reasons:

- High density of occupied residences along the route and close proximity to the town of South Shore and Milbank;
- Increased crossings of existing infrastructure including electrical lines and county roads near towns;

- Crosses one parcel of South Dakota Public Lands/Game Production Area near South Shore;
- Crosses three parcels and is in close proximity to five other parcels of South Dakota Public Lands/Private Lands Hunting Access;
- Crosses or is adjacent to seventeen United States Fish and Wildlife Service (USFWS) wetland or grassland easements;
- Route goes through wildlife buffer for active nesting bald eagles near Punished Woman and Round Lake;
- Less than 0.5 mile from Grouse Lek Buffer;
- Increased wetlands near South Shore;
- Increased tribal sensitivity due to proximity of Punished Woman's Lake;
- Increased tribal resources near Punished Woman Lake and impacts to tribal viewsheds and visual resources;
- 30% of route includes prairie lands which have a high cultural site density;
- High dissection of agricultural lands along east/west portion of route; and
- Increased length of generation tie line.

The alternate route is not optimal based upon the above listed drawbacks. Also, numerous residences are within 500 ft. of the route, including but not limited to the towns of Milbank, South Shore, and Stockholm. This alternate route was located within 0.5 mile of the town of South Shore and increased the number of residences and potential adverse impacts to human settlements. The alternate route crosses a large amount of wetlands and National Wetlands Inventories (NWI) near South Shore. Additional wildlife concerns include Route goes through wildlife buffer for active nesting bald eagles and active grouse lek near Punished Woman and Round Lake. Tribal sensitivity and cultural site density increases near the Punished Woman Lake. Impacts to tribal viewsheds and visual resources would be impacted by close proximity to South Shore and Punished Woman's Lake. Additionally, 30% of the route consists of prairie lands, which are known to have a high density of cultural and tribal resources. The majority of the prairie lands are also close to South Shore and Punished Woman's Lake which Tribes have expressed concern over. The alternate crossed many existing electrical lines and county roads. The alternate route would have bisected agricultural fields rather than running along landowner boundaries to achieve a shorter route.

Eastern Route Turning North:

The project could have followed an Eastern Route initially before heading North. Though the route could have followed the existing road of 161st St., it would cross the towns of Strandburg and Labolt which does not minimize the proximity of the line to population. It would have added approximately 4 miles to the length of the Transmission line.

This alternate route is not preferred for the following reasons:

- High density of occupied residences along the route and close proximity to the town of Strandburg and Labolt;
- Route goes through the Dakota Granite Company Property and gravel/granite pits;
- Increased crossings of existing infrastructure including electrical lines and county roads especially near towns;
- Crosses one parcel and in close proximity to SD Public Lands/Private Lands Hunting Access; Adjacent to three Waterfowl Production Areas;
- Crosses or is adjacent to twelve USFWS wetland or grassland easements;
- Proximity to Crooked Lake, a known area for nesting bald eagles;
- Crosses forty-eight wetlands and forty-one NHD flowlines;
- Large wetland crossing near Troy;
- Greater distance (approx. 1,170 ft.) of crossing of Lake Albert;
- High density of cultural/tribal sites expected in prairie lands; 15% prairie lands crossed with potential for high percentage of cultural/tribal resources;
- Dissection of agricultural lands; and
- Increased length of the generation tie line.

The alternate route was not optimal based upon the listed drawbacks. Also, numerous residences are within 500 ft. of the route, including but not limited to the towns of Troy, Strandburg, and Labolt; and additional residential communities are present along major roads such as 161st St. and 484th Ave. This alternate route affected a greater number of residences and increased potential adverse impacts to human settlements. Additionally, the route crosses through property of the Dakota Granite Company and gravel/granite pits. The alternate route also crosses a greater amount of wetland and grassland easements, a waterfowl production area, and known wetland along 161st and in the vicinity of Troy. The alternate route was nearer to Crooked Lake, a known area for nesting bald eagles. The alternate crossed many existing electrical lines and county roads, and would have bisected agricultural fields rather than running along landowner boundaries to achieve a shorter route.

8.1 Route Identification and Selection Process

The criteria set forth in 8.0 were employed during the route identification and selection process, which began with an analysis that involved collecting geographic information system (GIS) data from local, state, and federal agencies for the area between the CRW collector substation and the Big Stone South Substation. The Applicant used the GIS data, along with input from landowners and field reconnaissance, to identify opportunities and constraints within the Project Study Area. The constraints included primarily state and federal lands (as set forth in **Exhibit 4**) and easements, wetlands, and sensitive cultural resources. Based on consideration the criteria set forth in Section 8.0, the Applicant identified the proposed transmission line, which is set forth in **Exhibits 1** and **2**. Agency coordination regarding the Project is provided in **Appendix C.**

8.2 Project Route

The preliminary route for the Project and the Project Study Area is set forth in **Exhibits 1** and **2**. As of October 27, 2017, 99% of the transmission line route has been leased by the Applicant. The Applicant expects to have all easements finalized by the first quarter of 2018. The final design of the route, within the 1 mile corridor as set forth in **Exhibits 1** and **2**, will be determined in negotiation with participating landowners, and placement of Project facilities will be micro-sited to avoid or minimize impacts to environmental and cultural resources following field surveys.

9.0 Environmental Information (ARSD 20:10:22:13)

Sections 10 through 17 describe the existing environment at the time of the submission of the application, anticipated impacts to the existing environment from construction and operation of the proposed Project, identification of irreversible changes that are anticipated to remain beyond the operating lifetime of the proposed facility, and mitigation measures the Applicant will undertake. The information set forth in Sections 10 through 17 is the same for the single and double circuit option as the temporary and permanent impacts are the same under each option.

ARSD 20:10:22:13 states, "The environmental effects shall be calculated to reveal and assess demonstrated or suspected hazards to the health and welfare of human, plant and animal communities which may be cumulative or synergistic consequences of siting the proposed facility in combination with any operating energy conversion facilities, existing or under construction." No cumulative or synergistic consequences related to environmental effects contemplated by the regulation are known to exist for the proposed Project.

The Applicant is unaware of any other major industrial facilities in the Project Study Area that may have an adverse effect on the environment as a result of construction or operation of the Project.

To facilitate an understanding of the comparative impacts the single versus double circuit option, the following table provided approximate values of permanent impacts for each option. The values provided in the table are subject to change during final engineering and construction.

Single-Circuit Option, Anticipated Extent of Permanent Impacts From Transmission Structures (excluding guy anchor impacts)						
	Structures	Poles per Structure	Total Pole Count	Pole Radius of Impact (ft)	Impact per Pole (sq. ft.)	Total Impact (sq. ft.)
DEADEND	10	2	20	5	78.54	1570.80
HEAVY TANGENT	26	1	26	5	78.54	2042.04
IN-LINE DEADEND	3	1	3	6	113.10	339.29
LIGHT RA	6	1	6	5	78.54	471.24
LIGHT TANGENT	153	1	153	5	78.54	12016.59
MEDIUM RA	31	2	62	5	78.54	4869.47
SS DEADEND	3	1	3	6	113.10	339.29
Total						21648.71

Double-Circuit Option, Anticipated Extent of Permanent Impacts From Transmission Structures (excluding guy anchor impacts)						
	Structures	Poles per Structure	Total Pole Count	Pole Radius of Impact (ft)	Impact per Pole (sq. ft.)	Total Impact (sq. ft.)
DEADEND	12	2	24	5	78.54	1884.96
HEAVY TANGENT	32	1	32	5	78.54	2513.27
IN-LINE DEADEND	4	1	4	6	113.10	452.39
LIGHT RA	8	1	8	5	78.54	628.32
LIGHT TANGENT	184	1	184	5	78.54	14451.33
MEDIUM RA	38	2	76	5	78.54	5969.03
SS DEADEND	4	1	4	6	113.10	452.39
Total						26351.68

*Double Circuit Option assumes a 20% increase in total structure count in the event pole spotting is revised to reduce pole heights.

10.0 Effect on Physical Environment (ARSD 20:10:22:14)

10.1 Existing Environment

10.1.1 Description of Land Forms

The Project crosses three physiographic regions in eastern South Dakota. From northeast to southwest these are the Minnesota River Prairie, the Prairie Coteau Escarpment, and the Prairie Coteau or Coteau des Prairies. As described by Bryce et al. (1996), the northeastern half of the alignment is situated within the Minnesota River Prairie and is characterized by level terrain of thick glacial drift dotted with wetlands, although fewer in number and less persistent than the isolated wetlands (i.e., prairie potholes) of the Coteau des Prairies to the west. The Coteau des Prairies ecoregion was formed by stagnant glacial ice melting beneath sediment layers, resulting in a tightly undulating landscape of hummocks perforated by seasonal and semi-permanent wetlands and a chain of large lakes. Separating the Minnesota River Prairie from the Prairie Coteau is the Prairie Coteau Escarpment, which forms a small, yet distinctive landform rising 300 to 600 ft. above the Minnesota River valley. The escarpment is incised by steep perennial streams that flow off it to the Minnesota River valley to the east. Elevations along the Project range from 1,050 ft. above sea level (asl) at the northeastern end and rise to 1,970 ft. asl at its southwestern end. The topography of the Project is shown in **Exhibit 5**.

10.1.2 Geological Features and Constraints

The Coteau des Prairies and the broad valley of the Minnesota River provide large examples of the glaciation in eastern South Dakota, which occurred during the Upper Wisconsin period of the Pleistocene. Most of the Project area is underlain by glacial drift (till, ground moraine) that varies from 40 to 70 ft. in thickness, but averages about 50 ft. thick, although available information indicates the drift thickness to be at least 150 ft. on the Coteau des Prairies (Rothrock 1952), and the composite thickness of these glacial deposits may be up to 300 ft. (Martin et al. 2004). As illustrated in **Exhibit 7**, the glacial drift is composed of till (i.e., ground moraine, end moraine, and stagnation moraine) from the Kansan, Iowan, and Wisconsin glacial periods, which consists of compact, silty, clay-rich matrix with sand- to boulder-size clasts of glacial origin) outwash sands and gravels, and wind-blown dust/sand. As described by Martin et al (2004), the geomorphic character of the till deposits ranges from smooth rolling terrain (ground moraine) to hummocky terrain with numerous sloughs (stagnation moraine), to elevated linear ridges with hummocky terrain locally at former ice sheet margins (end moraine) (Martin et al. 2004).

In addition to the glacial deposits, Quaternary alluvium is present along the North Fork and South Fork of the Whetstone River, the North Fork of the Yellow Bank River, and the former influent stream to and the discharge stream from Lake Albert (see **Exhibit 7**). The Project Construction Easement crosses alluvial deposits at the northern end of Lake Albert, near the intersection of 150th Street and County Route 35, and the North Fork of the Yellow Bank River near the intersection of State Route 15 and 153rd Street. The surficial geological deposits along the remainder of the Project Construction Easement consists of till, which is generally described as a compact, silty, clay-rich deposits with sand and boulder-sized clasts or by undifferentiated outwash (Martin et al. 2004).

As shown in **Exhibit 7**, undifferentiated Cretaceous bedrock, consisting of black shale, chalk, and sandstone, underlies the majority of the Project Study Area, but this bedrock is not exposed at the surface (Rothrock 1952). The uppermost bedrock unit in eastern half of Grant County is probably the Carlile Shale (see **Exhibit 7**), which is described as dark gray to blue-gray shale that contains calcareous concretions and a few thin layers of sandstone. The Precambrian-age Milbank Granite underlies portions of the Project Study Area and Construction Easement and is exposed at the surface in Section 25, Township (T) 121 North (N), Range (R) 47 West (W), and Sections 11, 12, 13 and 14, T120N, R48W. This granite is composed of approximately 60% dark red feldspar, 25% clear quartz, and 15% biotite, and is of high quality that is commercially quarried for monuments and building stone.

10.1.3 Economic Deposits

Based on data provided by the South Dakota Department of Environment and Natural Resources (SDDENR), review of aerial photographs, and field observations, there are economic deposits located in the Project Study Area and along the Project Construction Easement; however, no active granite quarries or gravel pits are located within the Project Construction Easement. Two active gravel pits fall within the northern tip of the Project Study Area in Sections 13 and 24, T120N, R47W in Big Stone Township. Four active granite quarries are located to the east of the Project Study Area and Project Construction Easement in Sections 7 and 18 (T120N, R47W) and Sections 12 and 13 (T120N, R48W) of Alban Township. The Applicant is not aware of any plans to develop extractive mineral resources in the Project Study Area, but the presence of these active gravel pits and quarries underscores the potential to develop those resources.

10.1.4 Seismic Risks

Risk of seismic activity along the Project Construction Easement is considered low. Between 1872 and 2013, eighty-seven earthquakes have been recorded in South Dakota (SDDENR 2013). None of these earthquakes have occurred in either Grant or Codington counties through which the Project passes. The Applicant is not aware at this time of subsidence potential or slope instability problems with the Project.

10.1.5 Soils

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) office for each county defines the soil associations found within their respective county. Soil associations are defined as a group of individual soil series that occur in a repeatable pattern across the landscape and share a distinctive pattern of soils, relief, and drainage. A soil association generally includes two or three major soil series and a few minor soil series.

Soil Survey Geographic (SSURGO) GIS data are available from the NRCS and were analyzed using ESRI's ArcMap 10.5 software to determine the soil associations located within the Project Construction Easement. Eighty-seven soil associations were identified in the Project Construction Easement, including fifteen in Codington County and seventy-four in Grant County; two individual soil associations are located in both counties. Descriptions of the soil associations by county including map unit symbol, soil type, slope percentage, parent material, drainage characteristics, and acreage area are provided in **Appendix D**.

Attributes to identify erodible or highly erodible soils are not provided in the SSURGO data. However, if disturbed, the increased potential for erosion associated with surface runoff for soils increases as slope gradient rises over 2% (Soil Science Division Staff 2017).

10.1.6 Prime Farmland

The NRCS defines prime farmland as areas with acceptable acidity or alkalinity, a dependable supply of moisture from irrigation or precipitation, favorable temperature, and an adequate growing season. Typically, soils in prime farmland are sufficiently well-drained and not excessively erodible during the growing season. Table 10.1.6 presents the percent of farmland classifications for the Project Study Area and for the Project Construction Easement.

Table 10.1.6 Prime Farmland Classification within the Project Study Area and Construction Easement

Farmland	Project Study Area		Project Construction Easement	
	Total Acreage	Percent	Total Acreage	Percent
All areas that are prime farmland	9,127.05	41.72%	262.55	40.9%
Farmland of statewide importance	2,139.53	9.78%	58.87	9.2%
Prime farmland, if drained	1,702.40	7.78%	45.70	7.1%
Prime farmland, if irrigated	990.23	4.53%	23.32	3.6%
Total	**13,959.20**	**63.81%**	**390.43**	**60.9%**

10.2 Potential Impacts

The risks posed by the Project are generally limited by the characteristics of the geologic materials in the area. The unconsolidated geologic and soil materials along the Project Construction Easement are composed of glacial till ground moraine that is generally of low permeability, although sand and gravel glacial outwash deposits and aeolian dusts and sands are present in the soil profile. The sand and gravel outwash deposits have high permeability, but are limited in size. The Project Construction Easement crosses these outwash deposits at two locations, in the southern portion of the route, in Sections 8, 9, 16 and 17, T119N, R49W and in Section 6, T118N, R50W, Section 2, T118N, R51W, Section 31, T119N, R50W, and Section 36, T119N, R51W.

Soil erosion is the greatest risk to the geologic environment. Where the land slope is relatively flat, such as in the Minnesota River Prairie lowlands, the soil erosion potential is low. However, along the Prairie Coteau Escarpment, steep slopes are present, and the topography within the Coteau des Prairies is variable. Where steep slopes (i.e., greater than 6%) are present, the potential for soil erosion increases significantly.

Soils information for the Project Study Area and Project Construction Easement is presented in **Appendix D**. As review of **Appendix D** indicates, approximately 27% of the soils along the Project Construction Easement have a slope greater than 6%. In addition, soil properties that

also influence erosion from water runoff include soil texture, percent organic matter, structure infiltration capacity, and soil permeability. Soils containing high proportions of silt and fine sand are most erodible, while well-drained and well-graded gravels and gravel sand mixtures with little or no silt are the least erodible materials. The soil composition and general drainage characteristics are also described in **Appendix D**. Slope length and gradient, and frequency, intensity, and duration of rainfall and the amount of time bare soils are exposed, all influence erosion caused by storm water runoff. In addition to natural processes, erosion could be caused by site-clearing and earthmoving activities as well.

Information from the SDDENR indicates that economically valuable mineral deposits, such as sand and gravel and granite, underlie portions of the Project Study Area and Project Construction Easement, as evidenced by the two active gravel pits at the northern end of the Project Study Area in Big Stone Township and the granite quarries located adjacent to the eastern boundary of the Project Study Area in Alban Township. Permanent impacts to economic deposits may occur due to support structures being located on top of deposits that could potentially be mined at some future date; however, the Applicant is not aware of any plans to develop these resources within the Project Construction Easement. Even with economic mineral development at some future date, the Applicant anticipates that any permanent impacts to those deposits would be minimal.

10.2.1 Soils

Construction of the Project will impact soils within the Project Construction Easement. A 32 ft. wide temporary travel path within the Project Construction Easement will be used for vehicle traffic to each structure location. In woodlands and shrublands, the full 150 ft. width of the Project Construction Easement will be cleared. This will result in an estimated 989.32 acres of temporary impacts to soils. The Applicant estimates approximately 3.37 acres of permanent impacts to soils will occur from the installation of poles, structure locations, and guy anchors.

Impacts to soils could include compaction, potential loss of soil due to erosion, and the potential contamination of soils as result of spills from construction equipment.

10.2.2 Prime Farmland Impacts

Table 10.2.2 provides the estimated temporary and permanent impacts to prime farmland associated with construction and operation of the Project.

