1.0 APPLICANT'S VERIFICATION

STATE OF MINNESOTA)
) ss.
COUNTY OF HENNEPIN)

Daniel R. Lesher, being duly sworn, deposes and says that he is the Routing Lead for the Brookings County Substation – South Dakota/Minnesota Border 345 kV Transmission Line and Brookings County Substation Project on behalf of Applicants Great River Energy, a Minnesota cooperative corporation, and Northern States Power Company ("Xcel Energy"), a Minnesota corporation (collectively, "Applicants").

He states that he does not have personal knowledge of all of the facts recited in the foregoing Application, but the information in the Application has been gathered by and from employees and contractors of Applicants and is believed to be accurate and reliable; and on that basis the information in the Application is verified by him as bring true and accurate on behalf of Applicants.

[redacted]

Daniel R. Lesher

Subscribed and sworn to before me this 22nd day of November, 2010.

LUANN T BENTON
NOTARY PUBLIC - MINNESOTA
MY COMMISSION
EXPIRES JAN. 31, 2015

Notary Public

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2.0 EXECUTIVE SUMMARY

Great River Energy, a Minnesota cooperative corporation ("Great River Energy"), and Northern States Power Company, a Minnesota corporation ("Xcel Energy"), (jointly, the "Applicants"), propose to construct the Brookings County – Hampton 345 kilovolt ("kV") Project ("Project") consisting of 345 kV transmission line facilities and substation connections between the Brookings County Substation and the Hampton 345 kV Substation near Hampton, Minnesota and between the Lyon County Substation near the City of Marshall, Minnesota and the Minnesota Valley Substation near Granite Falls, Minnesota. The Project is designed to increase generation outlet capability in eastern South Dakota and southwestern Minnesota, improve regional reliability, and enhance local community reliability. The Project includes new 345 kV transmission facilities, between 237 and 247 miles in length, depending on the final route selected, expansion of four existing substations, including the Brookings County Substation, construction of four new substations in Minnesota, and construction of electric system connections to tie existing high voltage transmission lines to the new facilities. The South Dakota portion of the Project consists of a 10.6-mile 345 kilovolt transmission line between the Brookings County Substation near White, South Dakota and the South Dakota/Minnesota border and associated modifications at the existing Brookings County Substation (the "Facility").

Figure 1 provides an overview of the Facility area in South Dakota.

Figure 2 provides an overview of the entire Project from Brookings County, South Dakota to Hampton, Minnesota.

The Brookings County – Hampton 345 kV Project is being proposed by a group of utilities, the CapX2020 Transmission Initiative ("CapX2020") utilities, who have joined together to identify and construct needed transmission facilities in the Upper Midwest. Great River Energy and Xcel Energy are part of the CapX2020 Transmission Initiative. Great River Energy is a not-for-profit electric cooperative providing electrical energy and related services to 28 distribution cooperatives serving nearly 1.5 million customers in Minnesota and Wisconsin. Headquartered in Maple Grove, Minnesota, Great River Energy is the fifth largest utility of its type in the country.

Xcel Energy is a Minnesota corporation headquartered in Minneapolis, Minnesota. Xcel Energy is a wholly-owned subsidiary of Xcel Energy Inc., a utility holding company with its headquarters in Minneapolis. Xcel Energy provides electricity services to more than 73,000 customers in South Dakota. Xcel Energy also provides electricity services to approximately 1.2 million customers and natural gas services to 425,000 residential, commercial and industrial customers in Minnesota; and electric and natural gas service to approximately 55,000 customers in North Dakota.

The Applicants submit this application ("Application") for a facility permit for the South Dakota portion of the Project to the South Dakota Public Utilities Commission ("Commission") pursuant to South Dakota Codified Laws ("SDCL") Chapter 49-41B and South Dakota Administrative Rules ("ARSD") Chapter 20:10:22. The Applicants are requesting authority to build double circuit conductor configurations in this Application. At this time, the transmission line is expected to be constructed with a single circuit on the double circuit capable structures. The second circuit will be added when conditions warrant.

The 345 kV transmission line will be constructed with single pole, self-weathering rust-colored steel double circuit structures. The height of the poles will range from approximately 130 to 175 feet and spans between poles are expected to be 750 to 1,100 feet (depending on geological or engineering constraints determined in final design). The typical right-of-way for the 345 kV transmission line will be 150 feet (75 feet on either side of the transmission line center). Specialty structures, including H-frame poles, may be required in certain limited circumstances. For example, H-frame structures are sometimes required near environmentally sensitive areas (including areas of significant bird activity) and are also used for long spans in some instances. These structures consist of two steel poles with cross bracing on concrete pier foundations. Advanced engineering will determine whether H-frame structures are necessary for the proposed transmission line facility; however, the Applicants currently are proposing to use only single pole steel structures. Easement procurement agreements with landowners of parcels crossed by the proposed transmission line are currently underway. The Facility, as proposed in South Dakota, is anticipated to cost approximately $25.6 million. The total Project is expected to cost approximately $725 million. Construction on the Facility is scheduled to begin in the fourth quarter of 2013 and the Facility is expected to be in service by the second quarter of 2015.