Table 10.2.2 Estimated Temporary and Permanent Impacts to Prime Farmland

Project Feature	Farmland Classification	Temporary Impacts (acres)[1]	Permanent Impacts (acres)[2]
Poles, structure locations, guy	Prime farmland	361.11	0.73
	Farmland of statewide	78.43	0.37

anchors, and temporary travel lane	Prime farmland if drained	62.51	0.29
	Prime farmland if irrigated	36.42	0.17
	Not prime farmland	386.75	1.81
Laydown areas and wire stringing area[3]	NA	64.1	0.0
Total[3]		989.32	3.37

1. *Temporary impacts are calculated assuming 2.88 acres of temporary impact around each structure location, including* guy anchor areas *and a 32-ft-wide temporary travel lane within and along the entire Construction Easement.*

2. *Permanent impacts are calculated as a 5-ft radius (78.5 sq. ft) per pole, plus guy anchor areas Temporary travel path has no permanent impact to prime farmland.*

3. *The exact locations of laydown areas, wire stringing areas, and their access roads are not known at this time but will be determined during final design. Therefore, it is not known what type of prime or statewide importance soil may be impacted by these features. Current design includes two 10-acre laydown yards and a 1.38-acre wire-stringing work area for each of 32 deadened structures.*

10.2.3 Mitigation

The Project has been routed to minimize impacts to land forms, geology, and economic deposits. Available geologic data indicate that the Project will not significantly affect soil conditions or bedrock geology. Seismic activity is not anticipated to affect the performance of the transmission line structures. The placement of structure foundations in the ground will have a minor impact to the underlying geologic conditions. Except as described in this Application, the Applicant is not aware of any additional constraints that may be imposed by geological characteristics on the design, construction, or operation of the Project. Additional geotechnical testing will be completed prior to construction to further evaluate site-specific geologic conditions at each pole or structure placement location.

Soil erosion is possible in areas of steep slopes, particularly in the Coteau des Prairies and along the Prairie Coteau Escarpment. To reduce adverse effects to and from soils, the Applicant will develop and implement a Storm Water Pollution Prevention Plan (SWPPP) and use Best Management Practices (BMPs) during construction to protect topsoil and adjacent wetland resources and minimize soil erosion. Soil areas disturbed during construction will be decompacted and returned to pre-construction contours to the extent practicable and in accordance with landowner agreements. The goal is to have all surfaces drain naturally, blend in with the undisturbed natural terrain, be left in a condition that will facilitate re-vegetation, provide for proper drainage, and prevent erosion. Construction laydown areas and temporary travel paths will be restored in accordance with the landowner agreements and the SWPPP.

11.0 Hydrology (ARSD 20:10:22:15)

11.1 Existing Environment

The Project crosses two hydrologic regions and seven watersheds, as defined by the United States Geological Survey (USGS). The northeastern two-thirds of the Project Study Area lies in the broad valley floor of the Minnesota River. This area is situated in drift deposits from the Kansan, Iowan, and Wisconsin glaciation episodes. The topography is relatively flat and much of the area is undrained; few outflowing streams are present that carry surface water runoff to the Minnesota River. Most water finds its way to swales or basins where it evaporates. Small isolated wetlands are present, but are relatively lower in density than in the southwestern one-third of the Project Study Area. While the frequency of well-defined stream channels is lower in the northeastern portion of the Project Study Area, very well-defined stream channels are present in the Prairie Coteau Escarpment and Coteau des Prairies. Due to its variable topography, the Coteau des Prairies area has a higher density of pothole lakes and wetlands, with some well-defined stream channels. **Exhibit 8** shows the hydrologic resources discussed in this section.

11.1.1 Rivers and Streams

Most of the Minnesota River Lowland is undrained and exhibits numerous swales and a slightly rolling ground surface that are characteristic of a recently glaciated surface (Rothrock.1952). Creeks and streams in the lowland generally are meandering, limited in extent, and intermittent; however they can be perennial, depending on the watershed location. The flow in many smaller streams stops or sinks into the glacial till before discharging contents to a larger stream or river system.

The Project Study Area crosses seven watershed units: Round Lake, Town of Stockholm, Headwaters of North Fork of Yellow Bank River, Milbank Cemetery, Lake Albert – North Fork Whetstone River, Outlet Whetstone River, and unnamed 07020000 10905. The USGS-named streams, and their floodplain listing, crossed by the Project Study Area and the Project Construction Easement are listed in Tables 11.1.1 and 11.1.1a The Project Study Area crosses named streams 73 times, while the Project Construction Easement only crosses named streams 53 times, with mapped floodplains at 29 of those locations (Tables 11.1.1.1 and 11.1.1a). The widest Project Construction Easement water crossings are the Lake Albert – North Fork Whetstone River crossing (230 ft.), located in the NW¼SW¼ of Section 35, Township 121 North, Range 47 West. Electronic Federal Emergency Management Agency (FEMA) floodplain data is available for Codington County and Grant County. Review of these data indicates that the Project Construction Easement crosses 16 mapped floodplains. As shown on **Exhibit 8**, many other named and unnamed streams and water bodies have designated 100-year-floodplains.

Table 11.1.1 USGS-Named Streams/River Crossings within the Project Study Area

Surface Water Name	Number of Crossings	Floodplain Present at River Crossing[1]
Whetstone River and Tributaries	3	Yes, FEMA Flood Zone A
Lake Albert-North Fork Yellow Bank	1	Yes, FEMA Flood Zone A
North Fork Yellow Bank River &	61	Yes, FEMA Flood Zone A
Round Lake	8	Yes, FEMA Flood Zone A
Total	**73**	**NA**

[1] *Includes review of available digital floodplain data for Codington County and Grant County.*

Source: National Hydrography Data set, USGS Streams data set and FEMA data set.

Table 11.1.1a USGS-Named Streams/River Crossings within the Project Construction Easement

Surface Water Name	Number of Crossings	Floodplain Present at River Crossing[1]
Unnamed tributary to Whetstone River	1	Yes, FEMA Flood Zone A
Lake Albert-North Fork Yellow Bank	1	Yes, FEMA Flood Zone A
North Fork Yellow Bank River &	45	Yes, FEMA Flood Zone A
Round Lake	6	Yes, FEMA Flood Zone A
Total	**53**	**NA**

[1] *Includes review of available digital floodplain data for Codington County and Grant County.*

Source: National Hydrography Data set, USGS Streams data set and FEMA.

11.1.2 Wetlands

According to the NWI, the Project will cross mostly freshwater emergent wetlands. Table 11.1.2 provides a summary of the NWI wetland types within the Project Study Area and Project Construction Easement.

Table 11.1.2 NWI-Mapped Wetlands Identified within Project Study Area and the Project Construction Easement

NWI Wetland Type	NWI mapped Wetland Area (Acres)	Percent of Area Containing Wetlands	NWI-mapped Wetland Area (Acres)	Percent of Area Containing Wetlands

Lake	53.98	4.92	0	0
Freshwater Emergent Wetland	815.28	74.38	21.206	82.22
Freshwater Forested/Shrub Wetland	72.61	6.62	2.458	9.53
Freshwater Pond	152.4	13.9	2.128	8.25
Riverine	1.87	0.18	0	0
Total	**1,096.14**	**100.00**	**25.792**	**100.00**

The USFWS manages wetland easements in the Project Study Area and Project Construction Easement. Within the Project Construction Easement, approximately 55.68 acres of land are contained within USFWS wetland easements. Only the designated protected basins within these areas are protected by the easement. Uplands surround the projected basins within USFWS wetland easements commonly are in agricultural use.

11.1.3 Groundwater Resources

Groundwater resources in the Project Study Area can occur in alluvium, sand, and gravel within 50 ft. of the surface. No mapped groundwater sources occur between 50 and 100 ft.; however, some groundwater may occur at depths greater than 100 ft. in Codington County (Jensen 2003). In Grant County, groundwater sources may occur at any of these depths and the geologic deposits are similar to those in Codington County (Jensen 2004; USGS 2015).

11.2 Potential Impacts

11.2.1 Rivers and Streams

Potential impacts to rivers, streams, and floodplains are expected to be avoided and minimized as much as feasible by spanning these resources. To the extent that avoidance is not feasible due to landowner preferences, other constraints, or constructability issues, the Applicant will make every effort to keep potential permanent and temporary impacts below the United States Army Corps of Engineers (USACE) Nationwide permit (NWP) thresholds. Temporary impacts are expected to be further minimized with the use of matting for cranes and other equipment. The Applicant will obtain and implement a SWPPP, including appropriate BMPs, to avoid sedimentation and runoff.

11.2.2 Wetlands

The Applicant expects the Project will span the majority of wetlands Construction Easement due to the typical support structure span distance of 800 ft.; however, there may be instances where

the support structures may have to be placed in wetland areas. In those instances, the Applicant will make every effort to keep permanent impacts below the USACE NWP thresholds. The Project Construction Easement does cross USFWS wetland easements; however, protection applies only to the protected basin(s) included in the easement. All protected basins in the Project Construction Easement will be spanned by the Project and no surface impacts to protected basins are anticipated.

The exact location of Project laydown yards and access roads are not known at this time; however, the Applicant will site these features to avoid impacts to wetlands. Wetland delineation surveys were ongoing at the time of this filing and the results of these surveys will be utilized to refine and select the exact locations of laydown yards and access roads. Further, the storm water BMPs that will be implemented as part of the SWPPP will provide additional protections to wetlands located in the Project Construction Easement. Based on the foregoing approaches, the Applicant anticipates that temporary and/or permanent impacts to wetlands during construction will be avoided or minimized.

11.2.3 Groundwater Resources

The Project will not use groundwater as a potable water source nor will any sort of water or waste discharge occur to groundwater. The Project will not result in discharge of heated water or deep well injections. The Project will not use offsite pipelines or channels for water transmission. The Project Study Area is underlain by undifferentiated Quaternary till and other glacial and periglacial deposits, such as outwash and glaciolacustrine features. None of these deposits are significantly developed for groundwater supplies.

Permanent impacts to groundwater are not expected. Depending upon the exact locations of support structures, shallow groundwater dewatering may be required for construction, but this will be a temporary impact to groundwater. The potential drawdown effects of any dewatering activity will be local and temporary. Permanent impacts to groundwater from construction dewatering activities and/or structure placement in the shallow groundwater flow regime is not expected.

Risk for groundwater contamination caused by release of contaminants during construction is low. The overall low permeability of the unconsolidated geologic and soil materials will inhibit contaminant flow, although isolated high permeability granular lenses of limited size may be present that could result in a more rapid contaminant distribution. If dewatering is necessary, appropriate permits will be obtained and BMPs will be implemented, as needed. The Project will not require water storage, reprocessing, cooling, or deep well injection. Permanent effects to aquifers and potable water supplies are not expected. See **Exhibit 9.**

11.3 Mitigation

The Applicant has minimized and avoided any direct permanent impacts to rivers, stream, and floodplains to the extent feasible, although temporary impacts may occur from construction activities.

To the extent practicable, impacts to water bodies and wetlands will be avoided through the support structure siting process and the use of storm water BMPs during construction. If any support structures need to be placed in wetlands, the design and location of those structures will be such as to keep the total permanent impacts to less than the USACE NWP threshold. No permanent impacts or structures will be placed within USFWS wetland easements protected basins.

To limit impacts to hydrologic resources caused by soil erosion, groundwater contamination or storm water runoff, the Applicant will obtain a South Dakota General Permit for Storm Water Discharges Associated with Construction Activity (SDR100000), develop and implement a SWPPP, and use BMPs to reduce impacts during construction. As required by SDR100000 and the SWPPP, any vehicle fueling within the Project Construction Easement will employ appropriate BMPs and will occur at an appropriate distance from waterways that are determined by site specific conditions, such as ground cover, slope, and soil type.

12.0 Effect on Terrestrial Ecosystems (ARSD 20:10:22:16)

12.1 Existing Environment

12.1.1 Methods

In order to develop a characterization of the existing environment, a desktop analysis was performed for the Project Study Area and the Project Construction Easement. The desktop analysis consisted of a review of publicly available resources with pertinent environmental data, including the USGS National Land Cover Database, high resolution aerial imagery, and data available from South Dakota State University's Public Research Access Institutional Repository and Information Exchange (PRAIRIE). These data were combined in GIS and manually reviewed by biologists experienced with aerial photography interpretation and the ecological communities of eastern South Dakota.

12.1.2 Terrestrial Vegetation and Wildlife Cover/Habitat Types

The Project is located within three subregions of the Northern Glaciated Plains Ecoregion, as defined in the Ecoregions of North Dakota and South Dakota: The Prairie Coteau, The Prairie Coteau Escarpment, and the Minnesota River Prairie regions (Bryce 1998). The Northern Glaciated Plains ecoregion is characterized by a flat to gently rolling landscape composed of

glacial drift. The subhumid conditions foster a transitional grassland between tall and shortgrass prairie. High concentrations of temporary and seasonal wetlands create favorable conditions for duck nesting and migration (Bryce 1998).

The Prairie Coteau ecoregion is the result of stagnant glacial ice melting beneath a sediment layer. The tightly undulating, hummocky landscape has no drainage pattern, and, therefore is perforated with closely spaced semi-permanent and seasonal wetlands. The region is characterized by a chain of large lakes that were formed where there was little ice shear and higher precipitation levels that allow widespread burr oak woodlands near wetland margins (Bryce 1998).

A small portion of the Project passes through the Prairie Coteau Escarpment ecoregion, which rises approximately 300 to 600 ft. in elevation from the Minnesota River valley to the edge of the Prairie Coteau. The elevation, broken topography, and sufficient precipitation favor dense deciduous forest growth in riparian areas. Cool, perennial streams flow off the escarpment, providing habitats and oxygenated water not found elsewhere in eastern South Dakota (Bryce 1998).

Thick glacial drift composes the level terrain of the Minnesota River Prairie. Wetlands are common, though they are fewer and less persistent than those in the neighboring subregions. The desiccating winds and historic fire regime created the prairie ecosystem in this region; however, it is transitional to woodland that occurs to the north and to the east in Minnesota. Today, the original tallgrass prairie has been replaced by intensive agriculture for grain, corn, and soybeans (Bryce 1998).

The predominant cover type within the Project Study Area and the Project Construction Easement is cultivated crops (55.05 and 47.69 percent, respectively), followed by herbaceous and land devoted to hay/pasture (Tables 12.1.2 and 12.1.2a; **Exhibit 10**). Cropland provides minimal habitat for most terrestrial species, though it may provide limited food source and cover for some species. Hay/pasture land, though periodically disturbed, may provide suitable habitat for grassland species adapted to such disturbance. The National Land Cover Dataset class "herbaceous" includes land that is currently not used for hay/pasture, or cropland, but that may or may not have been disturbed in the past. These areas likely provide suitable habitat for grassland and some prairie species. However, Bauman et al (2016) conducted a GIS exercise to quantify undisturbed lands in eastern South Dakota that are most likely to support native, undisturbed prairie that, in turn, are more likely to support prairie obligate and sensitive species.

Table 12.1.2 Land Cover within the Project Study Area

Land Cover	Total Area (Acres)	% of Total Area
Cultivated Crops	12,043.80	55.05%
Herbaceous	3,952.81	18.07%

Hay/Pasture	2,714.45	12.41%
Emergent Herbaceous Wetlands	1,424.73	6.51%
Developed, Open Space	1,024.45	4.68%
Open Water	311.94	1.43%
Deciduous Forest	273.87	1.25%
Developed, Low Intensity	62.18	0.28%
Developed, Medium Intensity	21.36	0.10%
Woody Wetlands	18.01	0.08%
Shrub/Scrub	14.61	0.07%
Barren Land	13.47	0.06%
Developed, High Intensity	3.28	0.01%
Total	**21,878.96**	**100.00%**

Table 12.1.2a Land Cover within the Project Construction Easement

Land Cover	Total Area (acres)	% of Total Area
Cultivated Crops	334.10	47.69%
Herbaceous	157.14	22.43%
Hay/Pasture	77.85	11.11%
Developed, Open Space	74.27	10.60%
Emergent Herbaceous Wetlands	39.20	5.60%
Deciduous Forest	11.07	1.58%
Open Water	4.64	0.66%
Developed, Low Intensity	1.50	0.21%
Shrub/Scrub	0.82	0.12%
Total	**700.59**	**100.00%**

Bauman et al (2016) utilized South Dakota Farm Service Agency's 2013 Common Land Unit data layers, and the 2012 US Department of Agriculture (USDA) National Agriculture Imagery Program county mosaic aerial imagery, to evaluate approximately 22.6 million acres of land in the 44 counties that comprise eastern South Dakota. Land that is currently under crop production, or that has in the past been used for crop production, was removed from consideration for the exercise. This was followed by manual removal of other disturbed areas. The remaining land tracts were then categorized as potentially "undisturbed grassland" or "undisturbed woodland." Water bodies larger than 40 acres as defined by the South Dakota

Department of Game, Fish, and Parks' (SDGFP) Statewide Water Bodies layer were then removed to allow a more accurate interpretation of the remaining undisturbed grassland/wetland complex. The resulting dataset provides an indication of the location of likely undisturbed grasslands that may support native prairies and provide habitat for prairie species (Bauman et al 2016). These areas may overlap with the cover types "herbaceous" and/or "hay/pasture" in Tables 12.1.2 and 12.1.2a.

According to Bauman et al (2016), there are 26 discreet tracts of land that may support native prairie within the Project Study Area. These tracts range in size from 0.2 acre to 490 acres, with an average size of 68 acres. The total acreage of land that may contain native prairie habitat within the Project Study Area is 1,760 acres. Within the Project Construction Easement, there are 119 acres that may contain native prairie habitat, with discrete tracts ranging from 0.02 acre to 17.4 acres.

12.1.3 State and Federally Listed Plant Species

The USFWS South Dakota Ecological Services Field Office publishes a list of threatened and endangered species known or presumed to occur within counties in South Dakota (USFWS 2017a). The SDGFP also maintains a list of threatened, endangered, and candidate species (SDCL Chapter 34A-8 and 34A-8A), and provides information on recorded observations within a given county (SDGPF 2016). Previous coordination with the USFWS and SDGPF also was reviewed for information on federally or state listed species (**Appendix C**). According to these sources, there are no records of state or federally listed plant species in Codington or Grant Counties.

12.1.4 State and Federally Listed Terrestrial Wildlife

The sources set forth in section 12.1.3 were reviewed for records pertaining to state and federally listed wildlife species. Table 12.1.4 represents a combination of those data sources, in addition to observations of state and federally listed terrestrial wildlife observed during field survey, and for species that both the USFWS South Dakota Ecological Services Field Office and the SDGFP has listed in correspondence with the Applicant regarding the Project (**Appendix C**).

Table 12.1.4 State and Federal Threatened and Endangered Species Potentially Present within the Project Study Area and Construction Easement.

Common Name	Scientific Name	Status[1]	County Records	County	Global Rank[2]	State Rank
Insects						
Dakota	*Hesperia dacotae*	FT	Recorded in county	Codington,	G2G3	S2

Common Name	Scientific Name	Status[1]	County Records	County	Global Rank[2]	State Rank
skipper				Grant		
Poweshiek skipperling	*Oarisma poweshiek*	FE	Recorded in county	Codington, Grant	G2	S2
Mammals						
northern long-eared bat	*Myotis septentrionalis*	FT	Potentially present in county	Codington, Grant	G4	S3
northern river otter	*Lontra canadensis*	ST	Recorded in county	Codington, Grant	G5	S2
Birds						
bald eagle	*Haliaeetus leucocephalus*	BGEPA	Recorded in county	Codington, Grant	G4	S1B,S2N
golden eagle	Aquila chrysaetos	BGEPA	Potentially present in county	Codington, Grant	G5	S3S4B, S3N
osprey	*Pandion haliaetus*	ST	Recorded in county	Grant	G5	S1B,SZN
piping plover	*Charadrius melodus*	FT, ST	Recorded in county	Codington	G3	S2B,SZN
red knot	*Calidris canutus rufa*	FT	Potentially present in county	Codington, Grant	G4T2	SNRN
whooping crane	*Gus americana*	FE, SE	Potentially present in county	Codington	G1	SZN

[1]FT – federally threatened; FE – federally endangered; ST – state threatened; SE – state endangered; BGEPA – protected by Bald and Golden Eagle Protection Act.

[2] Global/State Rank Definition (applied range wide for global rank and statewide for state rank)

G1 S1 – Critically imperiled because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
G2 S2 – Imperiled because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
G3 S3 – Either very rare and local throughout its range, or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction throughout its range because of other factors; in the range of 21 of 100 occurrences.
G4 S4 – Apparently secure, though it may be quite rare in parts of its range, especially at the periphery. Cause for long term concern.
G5 S5 – Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery.
SZ – No definable occurrences for conservation purposes, usually assigned to migrants
SR – Element reported for the state but no persuasive documentation
Bird species may have two state ranks, one for breeding (S#B) and one for nonbreeding seasons (S#N). Example: ferruginous hawk (S3B,SZN) indicates an S3 rank in breeding season and SZ in nonbreeding season.

12.2 Potential Impacts

Construction of the Project will result in temporary impacts to terrestrial communities within the Project Construction Easement. These impacts will result from human presence, development of temporary auxiliary features, construction of permanent equipment, and access along the Project Construction Easement. Vehicle traffic may increase along county roads in the Project area. The Project design and construction planning will be developed to minimize these impacts to the greatest extent practicable.

12.2.1 Prairie Butterflies Dakota Skipper (Federally Threatened) and Poweshiek Skipperling (Federally Endangered)

The Dakota skipper (*Hesperia dacotae*) is an obligate of undisturbed, native prairies, and generally inhabits wet lowlands dominated by bluestem grasses, or dry uplands that are a mix of bluestem and needle stem grasses (Vaughn 2005). Larvae have been observed feeding on several grasses, although little bluestem (*Schizachyrium scoparium*) is the preferred food source; the preferred nectar source for adults is purple coneflower (*Echinacea angustifolia*; Vaughn 2005), in addition to other prairie flowering species. As of 2002, Dakota skippers had been recorded at 53 sites in 10 counties, including four sites in Grant County and two sites in Codington County (USFWS 2002). Of the Dakota Skipper sites recorded in Grant and Codington Counties, none are within the Project Study Area or Project Construction Easement, and the closest occurrence is approximately 4.5 miles north of the Project. The USFWS designated critical habitat for the Dakota skipper in northern Grant County; however, Dakota skippers have not been recorded in the Project Study Area or the Project Construction Easement (USFWS 2015a).

The Poweshiek skipperling (*Oarisma poweshiek*) lives in high quality tallgrass prairie in both upland, dry areas and low moist areas (USFWS 2014). Nectar species for the poweshiek skipperling include purple coneflower, black-eyed Susan (*Rudbeckia hirta*), palespike lobelia (*Lobelia spicata*), and other flowering prairie species. There is no definitive research available regarding which plant species are necessary for larvae to develop, but they appear to select fine-stemmed grasses and sedges, such as slender spike rush (*Eleocharis elliptica*), prairie dropseed (*Sporobolis heterlepis*), and little bluestem (USFWS 2014; Shepherd 2005). Skadsen (2015) suggests the Poweshiek skipperling may be extirpated from South Dakota.

The Project could impact potentially suitable habitat for these prairie butterfly species through habitat removal or modification. Impacts could occur through placement of structures within suitable habitat or through routing of temporary features such as access roads. The species are vulnerable to impacts within larval habitat year-round and adult habitat during the flight season (approximately June 15 – July 20, weather dependent).

12.2.2 Northern Long-eared Bat (Federally Threatened)

Summer habitat for the northern long-eared bat (*Myotis septentrionalis)* consists of forested areas with trees greater than 3 inches in diameter at breast height (USFWS 2017a). Northern long-eared bats roost in live trees and/or snags that have exfoliating bark, cracks, crevices, and/or cavities (USFWS 2017a). The species typically forages in forest interiors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure (USFWS 2017a). Northern long-eared bats also may roost in human-made structures such as buildings, barns, bridges, and bat houses (USFWS 2017a). The species hibernates in caves, mines, or other cave-like structures during the winter. The USFWS lists the northern long-eared bat as possibly present in Grant and Codington Counties, indicating that the counties are within the range of the species and may contain suitable habitat. However, there are no records of the species being present in either county (USFWS 2017b). The nearest county records published by USFWS indicating the presence of the northern long-eared bat are in Brookings County to the south of the Project and in Roberts County to the north (USFWS 2017b).

The northern long-eared bat was listed as a threatened species with a 4(d) rule on April 2, 2015 (USFWS 2015b). The 4(d) rule prohibits purposeful take of the species range-wide, while removing prohibition of incidental take that results from certain activities, in certain areas, during certain times of year. The USFWS cites White Nose Syndrome, a fungal pathogen specific to bats, as the primary cause for the decline of the species, rather than habitat removal (USFWS 2015b). Acoustic surveys conducted within the nearby Crowned Ridge Wind Resource Area in 2016 resulted in no detections of northern long-eared bats during 830 detector nights (Tetra-Tech 2016). A detector night consists of one detector deployed for one calendar night. Tetra-Tech (2016) deployed three detectors for 210 nights and one detector for 200 nights between August and December 2016.

There is limited likelihood that northern long-eared bats are present within the Project Construction Easement. If the species is present, removal and fragmentation of forested habitat could affect northern long-eared bats. Removing potential roost trees (trees that provide roosting opportunity but are not known to be roosts) degrades the quality of the habitat, and removal of trees may eliminate potential foraging habitat. Felling occupied roost trees during the summer could affect individual northern long-eared bats, if present. Impacts to northern long-eared bats, if present, will be avoided and minimized to the extent practicable through Project design and BMPs described below in Section 12.3.

12.2.3 Northern River Otter (State Threatened)

Northern river otters (*Lontra canadensis*) can occupy many types of habitat; however, riparian vegetation along a wetland margin is a key habitat feature (SDGFP 2012). This species is more prevalent in areas with abundant food and limited disturbance (SDGFP 2012). Northern river

otters and beavers are closely associated; the northern river otter exploits dens, downed trees, ponds, and prey that thrive in beaver ponds (SDGFP 2012). The northern river otter was reintroduced into the Minnesota River valley in 1980 and 1981 (Skadsen 2016a). Since then, Skadsen (2016a) reports that the population has expanded its range and the species now is frequently observed along the Yellowbank River drainages in Grant County and along other tributaries and lakes within the Minnesota River valley. The Project Construction Easement crosses the North Fork of the Yellowbank River (see Table 11.1.1a above). The most recent documented occurrences of northern river otter in the vicinity of the Project Construction Easement were in 2004, 2005, and 2006 near the north fork of the Whetstone River (South Dakota Natural Heritage Database (SDNHD) spatial data accompanying correspondence shown in Appendix C).

Habitat removal and degradation are the primary potential impacts to the northern river otter. Erosion and siltation can affect water quality, limiting prey availability for northern river otters. Impacts to streams and waterbodies will be avoided to the extent practicable through project design and BMPs described below in Section 12.3.

12.2.4 Bald Eagle and Golden Eagle (Protected under Bald and Golden Eagle Protection Act)

Bald eagles (*Haliaeetus leucocephalus)* typically occupy habitat near large rivers, lakes, and marshes with available food sources (USFWS 2007). They build stick nests as large as 10 ft. in diameter in trees and occasionally on human-made structures (USFWS 2007). Skadsen (2017) identifies the bald eagle as an "uncommon migrant" in northeast South Dakota. The golden eagle (*Aquila chrysaetos*) nests primarily west of the Missouri River in South Dakota, usually on cliffs, rocky outcrops, and in large trees (Kochert et al. 2002; Pulkrabek and O'Brien 1974). Skadsen (2017) lists the golden eagle as a "rare migrant" in northeast South Dakota.

After a review of available sources of bald eagle nest records in Day, Grant, Marshall, and Roberts Counties, Skadsen (2017) identified 28 total bald eagle nests, only five of which occurred in Grant County. Ongoing eagle use surveys conducted within a nearby study area, located in the same counties as the Project, indicate the presence of bald eagles in the vicinity of the Project; however, no golden eagles have been observed during these recent surveys. In 2015, eagle use studies in another nearby study area indicated bald eagles but no golden eagles were observed in the general vicinity of the Project (Tetra-Tech 2015). A total of 453 hours of survey was conducted over all four seasons during the 2015 survey, during which four bald eagles and zero golden eagles were observed (Tetra-Tech 2015). The timing of the sightings suggests that observed individuals likely were likely migrants and not resident breeding adults (Tetra-Tech 2015). In the spring and fall of 2008, avian surveys were conducted for a proposed wind energy

development project that Grant and Codington Counties (Tetra-Tech 2008a and 2008b). Three golden eagles and zero bald eagles were observed (Tetra-Tech 2008a and 2008b).

Potential impacts to bald and golden eagles, if present in the Project area, include the possibility for collisions with power lines and structures. Impacts to bald and golden eagles will be avoided to the extent practicable through project design and BMPs described in Section 12.3.

12.2.5 Osprey (State Threatened)

Ospreys (*Pandion haliaetus)* inhabit areas near large water bodies that support their prey, which consists almost exclusively of fish (SDGFP 2017). Their nest sites include large trees on or near water bodies, with preference to locations that offer separation from surrounding vegetation to avoid predators (SDGFP 2017). Skadsen (2017) reports that ospreys successfully nested on an artificial platform in Grant County. Osprey have the potential to collide with power lines and structures. Impacts to osprey will be avoided to the extent practicable through project design and BMPs described below in Section 12.3.

12.2.6 Piping Plover (Federally and State Threatened)

Within South Dakota, piping plovers (*Charadrius melodus)* breed and nest on open beaches, alkaline wetlands, and sandflats (Aron 2005). In the Northern Great Plains, the nesting season extends from late April through August, with peak activity in May and June (Aron 2005). Nests consist of shallow scrapes in the sand lined with rocks or small shells (Aron 2005). The SDGFP (2016) lists the piping plover as known to have occurred in Codington County; however, the USFWS (2017b) does not list the species as a known or potential occurrence in either Grant or Codington County. The Platte River Recovery Implementation Program (PRRIP; 2017) indicates that the species nests primarily on the Missouri River, downstream of the Gavins Point and Fort Randall Dams, with some nesting on tributaries of the Missouri. The PRRIP (2017) also states that piping plovers have been observed at Horseshoe Lake in western Codington County. Potential impacts to piping plovers include prey habitat degradation and the possibility for collisions with power lines and structures. Impacts to piping plover will be avoided to the extent practicable through project design and BMPs described below in Section 12.3.

12.2.7 Red Knot (Federally Threatened)

The red knot (*Calidris canutus rufa*) is a shoreline species that breeds in drier Arctic tundra areas that generally are sparsely vegetated. Nests are cup-shaped depressions lined with vegetation and located on the ground. Outside of the breeding season, the species primarily is found in marine habitats, especially near coastal inlets, estuaries, and bays (Harrington 2001). The species may be present in South Dakota as a migrant or accidental occurrence, but breeding or wintering

populations have not been observed (Harrington 2001). This species is present only as a migrant within South Dakota. There is limited potential for collision with power lines and structures.

12.2.8 Whooping Crane (Federally and State Endangered)

According to a November 26, 2007, letter from USFWS, there are records of migrating whooping cranes (*Grus americana)* in Codington County (Appendix C). The USFWS indicates that South Dakota is within the whooping crane migration corridor and that the species may stopover in suitable habitat including cropland and pastures, wet meadows, shallow marshes, shallow portions of large water bodies, and both freshwater and alkaline basins (Appendix C). Stehn and Wassenich (2007) mapped 1,858 confirmed whooping crane sightings that occurred between 1975 and 2007 during migration and determined a 220-mile wide corridor within which 95 percent of the sightings occurred. The Project is approximately 85 miles east of this migration corridor, indicating that it is relatively less likely for the species to be present within the Project than in areas closer to the migration corridor.

The USFWS identifies power-line-strike mortality as one of the prominent threats to the species, in addition to the potential for disturbance if construction occurs during spring or fall migration (**Appendix C**). Avoidance of stopover habitat due to power line obstruction is another potential impact (Stehn and Wassenich 2007). Impacts to whopping cranes, if present, will be avoided to the extent practicable through project design and BMPs described below in Section 12.3.

12.3 Mitigation

Permanent and temporary impacts to wetland habitats will be avoided whenever possible. The Project Construction Easement will span all surface waterbodies (e.g., prairie potholes, ponds, lakes, streams, rivers, etc.) to the extent feasible to minimize the potential for direct impacts to these resources. In areas where temporary impacts to wetlands are unavoidable, the Applicant will re-vegetate disturbed areas to as close to preconstruction conditions as possible, in consultation with the landowner and per applicable permit conditions and requirements, to avoid potential permanent wetland habitat degradation. If any direct and permanent impacts are expected as a result of final infrastructure placement, the Applicant will work to the extend practical to limit all crossings of potentially jurisdictional wetlands and waters to under 0.10 acres of permanent impacts to remain eligible for USACE NWPs. These efforts also would work to minimize impacts to the northern river otter and avian species that feed primarily on aquatic resources, if these species are present within the Project Construction Easement. Standard erosion and sediment control BMPs will be applied near streams, wetlands, and waterbodies to maintain water quality. Examples include construction of temporary sediment barriers, slope breakers, and mulching to avoid sedimentation and runoff as prescribed by a SWPPP.

Additionally, maintaining wetland habitat minimizes the potential for avian species to be impacted through wetland stopover avoidance. In order to avoid or mitigate for impacts to avian species discussed in Section 12.2, Project design will follow the guidance in the *APLIC Reducing Avian Collisions with Power Lines: the State of the Art in 2012* (APLIC 2012). This will minimize the potential for avian collisions in areas where stopover habitat could be used.

The limited tree clearing that cannot be avoided will be conducted during fall to late winter to avoid disturbing breeding birds during the nesting season and to avoid direct impacts to northern long-eared bats in the event they are present within the Project Construction Easement. In areas where seasonal avoidance is not possible, a nest survey will be conducted prior to clearing. If nests are discovered, an appropriate buffer will be established around them and clearing will not occur until young have fledged from the nests.

The Applicant has reviewed potentially suitable Dakota skipper and Powesheik skipperling habitat through desktop and field studies. Where suitable habitat cannot be avoided, the Applicant will avoid construction activities in those specific locations during the adult flight period (approximately June 15 to July 20, weather dependent) and/or re-vegetate disturbed areas to as close to preconstruction conditions as possible in coordination with the landowner and per applicable permit conditions and requirements. Seed mixes will be designed to incorporate vegetative species that support Dakota skippers and Poweshiek skipperlings.

The Project is not anticipated to result in sizable permanent impacts to existing natural and undisturbed areas. Typically, transmission line projects do not result in sizable permanent impacts due to a limited footprint of ground-disturbing activities. Land use will be permanently modified only in small, isolated areas where structures are placed. Temporary modification may occur for access, initial construction, or other ancillary features. Where temporary impacts are required, the land will be returned to pre-construction conditions. In previously natural areas (i.e., non-cropland), native vegetation seed mixes will be used to revegetate disturbed ground where feasible and pending landowner preferences.

13.0 Effect on Aquatic Ecosystems (ARSD 20:10:22:17)

13.1 Existing Environment

Aquatic resources are present as lakes, ponds, streams, and palustrine wetlands. These aquatic resources have been altered to various levels, ranging from wetlands that are annually cultivated to channelized watercourses to naturally occurring pothole wetlands that have little physical alteration. The Project Study Area and Project Construction Easement crosses wetland and other aquatic resources as discussed in Section 11.1.

13.1.1 State and Federally Listed Aquatic Wildlife

The USFWS South Dakota Ecological Services Field Office publishes a list of threatened and endangered species known or presumed to occur within counties in South Dakota (USFWS 2017). The SDGFP also maintains a list of threatened, endangered, and candidate species (SDCL Chapter 34A-8 and 34A-8A), and provides information on recorded observations within a given county (SDGPF 2016). Previous coordination with the USFWS and SDGPF was reviewed for information on federally or state listed species (**Appendix C**). Information obtained from these sources is summarized in Table 13.1.1.

The SDGFP lists several state-listed aquatic wildlife species in the state of South Dakota including the blacknose shiner (*Notropis heterolepis*) and northern redbelly dace (*Chrosomus eos*) that have the potential to occur in the Project Study Area (SDGFP 2016). The USFWS lists one federally listed aquatic species in Codington and Grant Counties, the Topeka shiner (*Notropis topeka*).

Table 13.1.1. State and federally listed aquatic wildlife potentially present within the Project Study Area.

Common Name	Scientific Name	Status[1]	County Records	County	Global Rank[2]	State Rank
Fish						
Blacknose shiner	*Notropis heterolepis*	SE	Recorded in county	Grant	G5	S1
Northern redbelly dace	*Chrosomus eos*	ST	Recorded in county	Grant	G5	S2
Topeka shiner	*Notropis topeka*	FE	Recorded in county	Codington	G5	S3

[1] *FT – federally threatened; FE – federally endangered; ST – state threatened; SE – state endangered;*

[2] *Global/State Rank Definition (applied rangewide for global rank and statewide for state rank)*

G1 S1 – Critically imperiled because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 S2 – Imperiled because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 S3 – Either very rare and local throughout its range, or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction throughout its range because of other factors; in the range of 21 of 100 occurrences.

G5 S4 – Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery.

13.2 Potential Impacts

Potential impacts to aquatic resources could occur through installation of structures in aquatic habitat or sediment deposition related to construction activities. However, the Applicant will avoid installation of structures in aquatic habitat to the maximum extent feasible. During construction, sediment may reach surface waters as a result of ground disturbance and excavation, grading, and traffic along within the Project Construction Easement. These potential impacts apply to all aquatic species and their habitat described below.

13.2.1 Northern Redbelly Dace (State Threatened)

The northern redbelly dace (*Chrosomus eos)* is a small olive to dark brown-colored fish native to eastern South Dakota that prefers quiet spring-fed areas of streams, bogs, and beaver ponds with aquatic vegetation (SDGFP 2017a). It is found within tributaries to the Missouri, Minnesota, Big Sioux, White, Niobrara, and Keya Paha River drainages. McCoy and Hales (1974) observed the northern red-belly dace in both the North and South Forks of the Yellowbank River in Grant County in 1973 (SDNHD spatial data accompanying correspondence shown in **Appendix C**), but the species was not observed during subsequent surveys (Dieterman and Berry 1996; Burgess and Shearer 2008). It is hypothesized that the species may be extirpated from northeast South Dakota (Skadsen 2016b). The Project Study Are and Project Construction Easement cross the North Fork of the Yellowbank River tributaries (Table 11.1.1 and 11.1.1a); however, there is no information available to determine whether or not the northern redbelly dace inhabits the actual Project Construction Easement.

13.2.2 Blacknose Shiner (State Endangered)

The blacknose shiner (*Notropis heterolepis*) is a small minnow native to eastern South Dakota, and found within tributaries to the Minnesota, Big Sioux, James and Keya Paha River drainages. The species prefers cool, clear streams with deep pools, abundant vegetation and sandy to gravel substrates (SDGFP 2017b). Historical records exist for the Little Minnesota River and Lake Traverse, neither of which are in Grant County (Bailey and Allum 1962). Skadsen (2016b) lists the blacknose shiner as likely extirpated from northeast South Dakota. Additional tributaries to the Minnesota River do occur in the Project Study Area, and the SDGFP (2016) indicates that the species is known from Grant County. However, there is no information available to determine whether or not the blacknose shiner inhabits the actual Project Construction Easement.

13.2.3 Topeka Shiner (Federally Endangered)

The Topeka shiner (*Notropis topeka)* is a small minnow native to eastern South Dakota, and is found within tributaries to the James, Vermillion, and Big Sioux drainages. The species prefers a variety of habitats including runs, pools, and backwater areas in cool, perennial streams. Occupied streams typically are groundwater-fed; and have high water quality, clean gravel

substrates, and vegetated banks (Shearer 2003). Shearer (2003) synthesized available occurrence data and identified 16 streams where the Topeka shiner was observed before 1997, and 38 streams where the species was observed between 1997 and 2002. None of those streams are in Grant or Codington Counties. However, additional tributaries to the Big Sioux River do occur in the Project Study Area, and the USFWS (2012) lists the species as known from Codington County. There is no information available to determine whether or not the Topeka shiner inhabits the actual Project Construction Easement.

13.3 Mitigation

Potential impacts to rivers and streams are expected to be avoided and minimized as much as feasible by spanning these resources. To the extent that avoidance is not feasible due to landowner preferences, or other constraints such as, constructability issues, any potential permanent and temporary impacts will be below USACE NWP thresholds. Temporary impacts are expected to be further minimized with the use of matting for cranes and other equipment. The Applicant will obtain and implement a SWPPP, including appropriate BMPs, to avoid sedimentation and runoff. Where appropriate, the Applicant will re-vegetate disturbed areas to as close to preconstruction conditions as possible in coordination with the landowner and per applicable permit conditions and requirements. If direct impacts to potential habitat cannot be avoided, further site-specific habitat surveys will be conducted to define the potential for impacts to any threatened or endangered aquatic species.

14.0 Land Use (ARSD 20:10:22:18)

14.1 Current Land Use

This Section discusses the existing environment, including current land use, displacement of residences or businesses, noise, communication facilities, and aesthetics, of the Project Study Area and the Project Construction Easement. Also described are the Project's potential impacts on these resources and measures to mitigate the potential impacts. Local land use controls, including zoning ordinances, are discussed in Section 15.

14.1.1 Existing Environment

The Project is located entirely on private land, which includes undeveloped rural areas, agricultural lands, and residential farmsteads. The primary land use within the Project Study Area and Project Construction Easement is cultivated agricultural land used for planted crops, primarily corn; herbaceous grassland; and pastureland (see Section 12, Tables 12.1.2 and 12.1.2a for land cover acreage and percentage). The Project Study Area and Project Construction Easement cross land used for open pasture and grazing. Land along the Project Study Area is characterized by relatively level, hummocky terrain across the Minnesota River valley and

Coteau des Prairies, with relatively steep slopes along the Prairie Coteau Escarpment. Vegetation is primarily cropland and grassland with small patches of planted trees around farmsteads/homesteads, in the form of shelterbelts, and near natural waterbodies.

14.1.2 Potential Impacts

The Project is compatible with existing land use, and is not anticipated to result in sizable permanent impacts to surrounding land. Typically, transmission line projects do not result in sizable permanent impacts due to their limited footprint of ground-disturbing activities. Land use will be permanently modified only in small, isolated areas where structures (e.g., pole foundations, guy wires) are placed. Temporary modification may occur for access, initial construction, or other ancillary features. Where temporary impacts are required, the land will be returned to pre-construction conditions. The area surrounding the Project Construction Easement primarily is used for agricultural production, which is expected to continue following construction and operation of the Project (see Section 19.2). Construction of the Project will result in short-term disturbances to soils and vegetation and increased traffic and noise on local roads. Noise and temporary air quality impacts, in the form of diesel exhaust and dust and resulting from the operation of heavy equipment, are anticipated. However, once construction is complete, traffic and noise levels will return to pre-construction levels. Long-term operation of the proposed Project is not expected to adversely impact rural lifestyles or create hardships for rural residents. The addition of income for agricultural landowners also is expected to facilitate continued farming and ranching of the lands in agricultural production because operation of the Project is a compatible use.

Based on data collected by the Planning Districts of South Dakota, 49 structures associated with farmsteads are located within the Project Study Area. No farm structures are located within the Project Construction Easement.

The Applicant will execute lease options or purchase land rights for private property crossed by the Project, in accordance with state and federal land acquisition requirements. Land rights will be recorded as part of the public record.

14.1.3 Mitigation

The Project is generally compatible with the existing land uses in the area, and no additional mitigation is required. The project will minimize impacts to agricultural operations.

14.2 Displacement

14.2.1 Existing Environment

Displacement results from ROW acquisitions that require the use of property occupied by a business or residence. A displacement is defined as an impact to an occupied business or home that is located within the Project Construction Easement.

Businesses and residences near the Project were identified through field observations and review of aerial photography.

One commercial stone quarry, two sand quarries, and approximately 80 residences, including 20 residences in the town of Stockholm, are located within the Project Study Area. According to the South Dakota GIS, only 11 structures are located within 500 ft. of the Project Construction Easement (Table 14.2.1). Of those 11 structures, seven are occupied rural residential structure and/or farmsteads, and three are classified as abandoned. There is one weigh station within 500 ft. of the Project Construction Easement.

Table 14.2.1. Occupied and Vacant Homes within 500 Feet of the Proposed Project Construction Easement.

Structure	County	Township/Range/Section	Comment	Distance to Project Construction Easement (ft)
Rural Residential	Grant County	121 North / 47 West / 34	Occupied	147.73
Farm	Grant County	120 North / 48 West / 17	Occupied	171.23
Farm	Grant County	120 North / 48 West / 19	Abandoned	229.47
Rural Residential	Grant County	120 North / 48 West / 30	Occupied	266.71
Farm	Grant County	120 North / 48 West / 11	Occupied	274.96
Rural Residential	Grant County	120 North / 48 West / 30	Occupied	285.61
Rural Residential	Grant County	120 North / 49 West / 36	Abandoned	286.12
Farm	Codington County	118 North / 51 West / 2	Occupied	296.84
Farm	Grant County	120 North / 48 West / 16	Abandoned	322.46
Rural Residential	Grant County	120 North / 48 West / 1	Occupied	361.13
Weighstation	Grant County	121 North / 47 West / 24	Other	428.93

Source: South Dakota GIS 2015.

14.2.2 Potential Impacts

No occupied businesses or residences are within the Project Construction Easement. Therefore, no businesses or residences will be displaced.

14.2.3 Mitigation

No mitigation is proposed because no businesses or residences will be displaced.

14.3 Noise

Noise, defined as unwanted sound, may comprise an assortment of sounds of different intensities across the full frequency spectrum. Noise is measured on a logarithmic scale in units of decibels (dB). Human hearing is not equally sensitive to all frequencies of sound, and the A-weighted decibel (dBA) scale most closely corresponds to the frequency sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA (Table 14.3). Cumulative noise increases along the scale of human perception in a logarithmic scale with noise levels at less than 3 dBA being barely perceptible and changes in noise levels over 20 dBA being dramatically perceived.

Table 14.3 Typical human response to A-weighted decibel noise (dBA).

Sound Pressure Level (dBA)	Human perception
Less than 3 dBA	Barely perceptible
5 dBA	Clearly noticeable
10 dBA	Doubling or halving of loudness
20 dBA	Dramatic change in loudness

14.3.1 Existing Environment

The primary land uses surrounding the Project Study Area and Project Construction Easement are agricultural and consist of farms with dispersed recreation areas, fishing areas, and lakes. Existing noise in rural areas vary between 40 and 50 dBA, and noise in suburban areas varies generally between 50 and 60 dBA (Smith et al. 1999). General background noises such as a quiet rural area, a whisper, a library, and a quiet suburb are under 50 dBA. Noise levels in urban areas range from 60 to 70 dBA (Smith et al. 1999) and include noises such as conversations in restaurants, offices, and running of household items including a dishwasher, vacuum, or radio. Everyday common noise levels are noted in Table 14.3.1. Higher noise levels, generally those between 80 to 180 dBA, include jet takeoffs, motorcycles, concerts, stadium noise, shotguns, and a rocket launch (Noise Help 2017; IAC Acoustics 2017).

Table 14.3.1 Noise source examples of A-weighted decibel noise (dBA).

Sound Pressure Level (dBA)	Noise Source Example(s)
10	A pin dropping
20	Rustling leaves
30	Whisper; quiet rural area
40	Computer; library

50	Refrigerator; quiet suburb
60	Air conditioner at 100 ft.; conversation in restaurant, office, background music
70	Dishwasher; vacuum cleaner; radio; passenger car at 65mph
80	Garbage Disposal, car wash, propeller plane flyover at 1,000 ft.; diesel truck at 40 mph
90	Boeing 737 at one nautical mile; lawn mower
100	Motorcycle (riding); garbage truck; jet flyover at 1,000 ft.
110	Concert with live rock music; jackhammer; steel mill, automobile horn at 1 meter
120	Thunderclap; chainsaw; oxygen torch
130	Peak stadium crowd noise
140	Jet engine at takeoff; air craft carrier deck
150	Fighter jet launch
160	Shotgun
170	Safety airbag
180	Rocket launch

Sources: Noise Help 2017; IAC Acoustics 2017.

14.3.2 Potential Impacts

Construction activities will generate short-term and intermittent noise that may affect nearby residences on a short-term basis. Construction noises may range depending on equipment used and the operation being performed but may typically range from 70 to 100 dBA for typical construction equipment such as air compressors, backhoes, concrete mixers, cranes, dozers, generators, jackhammers, scrapers, shovels, and trucks (National Transportation Library 2017). Operation of the transmission lines will produce noise, called corona noise. The noise level is contingent on conductor conditions, voltage level, and weather conditions. In foggy, damp, or rainy weather, transmission lines can make a crackling sound due to a small amount of electricity ionizing the moist air near the conductors. People do not normally hear noise from a transmission line during heavy rain because the background noise level of the rain is usually greater than the noise from the transmission line. During dry conditions, corona noise results in noise levels of 40 to 50 dBA in close proximity to a transmission line, which is comparable with general rural area noise. In wet conditions, corona noise may increase to 50 to 60 dBA which is comparable to suburban or urban area noise levels (Transmission Line Noise Fact Sheet 2017).

The State of South Dakota does not regulate noise from transmission lines (corona noise) with measureable standards (Edison Electric Institute 2013; South Dakota statutes Chapter 49-41B). Audible noise calculations for single versus double circuit are discussed further in Section 23.4.3, with noise for single circuit ranging 1.4 to 31 dBA and double circuit ranging from 11.6 to 40.9 dBA.

14.3.3 Mitigation

During construction, noise levels will be minimized by ensuring that construction equipment is equipped with working mufflers to minimize noise levels. Construction activities generally will be limited to the hours of 7 a.m. to 9 p.m. No additional mitigation measures are necessary since there will be minimal noise impacts from Project.

14.4 Satellite, Cellular, Radio, TV, and GPS Reception

Corona discharge from high-voltage transmission lines can generate electromagnetic "noise" at the same frequencies used to transmit radio and television signals. Corona discharge is caused by the ionization of the air surrounding conductors and hardware and can cause interference with the reception of radio and television signals depending on the strength and frequencies in which these signals are broadcast. Wet weather can greatly enhance the effects of corona discharge. Corona discharge can be minimized by increasing the spacing between conductors, and through regular maintenance and tightening of loose hardware on the transmission line.

If radio interference from corona discharge associated with a transmission line occurs, satisfactory reception from AM radio stations can be achieved by appropriate modification of, or an addition to, the receiving antenna system. Typically, AM radio frequency interference occurs directly underneath a transmission line and dissipates quickly as one move either side of the line.

Corona-generated radio frequency noise currents decrease in magnitude with increasing frequencies and are relatively small within the FM broadcast band. Therefore, FM radio receivers generally do not pick up interference from transmission lines. Additionally, the inherent interference rejection properties in FM radio systems make them virtually immune to amplitude-type disturbances.

Cellular phones operate on a wide range of radio frequencies and are not expected to pick up interference from transmission lines. Furthermore, as telecommunication carriers broaden the capabilities of cellular phones, corona-generated noise has too small a frequency range and will become increasingly insignificant as an interference source. The current generation of cellular phones increasingly incorporates satellite communication capabilities; as such, interference from the Project's corona-discharge is not expected to occur.

Signal blocking caused by large metal structures may cause interference with two-way mobile radios if the structure is aligned between the receiver and a weak, distant signal. However, this interference usually is removed by repositioning the mobile radio receivers away from transmission line structures, thereby restoring communications.

Although rare, television interference may occur when a large transmission structure is aligned between the receiver and a weak distant signal, creating a shadow effect. Television interference also may be caused by loose and/or damaged hardware along the transmission line.

Global Positioning System (GPS) units use three or more satellite signals to triangulate a position. The accuracy of this position is affected by the number of satellites, the geometry of the satellites' position in the sky at a given moment, and by atmospheric factors. GPS units are constantly receiving or dropping satellite signals as satellites constantly orbit the earth. A study published by the Institute of Electrical and Electronics Engineers in 2002 (Siva and Olsen 2002) determined that GPS signals are not affected by overhead conductors or by electromagnetic interference. Although a rare event, a temporary drop in GPS accuracy may occur as a result of line-of-sight blockages if a transmission structure is situated between a GPS receiver and a satellite. Signal and GPS accuracy is usually restored with minor repositioning of the unit or satellites above.

14.4.1 Existing Environment

Twelve Federal Communications Commission (FCC)-registered communication towers are located in Grant County, while 20 FCC-registered towers are located in Codington County; however, none of the towers are located within the Project Study Area or the Project Construction Easement (Homefacts 2017).

14.4.2 Potential Impacts

In June 2009, national television broadcasts were transitioned to digital signals. Digital reception is typically less resistant to multipath reflections, and more tolerant of "noise" in most cases, than analogue broadcasts. Although digital television broadcasts are more tolerant of radio frequency noise, if reflections or noise levels are great enough, they can impact digital television reception. There is a potential for corona and gap discharges associated with the high voltage transmission line to impact transmissions from omnidirectional communication towers, such as radio and television, if the height of the transmission line and the beam paths from those towers are aligned.

14.4.3 Mitigation

Project hardware will be designed and maintained to minimize corona and gap discharges. However, if interference to radio, cellular telephone, television, GIS or other communication tower facilities occurs, the Applicants will work with the communication towers' owners to mitigate the impacts. If interference from corona discharge occurs for radio or television stations within the primary coverage area, the Applicants will work with residents to achieve satisfactory reception. Modification to the existing antenna system, or installation of an outside antenna if one is not present, typically restores satisfactory reception. In the rare instance that the Project causes interference within a primary coverage area, the Applicants will work with the affected viewers to correct the problem at the Applicant's expense.

14.5 Aesthetics

Landscapes that include a balance of diversity and harmony have the highest potential for scenic value and may be considered important to persons living in or traveling through a region. Viewer perception is founded on two items: the sensitivity and magnitude of the viewer's concern for the view shed, and exposure (i.e., function of the type, distance, perspective, and duration of the view). Sensitive visual and aesthetic resources within the Project Study Area include historical structures, open space, and water resources.

14.5.1 Existing Environment

Dominant visual characteristic in the Project Study Area is agricultural land (both cultivated and grazed) followed by a mixture of rural residential, wetlands, and water features. Constructed infrastructure, including homes, cities, transmission lines, highways, county roads, railroads, barns, silos, communication towers, and other structures exist throughout the Project Study Area but not within the Project Construction Easement, with the exception of roads and railroads. Area topography includes relatively flat land slopes, such as in the Minnesota River Prairie lowlands. However, along the Prairie Coteau Escarpment, steep slopes are present, and the topography within the Coteau des Prairies is variable. Visual topographic characteristics include seasonal and semi-permanent wetlands, hummocks, hills, perennial streams, and flat land areas. This is discussed in greater detail in Section 10. Project elevations range from 1,050 ft. asl at the northeastern end and rise 1,970 ft. asl at the southwestern end. The topography of the Project is shown in **Exhibit 5**.

14.5.2 Potential Impacts

The degree to which the Project will be visible will vary by location. The Project would frequently be visible to landowners who live along or near the Project, or residents who travel the roads near the Project. However, constructed features (e.g., existing utility lines), topography, and natural landscape features such as tree cover, in relation to a viewer's physical location, may impede view of the Project. Generally, the Project also will be visible outside of local communities, such as Watertown.

14.5.3 Mitigation

The Applicant utilizes measure to minimize the impact the Project will have upon existing scenic integrity. Many areas near the Project Study Area and Project Construction Easement currently are visually impacted by existing roadways, transmission lines, and railroads. The Applicant will continue to work with landowners and public agencies to identify concerns related to the Project and aesthetics. Placement of infrastructure will be designed to minimize visual impacts to scenic locations and maximize the feasible distance from road and trail crossings. The Applicant will

use care to preserve the natural landscape and prevent any unnecessary destruction, scarring, or defacing of the natural surroundings.

15.0 Local Land Use Controls (ARSD 20:10:22:19)

The Project will be constructed on land regulated by the Codington County and Grant County zoning ordinances and land use control policies. Current project land use is described in detail in Section 14.1. Comprehensive land use plans are available for Codington and Grant Counties. Construction of the Project (whether single or double circuit) will comply with applicable local ordinances as discussed in Section 24.0 and are consistent with the Comprehensive land use plans for both Codington and Grant Counties.

16.0 Water Quality (ARSD 20:10:22:20)

16.1 Existing Environment

Section 303(d) of the federal Clean Water Act requires that the states develop a list of waterbodies that do not meet their designated uses due to excess pollutants (impaired waters) and to determine total maximum daily loads of all pollutants from all sources that a waterbody can receive and still meet applicable water quality standards. The 303(d) list of impaired waters is issued every 2 years and is based on violations of water quality standards violations. Review of the 2016 list SDDENR 2016) indicates that the Project Construction Easement does not cross any waterbodies that are listed as impaired by the U.S. Environmental Protection Agency (USEPA).

16.2 Potential Impacts

During the construction of the Project (under both the single and double circuit design options), there is a potential for sediment from disturbed lands or other contaminants to reach surface waterbodies as a result of excavation, grading, equipment operation, construction traffic, or other unforeseen circumstances. If land surface erosion or other potential contaminant sources are not controlled during construction, the quality of any receiving surface waterbodies has potential be affected.

16.3 Mitigation

The Project Construction Easement will span all surface waterbodies to the extent feasible (i.e., prairie potholes, ponds, lakes, streams, rivers, etc.) to minimize the potential for direct impacts to these resources. If any direct and permanent impacts are expected as a result of final infrastructure placement, the Applicant will keep all crossings of potentially jurisdictional wetlands and waters under the 0.10 acre threshold of permanent impacts to remain eligible for using the NWPs.

However, due to the nature and extent of the construction activity, the Applicant will need a National Pollutant Discharge Elimination System (NPDES) general permit for storm water discharges associated with construction activities (SDR100000) from the SDDENR. Additionally, the Applicant will prepare and implement a SWPPP that describes storm water BMPs that will be used to minimize the potential for erosion and subsequent sedimentation as a result of Project construction.

Once Project construction has been completed, no significant impact to surface water quality is expected because wetland and waterbody impacts will have been avoided and minimized, and disturbed land will be restored to as close to pre-construction conditions as possible, as required by the SWPPP.

The Applicant will implement BMPs during construction of the Project to protect topsoil and adjacent waterbodies and minimize soil erosion. Structural and non-structural erosion and sediment control practices will be employed to minimize the potential for contaminants to be discharged to surface waterbodies. These BMPs may include, but are not limited to, the following:

- Containment of stockpiled material away from surface waterbodies and shorelines;
- Control of storm water run-on and runoff;
- Topsoil will be segregated and stockpiled separately in areas where topsoil is removed. Topsoil will be respread following construction completion. In temporary travel lanes, laydown areas, or other areas where the topsoil has become compacted, the topsoil will be decompacted prior to reseeding; and
- Disturbed areas will be reseeded and revegetated.

17.0 Air Quality (ARSD 20:10:22:21)

17.1 Existing Environment

The State of South Dakota follows ambient air quality goals and standards as defined under the federal government regulations (ARSD 74:36:02). The Project Study Area and Construction Easement are located in an area currently under National and South Dakota Ambient Air Quality Standards. The nearest Ambient Air Quality Monitoring Site is located in Watertown in Codington County, South Dakota, southeast of the Project.

The existing air quality of the Watertown region is good, based on the air quality index established by the USEPA under federal regulations. The Project Study Area has limited air pollutant emissions. The Brookings and Watertown area has only exceeded the 24-hour particulate matter 10 microns in diameter or less (PM 10) standard three times in the 27 years the measurement system has been in operation. These exceeding events were due to high wind

events casing fugitive dust levels to exceed the 24-hour standard (SDDENR 2014). Fugitive dust emissions are generated from wind erosion of disturbed areas and may affect both rural and urban environments. Air quality pollutant emissions include particulate matter such as fine dust from vehicle travel on unpaved roads; agricultural activities; other wind-blown dust and air pollutants; ozone or ground-level smog such as carbon monoxide; and sulfur dioxide and nitrogen oxides from vehicles, stationary sources burning coal and oil, electric utilities, and industrial boilers. Sulfur dioxide and nitrogen oxide are monitored in Sioux Falls, which is the closest monitoring station to the Project Study Area that monitors these elements (SDDENR 2017).

17.2 Potential Impacts

Temporary impacts to air quality are expected as a result of Project construction under both the single and double circuit design options. Construction may result in increased short-term fugitive dust particulate matter and emissions due to increased vehicle traffic. Construction activities may include the following: ROW clearing, hauling and excavation, etc. These impacts are temporary, and no long-term impacts are anticipated from construction activities. No impacts from Project operation are anticipated.

17.3 Mitigation

National Ambient Air Quality Standards and state standards will be followed for the duration of the Project. State and federal standards will be applied to minimize potentially harmful particulates and emissions. The Applicant will use standard BMPs to minimize air quality pollution emissions that may include dust control, monitoring, and reclamation during and after construction.

18.0 Time Schedule (ARSD 20:10:22:22)

The Applicant proposes that the Project be in-service by December 31, 2019. The following table provides the anticipated, high-level permitting and construction milestones and schedule.

Table 18 Permitting and Construction Schedule

Schedule Item	Date
Submit PUC Facility Permit Application	October 2017
Material Procurement	April 2018
Final Transmission Line and Substation Connection Design	April 2018
Completion of Construction Easement Acquisition	August 2018
Anticipated Date of Commission Decision on Facility Permit	October 2018
Construction Start	October 2018
In-Service Operations	On or about December 31, 2019

19.0 Community Impact (ARSD 20:10:22:23)

This section describes the main community characteristics in and around the Project Study Area, including the Project's impacts on socioeconomics, community resources, agriculture, transportation, and cultural resources. Socioeconomic variables evaluated include population, minority populations, poverty, employment and income, and housing. These variables were obtained or derived from 2010 and 2016 U.S. Census Bureau data and projections. The community impacts are the same for the single and double circuit design options.

19.1 Socioeconomic and Community Resources

The socioeconomics analysis area is Codington and Grant Counties. Data for the City of Watertown and the State of South Dakota occasionally are used for comparison.

19.1.1 Existing Environment

Table 19.1.1 shows select demographic factors for these select regions. With respect to minority populations, Watertown's percentage of minorities is higher than Codington or Grant Counties', but is lower relative to the state as a whole. The percent of population living below poverty level is highest for the state, followed by Watertown, Codington County, and then Grant County. Per capita income is extremely similar across the four areas.

Table 19.1.1 Socioeconomic factors in select regions.

Location	Population	Minority Populations (Percent)	Population Below Poverty Level (Percent)	Per Capita Income
Watertown	21,482	5.2	11.1	$26,389
Codington Co.	27,227	5.7	10.8	$26,767
Grant Co.	7,148	2.9	9.2	$26,741
State of South Dakota	814,180	14.1	13.5	$26,747

Source: U.S. Census Bureau, 2010

Table 19.1.1a Employment by occupation in select regions, shown as percent of employed persons.

Industry/Labor Market	Watertown	Codington Co.	Grant Co.
Sales and Administration	27.3	25.9	25.4
Production and Transportation	17.9	17.4	8.7
Science and Arts, including Health Facilities	9.7	9.9	5.5
Management	6.9	8.7	15.8
Farming	1.4	2.2	8.2
Construction and Extraction	5.6	5.6	5.8
Installation, Maintenance, and Repair	3.7	3.5	5.3
Business	3.1	3.0	2.6

As shown in Table 19.1.1a, the largest employment and labor markets by occupation in Watertown and Codington County are similar and consist of sales and administration (27.3 % and 25.9%, respectively), production and transportation (17.9% and 17.4%, respectively), science and arts (including health facilities) (9.7% and 9.9%, respectively), management (6.9%

and 8.7%, respectively), and construction and extraction (5.6% for both). The largest employment and labor markets by occupation in Grant County are sales and administration (25.4%), management (15.8%), production and transportation (8.7%), farming (8.2%), and construction and extraction (5.8%). The three largest employment industries in Watertown and Codington County are similar and include manufacturing (21.6% and 20.2%, respectively), educational and healthcare services (16.9% and 16.4%, respectively), and retail trade (13.1% and 12.2%, respectively). The three largest employment industries in Grant County are agricultural (16.7%), educational and healthcare services (16.3%), and wholesale trade (8.7%)(U.S. Census Bureau 2010). Smaller industries and labor markets with fewer employees in Watertown, Codington County, and Grant County include infrastructure, fire protection, law enforcement, recreational facilities, schools, and other community or government services.

Current housing and land values for the region are similar. The median household income totaled $46,766 in Watertown, $48,912 in Codington County, $51,272 in Grant County, and $50,957 in the state. Using 2015 inflation-adjusted dollars, the per capita income in Watertown was $26,389, Codington County was $26,787, and Grant County was $26,741. The per capital income for the state was $26,747. The percentage of persons living below the poverty level ranked highest at the state level at 13.7%, followed by Watertown at 11.1%, Codington County at 10.3%, and Grant County at 9.2%.

In 2016, the U.S. Census Bureau reported 10,050 housing units in Watertown, 12,937 housing units in Codington County, and 3,572 in Grant County. The Codington County 2016 data reflect a 4.36% increase in housing units compared with 2010 Census data, and the Grant County 2016 data shows a 1.99% increase. Watertown shows a 4.06% increase since 2010. In 2010, the median value of owner-occupied housing units in Watertown and Codington County were similar at $144,900 and $145,500, respectively, while Grant County was lower at $107,900. The Codington County 2016 figures reflect a 4.36% increase in value since the 2010 Census, Grant County shows as 1.29% increase, and Watertown shows a 4.37% increase.

The Census Bureau provides periodic socioeconomic estimates for selected geographies to help provide information on the changing demographics of the population between decennial censuses. Through the American Community Survey, the Census provided 3-year socioeconomic estimates for Codington and Grant Counties and the State of South Dakota, as summarized in Table 19.1.1b.

Table 19.1.1b Socioeconomic projections from 2010 to 2016.

Location	Population	Race Percentage (White)	Percentage of Population Below Poverty Level	Per Capita Income
Watertown	22,172	94.8	11.1	$26,389
Codington	28,063	94.4	10.8	$26,767

Grant County	7,148	96.6	9.2	$26,741
South Dakota	865,454	85.2	13.7	$26,747

Source: U.S. Census Bureau 2010

19.1.2 Impacts and Mitigation

There will be short- and long-term benefits to those in the vicinity of the Project that include, but are not limited to an increase to the counties' tax base as a result of the incremental increase in revenues from utility property taxes (based on the Project value). The chief economic effect of the Project will result from property taxes paid for ROW and improvements in Codington and Grant Counties. The assessed value of the proposed ROW and improvements has not yet been determined; therefore, it is not currently possible to determine the amount of tax revenues that will accrue to Watertown, or to Codington and Grant Counties. Additional benefits will result from the Project's capability to transmit energy generated from renewable and other energy resources that could spur energy development in the area, thereby resulting in additional economic gains. Further information on benefits of the Project is presented in Section 4.0.

Construction and operation of the Project is not anticipated to affect the local distribution of jobs or occupations in the community. The Project is not anticipated to have significant short- or long-term effects on commercial and industrial sectors, housing, land values, labor markets, health facilities, sewer or water treatment facilities, solid waste management facilities, fire or police facilities, schools, recreational facilities, and other government facilities or services. The Applicant does not expect a permanent impact on the population, income, occupation distribution, or integration or cohesion of communities.

The Project will be offset from roads and section lines; the transmission structures and the Project ROW are not expected to be located within the road ROW. The final engineering design will take into account planned or programmed future improvements to area roadways to ensure sufficient road ROW is maintained for future roadway widening.

The Project will have a positive impact on the local area as a result of lodging and food sales and other indirect economic benefits associated with transient workers. The Applicant expects the Project will employ workers associated with construction and support service areas. Employee estimates are described in Section 20.

The Project is expected to have a negligible effect, if any, on the assessed values of private property and, therefore, on property taxes (Hoen et al. 2013).

The Applicant expects to store less than 2,200 pounds of hazardous waste per month, which falls under the Resource Conservation and Recovery Act storage limit to qualify as a Conditionally Exempt Small Quantity Generator. The transportation, treatment, and disposal of hazardous waste will be required in accordance with state and federal regulations. Additionally, there is the

possibility that the improper use, storage, and/or disposal of hazardous materials such as fuels, oils, and maintenance fluids could result in a release that could cause contamination and exposure during construction, operation, and maintenance activities associated with the Project. Direct effects of a release would include contaminating soil and water resources, while indirect effects would include exposing humans, wildlife, and vegetation to the contamination. The Applicant will implement a Spill Prevention, Control, and Countermeasure plan to minimize risk and contamination. Specifically, this plan will ensure that necessary resources are available to respond to a release and will minimize the risk of contaminating soil and water resources and the associated exposure to humans, wildlife, vegetation, and air quality. The risk of contamination and exposure will be further minimized by the Project's overall design, BMPs, and mitigation measures.

Consistent with the Applicant's corporate environmental health and safety policy, the Applicant also will implement an Environmental Training and Monitoring Program that will communicate environmental concerns and appropriate work practices, including spill prevention, control, and countermeasure protocols to all field personnel.

19.2 Agriculture

19.2.1 Existing Environment

Codington County has a total land area of 717 square miles, with approximately 577 square miles of land (80% of the county land area) being in farms (rounded to the nearest whole number) (United States Census Bureau 2013, Census of Agriculture for 2012). In 2012, there were a total of 713 farms, and the average-sized farm was 518 acres. Crop sales were primarily grains, oil seeds, dry beans, and dry peas, and cattle, hogs, and sheep comprised the majority of livestock sales (Census of Agriculture 2012). From 2007 to 2012, the number of full-time farms increased by 7.5 percent from 2007 to 2012, land acres used for farming increased by 0.94 percent, and the average farm decreased in size by 0.65 percent. Sales of farm goods increased 60 percent from 2007 to 2012, and totaled $172,411,000 in 2012.

Grant County has a total land area of 688 square miles, with approximately 670 square miles of land (97% of the county land area) being in farms (rounded to the nearest whole number) (Census of Agriculture 2012). In 2012, there were a total of 618 farms, and the average-sized farm was 694 acres. Crop sales were primarily grains, oil seeds, dry beans, and dry peas, and cattle, hogs, and sheep comprised the majority of livestock sales (Census of Agriculture 2012). From 2007 to 2012, the number of full-time farms increased by 11.4 percent, land acres used for farming increased by 17.9 percent, and the average farm increased in size by 0.60 percent. Sales of farm goods increased 80 percent from 2007 to 2012, and totaled $240,819,000 in 2012.

19.2.2 Impacts and Mitigation

The Project is expected to have minimal effects on agriculture in the region. Field observations and review of aerial photography indicate that the majority of active farming operations involve cattle grazing with a minimal amount of tilled agriculture.

The Project will result in temporary and permanent impacts to farmland along the Project route. No impacts to livestock operations are anticipated. During Project construction, cattle will be restricted from grazing in the vicinity of the Project Construction Easement. After construction is completed, grazing in the Project Construction Easement will be permitted. Permanent impacts to agricultural lands primarily will result from structure installation along the Project Construction Easement. Construction of the Project is anticipated to result in a permanent loss of approximately 3.37 acres of agricultural land (please see Table 10.2.2). The permanent impacts associated with each structure were calculated assuming a 5-ft. radius (approximately 75 square ft.) around each pole, a 10-ft. radius (approximately 314 square ft.) around each structure foundation (because landowners may not wish to cultivate the land any closer than five ft. from the structure base), and guy anchors strings as they intersect the ground surface. At the time of this Application, exact locations of structures and associated features (e.g., access roads) are not known. Construction of the Project will result in an estimated 989 acres of temporary impacts to farmland due to the preparation of structure foundations, laydown areas, structure assembly areas, wire stringing areas, and travel paths (please see Table 10.2.2). This impact is estimated based on the National Land Cover Database land cover breakdown of the Project Construction Easement, the temporary use of a 32-ft. wide travel path within the Project Construction Easement, installation of pole structures, and stringing of conductors.

Areas disturbed during construction will be repaired and restored to preconstruction contours to the extent practicable so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural re-vegetation, provide for proper drainage, and prevent erosion. Construction laydown areas and temporary transmission line travel paths will be restored per landowner agreements. Drain tile lines may be present along the Project route. The Applicant will work with landowners to identify and mark drain tile lines to avoid damage during construction. Where locations are known, temporary travel paths will avoid drain tiles where possible. Where avoidance is not possible, matting may be required. If drain tile lines are inadvertently damaged by construction of the Project, the Applicants will repair tile lines. Landowners will be compensated for any crop damage that occurs during construction.

19.3 Transportation

Transportation within the Project Study Area includes that occurring on U.S. highways (including an interstate), state highways, Codington and Grant County highways, township roads, unauthorized roads, and roads on private lands.

19.3.1 Existing Environment

Most of the Project is within 0.25 mile of existing transportation routes, including township and county roads. The network that will comprise the transportation system used during Project construction and operations and maintenance (O&M) includes rural and section line roads. The Project crosses active railroads in two locations (T121N R47W and T119N R50W). An inactive railroad is crossed in T121N, R47N. Major roads within the Project Study Area are depicted in **Exhibits 1** and **2**. Airports in the Project's vicinity in South Dakota include Watertown Regional Airport, west of Interstate 29 and approximately 14.4 miles west of Project Study Area; the Ortonville Municipal Airport, 3.9 miles northeast of the Project Study Area; and Milbank Municipal Airport, 1.0 mile west of the Project Study Area. No private air strips occur near the Project Study Area. No impacts to registered commercial facilities are anticipated.

19.3.2 Impacts and Mitigation

The Project is not anticipated to result in permanent impacts to transportation resources in the Project Study Area. Indirect effects may include increased traffic volume along local, state, and federal roadways. Impacts are anticipated to be minor, as a relatively low number of workers and equipment will be accessing any one location within the Project Study Area at any time. Direct effects to transportation also will be minimal during O&M activities. The Applicant will work with state and local highway departments regarding applicable permitting requirements. The Applicants also will coordinate with railroads to span active and inactive lines, and to ensure construction and operation in the Project Study Area will not affect use of the railroads. There will no anticipated impacts to registered commercial aviation facilities.

19.4 Cultural Resources

Results of a record search and review of previously recorded cultural resources, as well as the results of the current Level III survey conducted for the Project are presented in this section.

In accordance with the *Guidelines for Cultural Resource Surveys and Survey Reports in South Dakota (For Review and Compliance)* (South Dakota State Historical Society 2005), the Project Study Area of a 0.5-mile buffer surrounding the Project Construction Easement was extended to include a 1-mile buffer of the Project Construction Easement for Cultural Resources only. A records search was conducted for the extended Project Study Area, which included a 1-mile buffer of the Project Construction Easement, on June 15, 2017 through the Archaeological Research Center at the South Dakota State Historical Society for the Project area. Pursuant to South Dakota Codified Law 1-20-21, information contained within the records search data is considered confidential and not for public distribution. Additional background research conducted for the project area included review of the historical General Land Office (GLO) plat maps available online from the Bureau of Land Management. Information presented below is a

summary of the data obtained from the Archaeological Research Center and from the GLO database; site specific locational information has been omitted.

The results of the records search indicate that 22 previous cultural resource inventories have been conducted within one mile of the project area for diverse other projects. Eight of these inventories overlap the project area; however, seven of these inventories were for linear projects and only minimally cover the Project Construction Easement. Five of the previous inventories were completed in the past 10 years.

19.4.1 Existing Environment

The Records Search conducted for the extended Project Study Area, which is 1 mile on either side of the Project Construction Easement per SD State Historic Preservation Officer guidance, indicates that eight previously recorded archaeological sites, four previously recorded historic bridges, 54 previously recorded standing historic structures, and two previously recorded cemeteries have been documented. One previously recorded standing historic structure has been determined eligible for the National Register of Historic Places (NRHP) within 1 mile of the Project Construction Easement. Previously identified sites intersected by the Project Construction Easement are discussed below by resource type.

19.4.1.1 Previously Documented Archaeological Sites

The Project Construction Easement intersects two of the previously recorded archaeological sites. Both sites (39GT2007 and 39GT2042) are historic railroad segments (**Appendix E, Table 1**). The remaining six archaeological sites identified within the extended Project Study Area includes two Native American artifact scatters (39GT0045 and 39GT0046), one historic school foundation (39CD0083), one Euro-American depression (39GT0007), one Euro-American burial (39GT0060), and one Euro-American artifacts scatter (39GT0063).

The two railroad sites in the Project Construction Easement have been determined eligible for the NRHP. The remaining six sites in the extended Project Study Area include two Native American artifact scatters and one Euro-American burial that have been determined to be not eligible for the NRHP, and one historic school foundation, one Euro-American depression, and one Euro-American artifact scatter that have not been evaluated for their eligibility for listing on the NRHP.

19.4.1.2 Previously Identified Standing Structures

Within the extended Project Study Area, 54 previously recorded standing structures have been identified (**Appendix E, Table 2**). Standing structures include residences, agricultural buildings, farmsteads, churches, schools, and commercial buildings. No previously recorded standing structures are located within the Project Construction Easement.

Of the 54 previously recorded standing structures, one is eligible for the NRHP, 50 have been determined not eligible for the NRHP, and three have not been evaluated for the NRHP. The NRHP-eligible structure is the James Andersen Farm (GT00000191).

19.4.1.3 Previously Identified Historic Bridges

Four previously recorded historic bridges have been identified within the extended Project Study Area surrounding the Project Construction Easement (**Appendix E, Table 3**). However, the Project Construction Easement does not intersect any of these resources. All four historic bridges have been determined not eligible for the NRHP.

19.4.1.4 Previously Identified Cemeteries

Two previously recorded cemeteries have been identified within the extended Project Study Area surrounding the Project Construction Easement (**Appendix E, Table 4**). However, the Project Construction Easement does not intersect either of these resources. Both cemeteries are determined not eligible for the NRHP.

19.4.1.5 General Land Office Review

The GLO survey plat maps were reviewed for historic features that coincide with the Project Construction Easement. This review revealed that from 1883, two townships (Township [T] 121N Range [R] 47W and T120N R48W) exhibited evidence of Euro-American settlement within the Project Construction Easement. In addition to direct evidence of Euro-American settlement, by the 1874 GLO mapping of T120N R48W, the Project Construction Easement crosses the historic boundary of the Old Sioux Indian Reservation. Codington County was established in 1877 and Grant County was formed in 1873; however, Grant County was previously part of Deuel County from 1862 until its creation (South Dakota Genealogy Trails 2006ab). Evidence of settlement on the examined maps includes improved roads, buildings, two trails, and a railroad.

The improved roads are all unnamed, and the buildings are unmarked on the historic GLO maps. The three buildings are all on plowed land and likely represent homesteads on the 1883 map for T121N R47W. On the 1865 map for T121N R47W, a trail possibly crosses the project in Section 26 and may be evidence of early settlement. The second trail is somewhat obscured by text in Section 1, T120N R48W, appearing as a dashed line in 1865 near a pond on land owned by Fritz Ongerheifer; the map does not depict to where this trail might have connected. The Chicago, Milwaukee, and St. Paul Railroad, which crosses the northernmost half-mile of the Project Construction Easement, was identified on the 1883 GLO plat for T121N R47W. The modern

extant railroad corridor now follows the historic railroad route. A complete description of identified GLO features that cross the Project Construction Easement can be found in Table 19.4.1.5.

Table 19.4.1.5 List of resources by Township and Range, following the Project Construction Easement north to south.

Township	Range	Year	Section	Resource(s)
121	47	1865	26	Possible trail (unlabeled dashed line)
		1883	24	Railroad, improved roads (2)
			25	Buildings (2), improved road
			26	Improved road
			35	Building, improved road
120	48	1874	--	None
		1883	1	Trail
			2	Improved road
			11	Improved road
120	49	1873	--	None
119	49	1874	--	None
119	50	1874	--	None
118	50	1874	--	None
118	51	1873	--	None
119	51	1873	--	None

19.4.2 Current Level III Survey for Cultural Resources and Architectural History Survey

In June and July 2017, a Level III Survey was conducted for archaeological, historical, and tribal resources within 75 ft. of either side of the Project Construction Easement, within a 200-ft. radius of turning points along the Project Construction Easement, including at substation and other facility lots. An architectural history survey was also conducted of standing buildings and structures within 1 mile on either side of the Project Construction Easement centerline, including substation and other facility lots. The Level III Survey was performed by tribal members from the Sisseton Wahpeton Oyate, Yankton Sioux, and Spirit Lake Nation selected to represent those tribes in identifying significant tribal resources and led by archaeologists meeting the U.S.

Secretary of the Interior's Professional Qualification Standards in that field. The architectural history survey was led by architectural historians meeting the U.S. Secretary of the Interior's Professional Qualification Standards in that field.

The Level III Survey identified 145 tribal sites and isolated artifacts during Project Construction Easement surveys, and identified 10 historic archaeological sites or isolated artifact occurrences, including the two previously recorded railroad alignments discussed in Section 19.4.1.1 Previously Identified Archaeological Sites. The historic architectural survey field-checked approximately 300 standing building and structure locations, where historic setting and feeling may be important, for consideration of potential visibility of the Project within 1 mile of the Project Construction Easement; these included, but were not limited to, previously recorded historic buildings and structures, including bridges and cemeteries, noted in earlier Sections.

All tribal sites, which are represented by rock cairns, alignments, and other traditionally recognized features on the landscape, are considered important to the tribes and will be considered as eligible for listing on the NRHP. The historic railroad sites are previously determined eligible for NRHP listing. The newly identified historic archaeological remains, primarily represented by sparse artifact debris or the occasional building foundation ruins, are proposed as not eligible for NRHP listing due to their lack of historical importance and lack of significant scientific research value. Standing buildings and structures that are eligible for NRHP listing and where historic setting and feeling are important for conveying their historic significance, and that are not screened from the Project (such as by wind rows or other trees or rolling landscape), are also considered to be part of the existing environment, which is potentially exposed to project impacts, beyond the immediate Project Construction Easement.

19.4.3 Avoidance of Potential Impacts

Planned construction activities for the Project may occur within the vicinity of sites important to tribal cultural traditions, archaeological sites, or historic standing structures. Sites evaluated as not eligible for NRHP listing are not significant and impacts to these sites would therefore not be considered. Those sites that are evaluated as eligible or of undetermined NRHP eligibility will be protected from direct impacts by establishing avoidance buffers around these resources. In addition to avoiding potent direct physical impacts to sites from construction activities, indirect secondary effects from the introduction of new visual elements into the historic setting of NRHP-eligible buildings and structures could impact the historic integrity of these sites.

19.4.4 Mitigation

Mitigation for NRHP-eligible tribal and archaeological resources will be to avoid physical disturbance and destruction of those resources. Avoidance of impacts will be accomplished by the following: (1) all ground-disturbing construction activities will be conducted away from

these resources; (2) not placing project structures within areas containing these resources, and (3) using only overhead spans of those resources that remain in the Project Construction Easement. Mitigation of NRHP-eligible buildings and structures beyond the Project Construction Easement will be conducted for those buildings and structures where integral historic setting could be impacted by the introduction of new visual elements. This mitigation will be accomplished through the recording of these historic structures and buildings so that their importance can be documented in the public record through filing with the Archaeological Research Center at the South Dakota State Historical Society.

20.0 Employment Estimates (ARSD 20:10:22:24)

The Project is expected to employ approximately 50 temporary workers to support Project construction under both the single circuit and double circuit design options. It is likely that general skilled labor is available either in Codington and Grant Counties or the state to serve the basic infrastructure and site development needs of the Project. Specialized labor will be required for certain components of Project construction. It is likely that this labor will be imported from other areas of the state or from other states, as the relatively short duration of construction does not warrant special training of local or regional labor. Balancing the use of local contractors and imported specialized contractors will likely alleviate any labor relations issues.

21.0 Future Additions and Modifications (ARSD 20:10:22:25)

There are no plans for future additions or modifications Project due to it being solely constructed to deliver energy from the CRW and CRW II to the transmission grid.

22.0 Transmission Facility Layout and Construction (ARSD 20:10:22:34)

22.1 Route Clearing

Route clearing activities will be conducted to ensure that the Project's ROW under both the single and double circuit design options is compliant with North American Electric Reliability Corporation (NERC) Reliability Standard FAC-003. For example, clear cutting (the removal of all trees, brush and other low-growing vegetation) will occur within the ROW, and along construction and maintenance travel paths, access roads and at structure erection sites. Also, consistent with FAC-003, trees that could present a danger to the safe operation of the Project (so termed "danger trees") will also be removed or pruned. Danger trees mean those trees outside of the ROW which are sufficiently unhealthy or damaged that they could fall and make contact with

the transmission line. Disposal of timber, tree tops, limbs, and slash will occur in compliance with applicable state and local ordinances. Wood from the clearing operation will be offered to the landowner or removed from the Project Construction Easement. The Applicant will coordinate with property owners and residents so that they are aware of the construction and clearing schedule, and will conduct the route clearing activities consistent with the easements granted by the property owner.

22.2 Transmission Construction Procedures

22.2.1 Equipment Delivery and Transportation

Under both the single circuit and double circuit design options, most of the material required for construction of the transmission line (e.g., poles, conductor cable, insulator bells) will be delivered to a temporary laydown area along the middle of the route (location not yet determined) to facilitate and minimize transportation efforts. These and other needed materials and equipment, including concrete, will be transported to pole locations within the Project Construction Easements along the route as construction progresses. Poles will be delivered by truck to structure locations within the Project Construction Easement.

22.2.2 Excavation, Foundations, and Structure Erection

Under both the single circuit and double circuit design options, insulators and other hardware will be attached to each structure while on the ground. Foundations for steel pole structures would require excavating or auguring a hole approximately 25 to 35 ft. deep and approximately 6 to 9 ft. in diameter. Exact excavation dimensions will depend upon soil conditions, whether the structures are designed for single or double circuits, and whether the structures will support an angle.

Steel pole structures will then be lifted, placed in the hole, or placed and secured on the foundation by a crane or similar heavy-duty equipment. The holes will be back-filled with select aggregate or concrete. Concrete trucks will deliver the concrete from a local batch plant. Excess soil will be removed from the site unless otherwise requested by the landowner. Most steel pole structures will be directly buried and will not require a foundation.

22.2.3 Transmission Line Conductor Stringing

Under both the single circuit and double circuit design options, conductors will be installed by establishing stringing setup areas within the Project Construction Easement, typically every two miles, where the spools of conductor cable will be stored. Temporary guard or clearance poles will be installed as needed over existing distribution or communication lines, streets, roads, highways, railways, or other obstructions after any necessary notifications are made and permits

obtained. The use of the guards or poles ensures that conductors will not obstruct traffic or contact existing energized conductors or other cables. Once the steel pole structures have been erected (see Section 22.2.2), crews will drive along the Project Construction Easement, securing the conductor pulling line through stringing blocks suspended from the insulators on the poles. The pulling line will be used to pull conductor through each block, and pulled to the required tension. Subsequently, the conductor will be clipped in using bucket trucks or helicopters once final sag is established. Shield wire will be installed in a similar manner.

22.2.4 Access Roads

Under both the single circuit and double circuit design options, where the transmission line parallels existing county or township roads, structure access will be obtained from existing roads. On cross-country segments, access will be along or within the Construction Easement. Access to these cross-country portions of the transmission line will require limited, if any, matting (such as over pipelines), but will not require construction of temporary access roads along the length of the ROW.

22.3 Restoration Procedures

Under both the single circuit and double circuit design options, crews will attempt to limit ground disturbance during construction to the extent possible, including avoiding driving over wet soils when feasible. Temporary disturbance areas will be restored to their original condition to the extent practical, and as negotiated with each landowner. Reclamation activities will include removing and disposing of debris, dismantling all temporary facilities, leveling or filling tire ruts, and controlling erosion. Reseeding areas disturbed during construction will be done with a seed mix free of noxious weeds, similar to that which was removed.

22.4 Maintenance Procedures

Under both the single circuit and double circuit design options, affiliates of NEER will use the existing transmission O&M organization that is responsible for approximately 8,500 miles of transmission lines and transmission voltage generation ties up to 500 kV across all NERC jurisdictions in the United States. These facilities are planned, maintained, and operated in compliance with applicable NERC Reliability Standards. The O&M organization has a program of maintenance standards providing the capability to manage compliance to transmission maintenance standards. The Applicant will use these O&M subject matter experts to develop and implement procedures for the maintenance of the transmission line and substation. The attributes of the Crowed Ridge Wind maintenance procedures will be informed by NEER Affiliates that already have:

- Well-established O&M practices and standardized processes, which are already being used to operate high voltage transmission facilities.

- Access to over 760 power system professionals, including technicians and other staff, with expertise in all aspects of transmission and substation equipment installation, maintenance and repair.
- Experience from operating and maintaining power delivery assets in all NERC jurisdictions at voltages up to 500 kV.
- An excellent record of transmission and substation reliability, built on robust design and O&M programs that incorporate condition assessment, diagnostics, and asset management for effective and efficient investment of resources and capital.
- Experience addressing a wide variety of operating challenges ranging from hurricanes, tornadoes, and other high wind conditions, dust contamination, avian interaction, and lightning. For example, outages in the Florida Power & Light Company transmission system, as well as the Lone Star system, is followed up by an Event Response Process in which NEER Affiliates use diagnostic techniques to identify the root cause of a problem to prevent reoccurrence. Solutions to transmission O&M problems include new designs, new conditions assessment processes, and/or new products. NEER affiliates also often work directly with equipment manufacturers to develop these solutions in order to continually improve the reliability of its transmission systems.

Based on the above, consistent with the applicable NERC Reliability Standards, regular maintenance of the Project will include, but are not limited, to the following activities: vegetation patrol and management, transmission line visual inspection, detailed climbing inspection, special assessments of the line, and general facilities/grounds upkeep.

23.0 Information Concerning Transmission Facilities (ARSD 20:10:22:35)

A high voltage transmission line consists of three phases; each phase is located at the end of a separate insulator string, all physically supported by structures. Each phase consists of one or more conductors; when more than one conductor is used to make up a phase, the term "bundled" conductors is used. Conductors are metal cables consisting of multiple strands of steel and aluminum wire wound together. The conductors for the Project will be approximately one to two inches in diameter.

Shield wire cables are strung above the electrical phases to prevent damage from lighting strikes. These shield wire cables are typically less than one inch in diameter. The shield wire can also include a fiber optic cable that allows a path for substation protection equipment to communicate between terminals on the transmission line.

The transmission line ROW (i.e., Construction Easement) width is primarily dependent on structure design, span length, and electrical safety requirements associated with the transmission line's voltage. The ROW will be typically be 150 ft. wide for the single or double circuit option with additional ROW at angles to encompass additional pole spacing, guy wires, and associated hardware as required.

Single Circuit Option

The single circuit design will have three phases, each consisting of two conductors. The conductors will be placed on the tangent structures in a delta configuration having one phase on one side and two phases on the other. On dead-ends and turning structures the three phases will be on the same side. The single circuit option can utilize a single tubular steel turning structure with guy wires. The single circuit design will use structures that are approximately 120 ft. tall.

Double Circuit Option

The double circuit design will have six phases, with three phases on each side of the structure. Each phase will consist of two conductors. The double circuit design will use structures that are approximately 20 ft. taller than for a single circuit transmission line. The double circuit option will also have more turning structures that will consist of two structures.

23.1 Configuration of Towers

Single Circuit Option

The Applicant proposes to use tubular steel structures with a height of approximately 120 ft. and spans of 600 to 1,000 ft. between poles for the Project. Running angle or dead-end structures will be guyed to support the structure, with guys located completely within the Project ROW. The steel structure would be less than 10 ft. in diameter at the ground level. The design of the single circuit transmission towers is set forth in **Appendix F.**

Table 23.1 Structure Summary - Single-Circuit Option

Structure Type	Typical Application	Structure Material	Typical Structure Height Above Ground (feet)	Typical Foundation Diameter Per Pole (feet)	Typical Span Length (feet)
Direct-Embedded Monopole	Tangent, Light Angle	Galvanized Tubular Steel	120	8-10	600 - 1000

Guyed, Direct-Embedded Monopole or 2-Pole	Angles and Deadends	Galvanized Tubular Steel	120	7-9	600 - 1000
Self-Supporting Monopole or 2-Pole	Angles and Deadends	Galvanized Tubular Steel	120	8-10	600 - 1000

Double Circuit Option

The Applicant proposes to use tubular steel structures with a height of approximately 140 ft. and spans of 600 to 1,000 ft. between poles for the Project. Where possible, running angle or dead-end structures will be guyed to support the structure with guys located completely within the Project ROW. The design of the typical double circuit transmission structures is set forth in **Appendix G**.

Table 23.1 a. Structure Summary – Double-Circuit Option

Structure Type	Typical Application	Structure Material	Typical Structure Height (feet)	Typical Foundation Diameter Per Pole (feet)	Typical Span Length (feet)
Direct-Embedded Monopole	Tangent, Light Angle	Galvanized Tubular Steel	140	8-10	600 - 1000
Guyed, Direct-Embedded 2-Pole	Angles and Deadends	Galvanized Tubular Steel	140	6-8	600 - 1000
Self-Supporting 2-Pole	Angles and Deadends	Galvanized Tubular Steel	140	8 - 12	600 - 1000

Under both the single and double circuit design options, the Project will be designed to meet all relevant local and state codes, National Electric Safety Code (NESC) requirements. Appropriate standards will be met for construction and installation and all applicable safety procedures will be followed during and after installation.

23.2 Conductor Configuration

Single Circuit Option

The single circuit design will have three phases, each consisting of two conductors in a bundled configuration. It is anticipated that each phase will consist of bundled 1590 kcmil 45/7 ACSR "Lapwing" conductor or conductors of comparable capacity.

Double Circuit Design Option

The double circuit design will have six phases, with three phases on each side of the structure. Each phase will consist of two conductors in a bundled configuration. It is anticipated that each phase will consist of bundled 795 kcmil 26/7 ACSR "Drake" conductor or conductors of comparable capacity.

23.3 Proposed Transmission Site and Major Alternatives

The site of the Project is described in Section 2.1 and shown on Figures 1 and 2. Section 8.0 outlines the route identification and selection process for both the single circuit and double circuit design options.

23.4 Reliability and Safety

23.4.1 Transmission Line Reliability

The Project will be designed in compliance with the American Society of Civil Engineers Manual of Practice No. 74, Guidelines for Electrical Transmission Line Structural Loading, and the NESC. Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is detected on the system. Scheduled maintenance outages are also infrequent on high voltage transmission lines, such as those associated with the Project.

23.4.2 Safety

Under the single circuit and double circuit design options, the Project will be designed to meet the local, state, and NESC standards regarding clearances to ground, crossing utilities, and buildings. Construction crews will comply with all applicable standards regarding installation of facilities and standard construction practices. The Applicant's and industry safety procedures will be followed during and after installation of the transmission line. The Project will be monitored at an operating center, and associated substations equipped with relays and breakers that insure the line is operating safely

23.4.3 Electric and Magnetic Fields

Voltage on any wire (conductor) produces an electric field. The intensity of the electric field is proportional to the voltage of the transmission line. The flow of electrical current on a wire produces a magnetic field. The intensity of the magnetic field is proportional to the current flow through the conductors. Electric and magnetic fields (EMF) extend outward from the conductor and decrease rapidly with distance from the conductor. There is no federal or South Dakota state standard for transmission line EMF.

Because the use of electric power is so widespread, people frequently are exposed to EMF from secondary power lines, home wiring and lighting, and electric appliances and tools. EMF is highest closest to these types of electrical equipment or devices and falls rapidly with distance. Existing sources of EMF in proximity to the proposed Project include the existing electric transmission and distribution lines in the area.

Electromagnetic Fields Analysis

Electromagnetic field and audible noise levels were evaluated for the proposed tangent structure configurations shown on **Exhibits F** and **G**, assuming typical pole heights and lowest phase-to-ground distances equal to the design clearance (26').

Calculations were performed using the *Bonneville Power Administration Corona and Field Effects Program (Corona II).*

Single-Circuit Option

Magnetic Field Calculations

For the Project, magnetic fields were calculated for the single-circuit option under "full-power" (600 MW, 0.95 p.f., 1585 A) and "half-power" (300 MW, 0.95 p.f., 793 A) conditions.

The calculated values for anticipated magnetic fields at the edges of the proposed easement and the maximum value within the easement are provided in the table below. Magnetic field profiles for both "full-power" and "half-power" conditions are also included below (see Table 23.4.3 and Figures 23.4.3.1 and 23.4.3.2).

Table 23.4.3 Calculated Magnetic Field Levels, in milliGauss (mG)

	Edge	Maximum
Full-Power Case, 600 MW	43.8	285.3
Half-Power Case, 300 MW	21.9	142.7

Figure 23.4.3.1

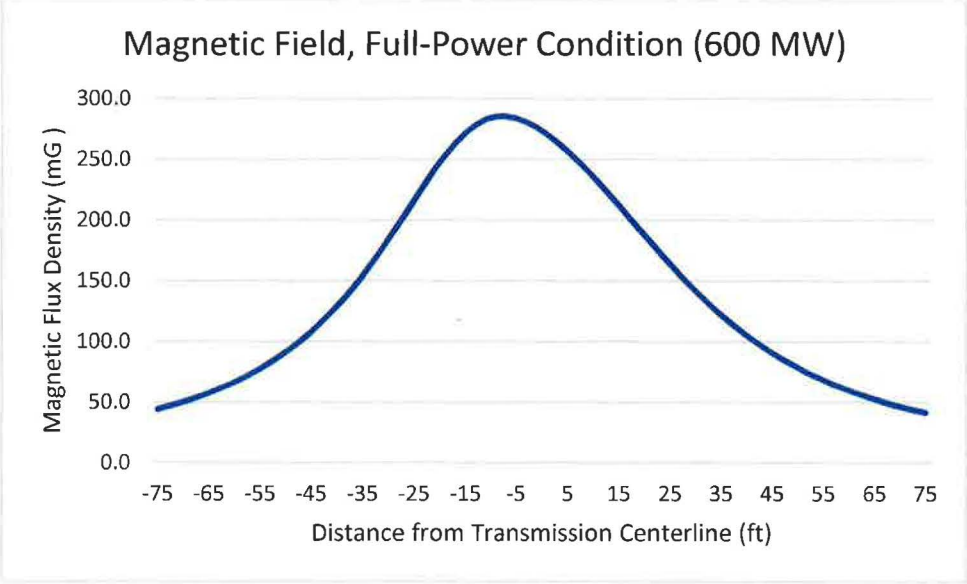
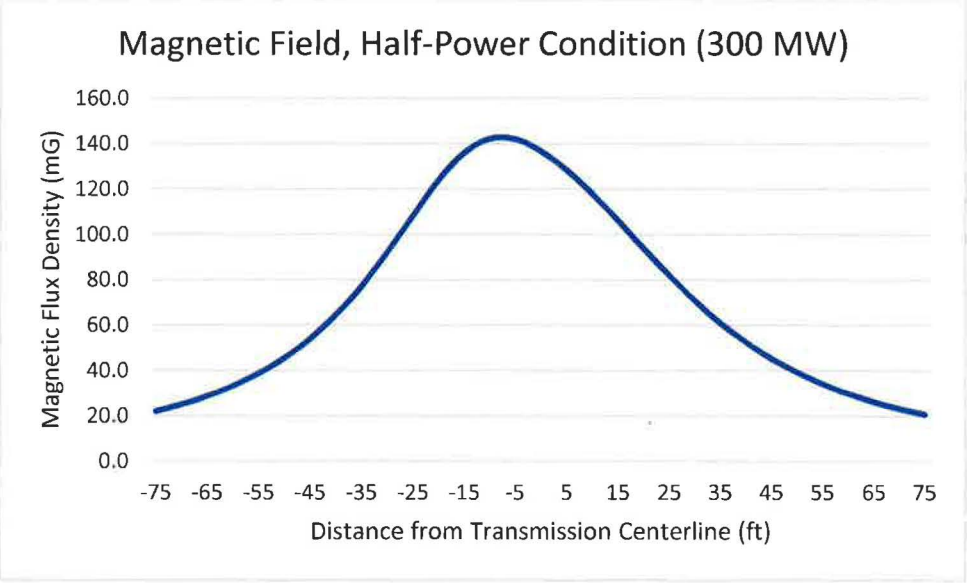


Figure 23.4.3.2



Electric Fields and Audible Noise Calculations

Electric field intensity and audible noise levels are independent of power flow, being only a function of the transmission line voltage. The following table (Table 23.4.3a) provides calculated values for electric fields and audible noise levels that may be anticipated for the single circuit option. Again, values provided are calculated at the edges of the proposed easement and the

maximum value within the easement. Electric field and audible noise profiles are also included below in Figures 23.4.3.3 and 23.4.3.4.

Table 23.4.3a Calculated Electric Field and Audible Noise Levels

	Edge	Maximum
Electric Field (kV/m)	0.690	4.89
Audible Noise, Fair Weather (L_{50}, dBA)	1.4	6.0
Audible Noise, in Rain (L_{50}, dBA)	26.4	31.0

Figure 23.4.3.3

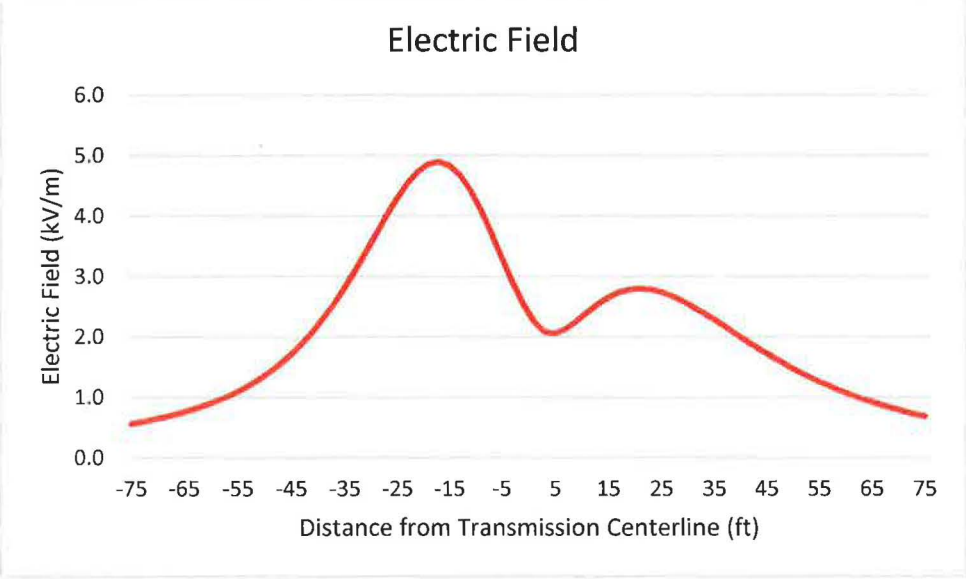
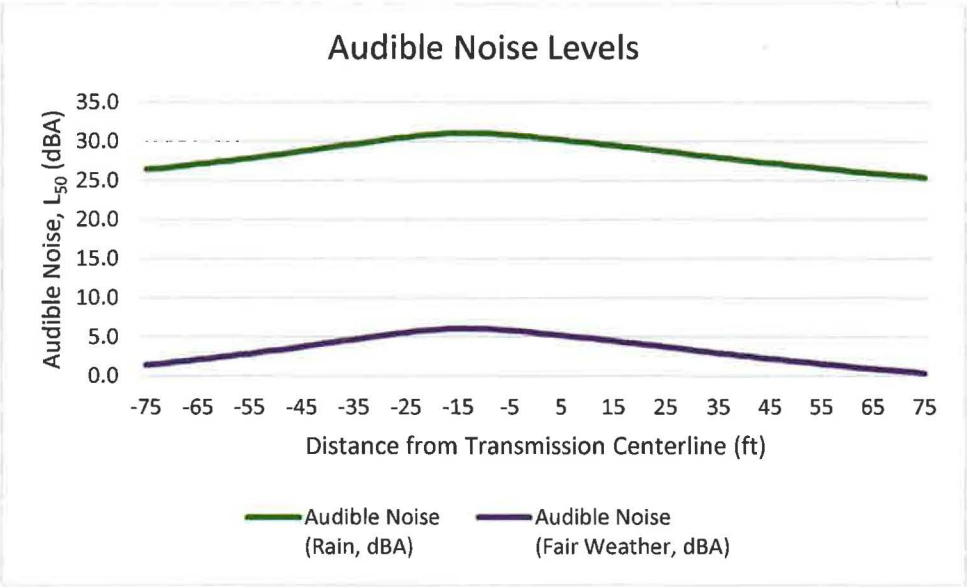


Figure 23.4.3.4


Audible Noise Levels
Audible Noise, L_{50} (dBA)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
-75 -65 -55 -45 -35 -25 -15 -5 5 15 25 35 45 55 65 75
Distance from Transmission Centerline (ft)
Audible Noise (Rain, dBA)
Audible Noise (Fair Weather, dBA)

Double-Circuit Option

Magnetic Field Calculations

For the Project, magnetic fields were calculated for the double-circuit option under "full-power" (300 MW, 0.95 p.f., 793 A per circuit) and "half-power" (150 MW, 0.95 p.f., 397 A per circuit) conditions.

The calculated values for anticipated magnetic fields at the edges of the proposed easement and the maximum value within the easement are provided in the table below. Magnetic field profiles for both "full-power" and "half-power" conditions are also included below below in Table 23.4.3b and Figures 23.4.3.5 and 23.4.3.6.

Table 23.4.3b Calculated Magnetic Field Levels, in milliGauss (mG)

	Edge	Maximum
Full-Power Case, 600 MW	13.1	137.2
Half-Power Case, 300 MW	6.5	68.7

Figure 23.4.3.5

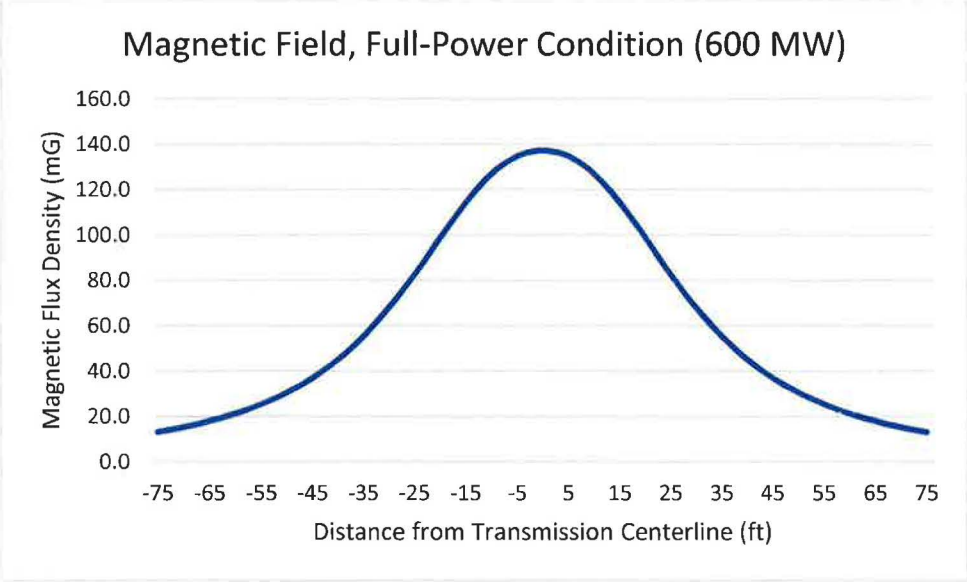
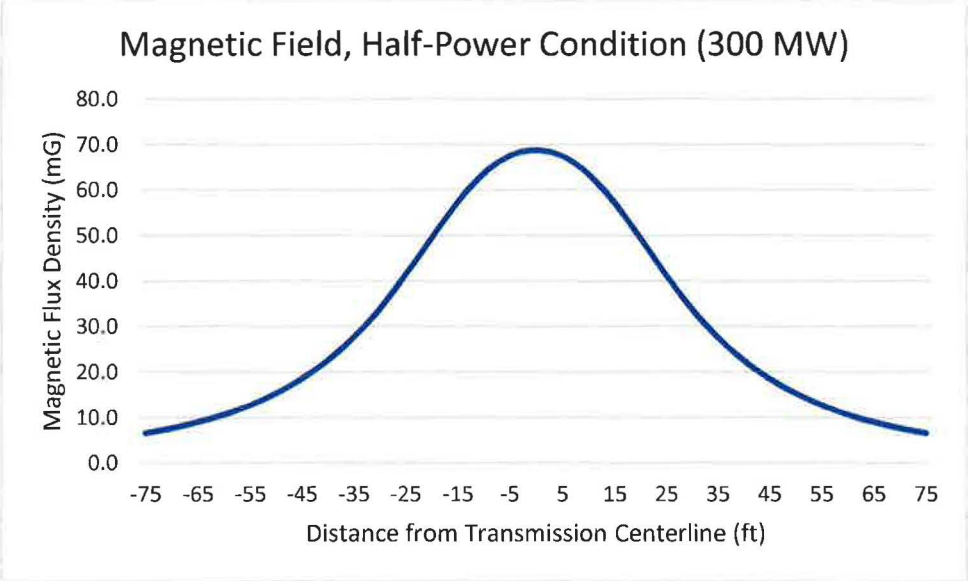


Figure 23.4.3.6



Electric Fields and Audible Noise Calculations

Electric field intensity and audible noise levels are independent of power flow, being only a function of the transmission line voltage. The following table 23.4.3c provides calculated values for electric fields and audible noise levels that may be anticipated for the double-circuit option. Again, values provided are calculated at the edges of the proposed easement and the maximum value within the easement. Electric field and audible noise profiles are also included below.

Table 23.4.3c Calculated Electric Field and Audible Noise Levels

	Edge	Maximum
Electric Field (kV/m)	0.162	4.08
Audible Noise, Fair Weather (L_{50}, dBA)	11.6	15.9
Audible Noise, in Rain (L_{50}, dBA)	36.6	40.9

23.4.4 Stray Voltage

The Institute of Electrical and Electronics Engineers (IEEE) defines "stray voltage" as "voltage resulting from the normal delivery and/or use of electricity (usually smaller than 10 volts) that may be present between two conductive surfaces that can be simultaneously contacted by members of the general public and/or their animals. Stray voltage is caused by primary and/or secondary return current, and power system induced currents, as these currents flow through the impedance of the intended return pathway, its parallel conductive pathways, and conductive

loops in close proximity to the power system. Stray voltage is not related to power system faults, and is generally not considered hazardous. (IEEE 2010). Electric transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences. However, transmission lines can induce stray voltage on a distribution circuit that is parallel to and immediately under the transmission line. Measures will be taken to address potential stray voltage issues on a case-by-case basis.

23.4.5 Farming Operations, Vehicle Use, and Metal Buildings Near Power Lines

All normal and current farming operations in the Study Area are compatible with the construction and operation of the proposed Project. The Applicant will coordinate with individual landowners if limitations or restrictions to use of the land within the Project Construction Easement are required for the safe operation of the Project.

23.4.6 ROW

The width of the Project Construction Easement will be 150 ft. for both the single and double circuit option with additional easement at angles to encompass additional pole spacing, guy wires, and associated hardware as required. The Project will require the acquisition of easements to cross private property and coordination with appropriate agencies where the transmission line shares ROW with other public utilities or public roads. The Applicant expects to obtain all easements by the first quarter of 2018. The Applicant's land rights agents will continue to work with the landowners to obtain permission for route surveys, environmental surveys, and soil investigations to occur prior to construction.

Transmission line staging and laydown areas will be limited to previously disturbed or developed areas wherever possible. When additional property is temporarily required for construction, temporary easements may be obtained from landowners for the duration of construction. Temporary easements will be limited to special construction access needs or additional staging or laydown areas required outside of the transmission line Project Construction Easement.

It is the Applicant's understanding that it does not have the right of condemnation. The Applicant will not use condemnation for the Project. All land use agreements will be voluntary.

23.4.7 Necessary Clearing Activities

Under the single and double circuit option, the Project will not require extensive tree clearing. A minimal number of trees will need to be removed pursuant to easement requirements. Wood that will be cleared from the ROW will be offered to the landowner or removed from the site, dependent upon the preference of the landowner. General easement clearing and maintenance is described in Section 22.1.

23.4.8 Underground Transmission

Under the single and double circuit option, no portion of the Project is expected to require underground transmission. It is rare for electrical transmission lines to be constructed underground because the cost to construct underground can be significantly greater and is more difficult to mitigate environmental issues. Due to the significantly greater expense associated with underground transmission construction and as the majority of the route is adjacent to existing road ROW or section lines, underground construction is not warranted on any portion of the route.

24.0 List of Potential Permits (ARSD 20:10:22:05)

Table 24 identifies federal, state and local permits, approvals and other coordination that may be needed for the generation tie line.

Table 24 Potential Required Permits and Approvals

Agency	Type of Permit, Approval, or Coordination	Status*	Need
Federal			
U.S. Fish and Wildlife Service Waubay Wetland Management District	Special Use Permit or Right-of-Way Permit	2	If construction in wetlands within wetland easements or in grassland easements, then compatibility analysis is required. A Permit may be needed for disturbance to land subject to a grassland easement.
U.S. Army Corps of Engineers	Section 404 of the Clean Water Act	2	Nationwide Permit 12 required for dredging or fill in jurisdictional waters of the U.S. for utility line projects.
Federal Aviation Administration (FAA)	FAA Form 7460-1, Notice of Proposed Construction or Alteration	C	Required for structures that will be 200 ft. above ground level (AGL) or higher or any other structure that may represent an aircraft hazard at specified distances from runways and/or airports. The FAA reviews and will issues a determination that construction of the Transmission Facility does not constitute a hazard to air navigation.
FAA	FAA Form 7460-2 - Notice	C	Notifies FAA of actual

Agency	Type of Permit, Approval, or Coordination	Status*	Need
	of Actual Construction or Alteration		constructed or altered structures.
U.S. Department of Agriculture - Natural Resources Conservation Service	Easement Modifications	C	Easement modification needed to span two easements, as needed
State of South Dakota			
Public Utilities Commission	Facility Permit	1	This Application; required for transmission lines greater than 115 kV
Department of Environment & Natural Resources	Section 401 Water Quality Certification	2	Required for fill in jurisdictional waters of the U.S.
	NPDES Permit: General Permit for Storm Water Discharges Associated with Construction Activities	2	Required for disturbance of over one acre of land. Must prepare a Storm Water Pollution Prevention Plan.
	Temporary water use permit for construction activities	2	Compliance with the Water Pollution Control Act. Temporary permits for the use of public water for construction, testing, or drilling purposes. Construction contractors will obtain as necessary.
	General Permit for Temporary Dewatering	2	Compliance with the Water Pollution Control Act. Temporary permit for the discharge of water for construction dewatering. Construction contractors will obtain as necessary.
South Dakota State Historical Society	SDCL 1-19A-11.1	2	Compliance required for state permits. Compliance with Section 106 of the National Historic Preservation Act is also required if a federal permit (USFWS, Individual Permit from USACE) is required for the Project.
Department of Transportation	Highway Access Permit; Road Crossing Agreements	2	Permit required for construction of access roads

Agency	Type of Permit, Approval, or Coordination	Status*	Need
			from state highways.
	Utility Permit	2	Permit required for utility crossings on state highway ROW, as necessary.
	Oversize/overweight Permit		Permit required for heavy hauling construction equipment and materials on state highways. Construction contractor will obtain, as necessary.
Local			
Codington County	Building Permits or Conditional Use Permits; Road Crossing Agreements; Oversize/overweight Permit	2	Permit required for a transmission line.
Grant County	Building Permits or Conditional Use Permits; Road Crossing Agreements; Oversize/overweight Permit	2	Permit required for a transmission line.
Townships	Road Crossing Agreements; Oversize/overweight Permit	2	The Project will require crossing agreements.

*Status Explanation:
1: Applied – decision pending
2: Final design will determine whether the permit/approval is required, or final layout is needed for permit application.

25.0 Additional Information in Application (ARSD 20:10:22:36)

The Application, including attachments and supporting testimony meet the Applicants burden of proof specified in SDCL 49-41B-22. The Applicants have also provided in **Appendix C** correspondence associated with its coordination efforts with state, federal, tribes and local governments.

26.0 Testimony And Exhibits (ARSD 20:10:22:39)

The Applicant is submitting testimony and exhibits in support of the Application. The Exhibits are identified in the Application, and the following will provide testimony in support of the Application:

Name and Title	Entity	Subject Matter
Jason Utton, Executive Director	NextEra Energy Resources, LLC	Need for the Transmission Line,

of Development		Outreach Activities and Other Permits
Dan Mayers, Director of Engineering, Transmission	NextEra Energy Resources, LLC	Transmission Route and Siting

27.0 Applicant's Verification

VERIFIED APPLICANT'S SIGNATURE

State of Florida)
County of Palm Beach) :SS

Jason Utton, being duly sworn, deposes and says that he is the authorized agent of Crown Ridge Wind, LLC.

He states that he does not have personal knowledge of all the facts recited in the forgoing application, but the information in the application has been gathered by and from employees, contractors of the owners of Crown Ridge Wind, LLC; and that the information in the application is verified by him as true and correct on behalf of Crowned Ridge Wind, LLC.

Dated this 26th day of October, 2017.

_____
Jason Utton
Executive Director
NextEra Energy Resources, LLC

Subscribed and sworn to before me this
26th day of October, 2017.

_____
Notary Public
My Commission Expires:

28.0 References

Aron, C. 2005. *South Dakota Interior Least Tern (*Sterna antillarum athalassos*) and Piping Plover (*Charadrius melodus*) Management Plan.* Wildlife Division Report No. 2005-02. Pierre: South Dakota Department of Game, Fish and Parks.

Avian Power Line Interaction Committee (APLIC). 2012. *Reducing Avian Collisions with Power Lines: The State of the Art in 2012.* Washington, D.C.: Edison Electric Institute and APLIC.

Bailey, R.M., and M.O. Allum. 1962. *Fishes of South Dakota.* Miscellaneous Publication No. 119. Ann Arbor: Museum of Zoology, University of Michigan.

Bauman, P., B. Carlson, and T. Butler. 2016. *Quantifying Undisturbed (Native) Lands in Eastern South Dakota: 2013.* Brookings: South Dakota State University Extension.

Bryce, Sandra A., James M. Omernik, David E. Pater, Micahel Ulmer, Jerome Schaar, Jerry Freeouf, Rex Johnson, Pat Kuck, and Sandra H. Azevedo. 1996. Ecoregions of North and South Dakota, (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Bryce, S.J., M. Omernik, D.E. Pater, M. Ulmer, J. Schaar, J. Freeouf, R. Johnson, P. Kuck, and S.H. Azevedo. 1998. *Ecoregions of North Dakota and South Dakota.* Jamestown, North Dakota: Northern Prairie Wildlife Research Center.

Burgess, A., and J. Shearer. 2008. A Comprehensive Aquatics Survey of Minnesota River Tributaries. Unpublished report, South Dakota Department of Game, Fish and Parks, Pierre.

Dieterman, D.J., and C.R. Berry, Jr. 1996. *The Distribution and Relative Abundance of Fishes in Seven Streams of the Minnesota River Basin of Northeastern South Dakota.* Special Report Federal Aid F-21-R-27. Prepared for South Dakota Department of Game, Fish and Parks, Pierre.

Edison Electric Institute. 2013. State Generation and Transmission Siting Directory. Edison Electric Institute, Washington, D.C.

Harrington, B.A. 2001. Red Knot (*Calidris canutus*). In *The Birds of North America*, No. 563, edited by A. Poole and F. Gill. Philadelphia, Pennsylvania: The Birds of North America, Inc.

Hoen, B., J. P. Brown, T. Jackson, R. Wiser, M. Thayer, and P. Cappers. 2013. A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States. Environmental Energy Technologies Division. Available online at: http://emp.lbl.gov/sites/all/files/lbnl-6362e.pdf. Accessed July 17, 2017.

Homefacts. 2017. Available at: http://www.homefacts.com/fcctowers/South-Dakota.html. Accessed June 10, 2017.

Jensen. Ann. 2003. First Occurrence of Aquifer Materials in Codington County, South Dakota. Department of Environmental and Natural Resources, Division of Financial and Technical Assistance, Geological Survey, Pierre, South Dakota.

Jensen. Ann. 2004. First Occurrence of Aquifer Materials in Grant County, South Dakota. Department of Environmental and Natural Resources, Division of Financial and Technical Assistance, Geological Survey, Pierre, South Dakota.

Kochert, M.N., K. Steenhof, C.L. McIntyre, and E.H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*). The Birds of North America Online (A. Poole, editor). Ithaca, New York: Cornell Lab of Ornithology.

Martin, James E., J. Foster Sawyer, Mark D. Fahrenbach, Dennis W. Tomhave, and Layne D. Schulz. 2004 Geologic Map of South Dakota. The Geological Survey, Department of Environment and Natural Resources. South Dakota.

McCoy, R.W. and D.C. Hales. 1974. A survey of eight streams in eastern South Dakota: physical and chemical characteristics, vascular plants, insects and fishes. *Proceedings of the South Dakota Academy of Science* 53:202–219.

Natural Resources Conservation Service (NRCS). 2017. Soil Survey Geographic (SSURGO) geographic information system (GIS) data, Codington and Grant Counties. South Dakota.

Platte River Recovery Implementation Program (PRRIP). 2017. (*Charadrius melodus*). Available at: https://www.platteriverprogram.org/AboutPRRIP/Pages/PipingPlover.aspx. Accessed July 19, 2017.

Pulkrabek, M., and D. O'Brien. 1974. An inventory of raptor nesting in Harding County, South Dakota-1974. Pittman-Robertson Project W-95-R-8. Pierre: South Dakota Department of Game, Fish and Parks.

Rothrock, E.P. 1952. The Geology of Grant County, South Dakota. Report of Investigations No. 20, South Dakota State Geological Survey. South Dakota.

Silva, J. Michael and Robert G. Olsen. 2002. Use of Global Positioning System (GPS) Receivers under Power-Line Conductors. In IEEE Transactions on Power Delivery, Vol. 17, No. 4, October 2002.

Shearer, J.S. 2003. *Topeka Shiner (*Notropis topeka*) Management Plan for the State of South Dakota.* Wildlife Division Report No. 2003-10. Pierre: South Dakota Department of Game, Fish and Parks.

Shepherd, M.D. 2005. Species Profile: *Oarisma poweshiek.* In *Red List of Pollinator Insects of North America,* edited by M.S. Shepherd, D.M. Vaughan, and S.H. Black. CD-ROM Version 1 (May 2005). Portland, Oregon: The Xerces Society for Invertebrate Conservation.

Skadsen, D.R. 2015. *Butterflies*. Northeast Glacial Lakes Watershed. Available at: http://www.neglwatersheds.org/images/Butterflies.pdf. Accessed July 19, 2017.

———. 2016a. *Mammals*. Northeast Glacial Lakes Watershed. Available at: http://www.neglwatersheds.org/images/Mammals.pdf. Accessed July 19, 2017.

———. 2016b. *Fish*. Northeast Glacial Lakes Watershed. Available at: http://www.neglwatersheds.org/images/Fish.pdf. Accessed 18 July, 2017

———. 2017. *Birds*. Northeast Glacial Lakes Watershed. Available at: http://www.neglwatersheds.org/images/Birds.pdf. Accessed July 19, 2017.

Smith, B.S. et al. 1999. Thrill or Threat? The Sound of Movies. The Hearing Review, Nov. 1999, pages 50-54.

Soil Science Division Staff. 2017. Chapter 3. Examination and Description of Soil Profiles in Soil Survey Manual. C. Ditzler, K. Scheffe, and H.C. Monger (eds.). USDA Handbook 18. Government Printing Office, Washington, D.C.

South Dakota Department of Environment and Natural Resources (SDDENR). 2013. Earthquakes in South Dakota (1872-2013). Update May 1, 2013. Available online at http://www.sdgs.usd.edu/publications/maps/earthquakes/earthquakes.htm. Accessed July 5, 2017.

———. (SDDENR) 2014. Exceptional Event Demonstration for PM10 Exceedances in Brookings and Watertown on October 6, 2011. Available at: https://denr.sd.gov/des/aq/aqnews/20111006EEDemonstration_final.pdf.

———. (SDDENR) 2016. The 2016 South Dakota Integrated Report for Surface Water Quality Assessment. Pierre, South Dakota. Available online at http://denr.sd.gov/documents/16irfinal.pdf. Accessed July 5, 2017.

———. (SDDENR). 2017. Online website for Air Quality Monitoring Sites. Available at: https://denr.sd.gov/des/aq/monitoring/state-mo.aspx.

South Dakota Department of Game, Fish and Parks (SDGFP). 2012. *South Dakota River Otter Management Plan*. Wildlife Division Report Number 2012-07. Pierre: South Dakota Department of Game, Fish and Parks.

———. 2016. State and Federally Listed Threatened, Endangered and Candidate Species Documented
in South Dakota by County. Updated on July 19, 2016. Available at: http://gfp.sd.gov/wildlife/docs/ThreatenedCountyList.pdf. Accessed July 11, 2017.

———. 2017a. Osprey Recovery in Southeastern SD. Available at: https://gfp.sd.gov/wildlife/management/diversity/osprey-recovery.aspx. Accessed July 11, 2017.

———. 2017b. Northern Redbelly Dace Characteristics. Available at: https://gfp.sd.gov/wildlife/critters/fish/rare-fish/northern-redbelly-dace.aspx. Accessed July 7, 2017.

———. 2017c. Blacknose Shiner Characteristics. Available at: https://gfp.sd.gov/wildlife/critters/fish/rare-fish/blacknose-shiner.aspx. Accessed July 7, 2017.

South Dakota Genealogy Trails (SDGT). 2006a. Grant County. Available online at http://genealogytrails.com/sdak/grant/countyhx.html. Accessed July 10, 2017.

———. (SDGT). 2006b. Codington County. Available online at http://genealogytrails.com/sdak/codington/CoHx.html. Accessed July 10, 2017.

South Dakota State Historical Society. 2005. Guidelines for Cultural Resource Surveys and Survey Reports in South Dakota (For Compliance and Review). South Dakota State Historical Society Cultural Heritage Center, Pierre, SD.

State of South Dakota. 2017. South Dakota Energy Conversion and Transmission Facilities: Chapter 49-41B. Available at: http://sdlegislature.gov/statutes/DisplayStatute.aspx?Statute=49-41b&Type=Statute. Accessed July 13, 2017.

Stehn, T.V., and T. Wassenich. 2007. Whooping crane collisions with power lines: an issue paper. *Proceedings of the North American Crane Workshop* 10.

Tetra-Tech. 2008a. *Spring Avian Survey, Bemis Wind Resource Area Grant, Codington, Deuel, and Brookings Counties, South Dakota*. Prepared for FPL Energy, LLC. July.

———. 2008b. *Fall Avian Survey, Bemis Wind Resource Area Grant, Codington, Deuel, and Brookings Counties, South Dakota*. Prepared for FPL Energy, LLC. December.

———. 2015. *Fall Avian Survey, Bemis Wind Resource Area Grant, Codington, Deuel, and Brookings Counties, South Dakota*. Prepared for FPL Energy, LLC. December.

———. 2016. *Crowned Ridge Wind Energy Center, Codington and Grant Counties, South Dakota 2016 Bat Acoustic Survey*. Prepared for Crowned Ridge Wind, LLC. December.

U.S. Census Bureau. 2010. 2010 U.S. Census Data. Available at: https://www.census.gov/2010census/data/. Accessed on August 21, 2017.

U.S. Fish and Wildlife Service (USFWS). 2002. *Status Assessment and Conservation Guidelines – Dakota Skipper, Iowa, Minnesota, North Dakota, South Dakota, Manitoba, and Saskatchewan. April 2002*. Available at: https://www.fws.gov/midwest/endangered/insects/pdf/dask-status.pdf. Accessed July 19, 2017.

———. 2007. Bald Eagle (*Haliaeetus leucocephalus*). Fact Sheet. Available at: https://www.fws.gov/migratorybirds/pdf/management/bald-eagle-fact-sheet.pdf. Accessed July 17, 2017.

———. 2014. Poweshiek Skipperling *(Oarisma poweshiek)* Fact Sheet. Available at: https://www.fws.gov/midwest/endangered/insects/posk/pdf/poskFactSheetOct2014.pdf. Accessed August 14, 2018.

———. 2015a. Endangered and threatened wildlife and plants; designation of critical habitat for the Dakota skipper and Poweshiek skipperling. 80 *Federal Register*: 59248–59384.

———. 2015b. 50 CFR Part 17 endangered and threatened wildlife and plants; threatened species status for the northern long-eared bat with 4(d) rule; final rule and interim rule. 80 Federal Register 63: 17973-18033.

———. 2017a. *2017 Range-Wide Indiana Bat Summer Survey Guidelines*. May 9, 2017. Available at: https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2017INBASummerSurveyGuidelines9May2017.pdf. Accessed July 17, 2017.

———. 2017b. *South Dakota Listed Species by County List* (updated January 11, 2017). Available at: https://www.fws.gov/southdakotafieldoffice/SpeciesByCounty_Jan2017.pdf. Accessed: July 11, 2017.

U.S. Geological Survey. 2015. Geologic Units in Deuel County, South Dakota. Available at: https://mrdata.usgs.gov/geology/state/fips-unit.php?code=f46039. Accessed July 13, 2017.

Vaughn, D.M., and M.D. Shepherd. 2005. Species Profile: Hesperia dacotae. In Red List of Pollinator Insects of North America, edited by M.D. Shepherd, D.M. Vaughan, and S.H. Black. CD-ROM Version 1 (May 2005). Portland, Oregon: The Xerces Society for Invertebrate Conservation.

27.0 Applicant's Verification

VERIFIED APPLICANT'S SIGNATURE

State of Florida)
County of Palm Beach) :SS

Jason Utton, being duly sworn, deposes and says that he is the authorized agent of Crown Ridge Wind, LLC.

He states that he does not have personal knowledge of all the facts recited in the forgoing application, but the information in the application has been gathered by and from employees, contractors of the owners of Crown Ridge Wind, LLC; and that the information in the application is verified by him as true and correct on behalf of Crowned Ridge Wind, LLC.

Dated this 26th day of October, 2017.

Jason Utton
Executive Director
NextEra Energy Resources, LLC

Subscribed and sworn to before me this
26th day of October, 2017.

Notary Public
My Commission Expires: 11/14/19

NANCY E. LLAMA
MY COMMISSION # FF 900481
EXPIRES: November 14, 2019
Bonded Thru Notary Public Underwriters