The Applicants obtained a Certificate of Need for Brookings County – Hampton 345 kV Project from the Minnesota Public Utilities Commission ("MPUC") on May 22, 2009 for the Minnesota portion of the Project. Order Granting Certificates of Need with Conditions, *In the Matter of the Application of Great River Energy, Northern States Power Company (d/b/a Xcel Energy) and others for Certificates of Need for the CapX 345-kV Transmission Project*, Docket No. ET-2, E-002, et al./CN-06-1115 (May 22, 2009 as modified August 9, 2009) ("Certificate of Need Order"). The Applicants also obtained a route permit from the MPUC for the majority of the Minnesota portion of the Project, with the exception of a segment of the Project from the Cedar Mountain Substation (Renville County) to the Helena Substation (Scott County), on September 14, 2010. Order Granting Route Permit, *In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota,* MPUC Docket No.: ET-2/TL-08-1474, Sept. 14, 2010. It is anticipated that a route permit for the remaining segment in Minnesota will be issued in early 2011.

Table 1 provides the Completeness Checklist for the Facility along with the location in this Application where the information can be found.

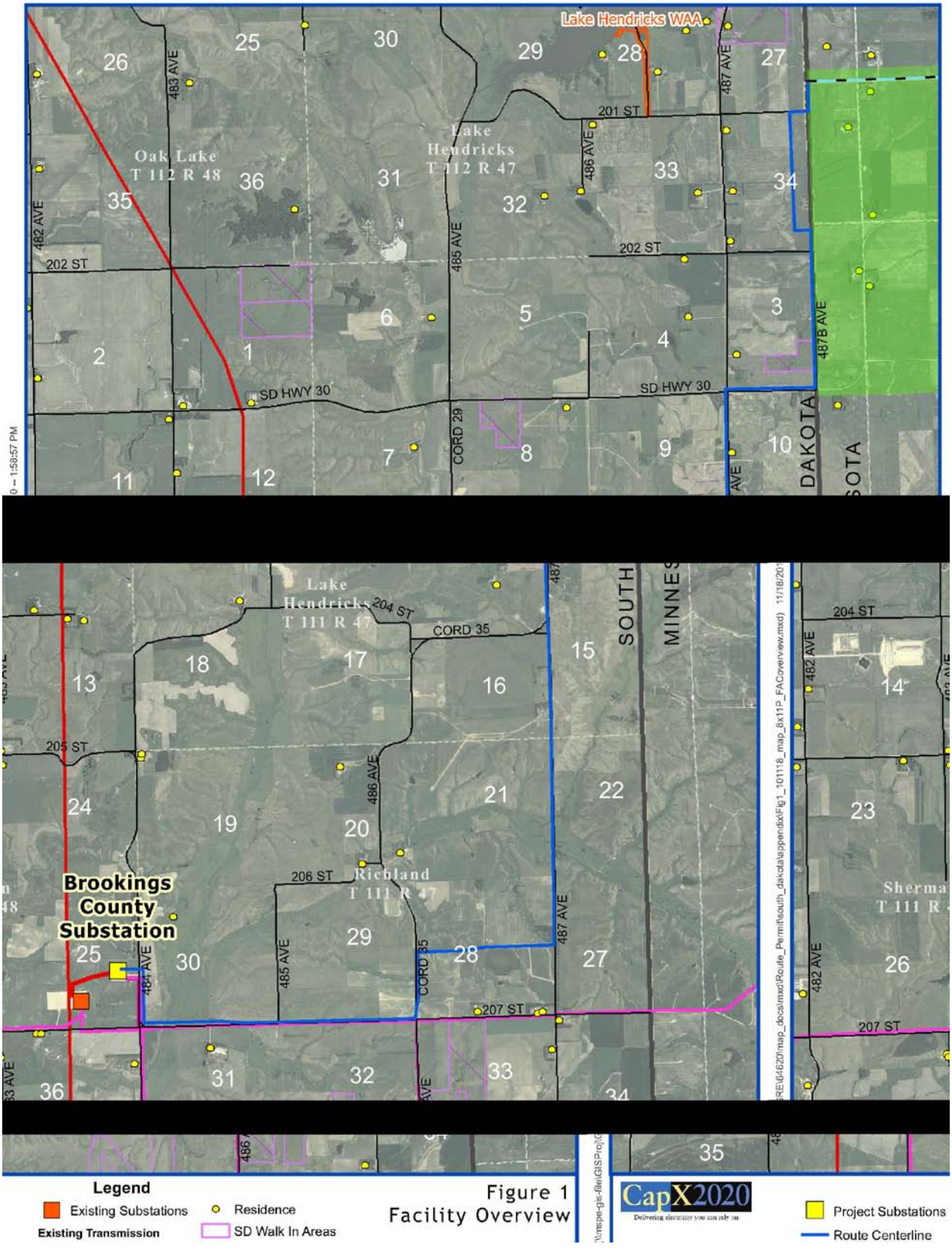
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Figure 1
Facility Overview
CapX2020

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Figure 2. Brookings Project Overview

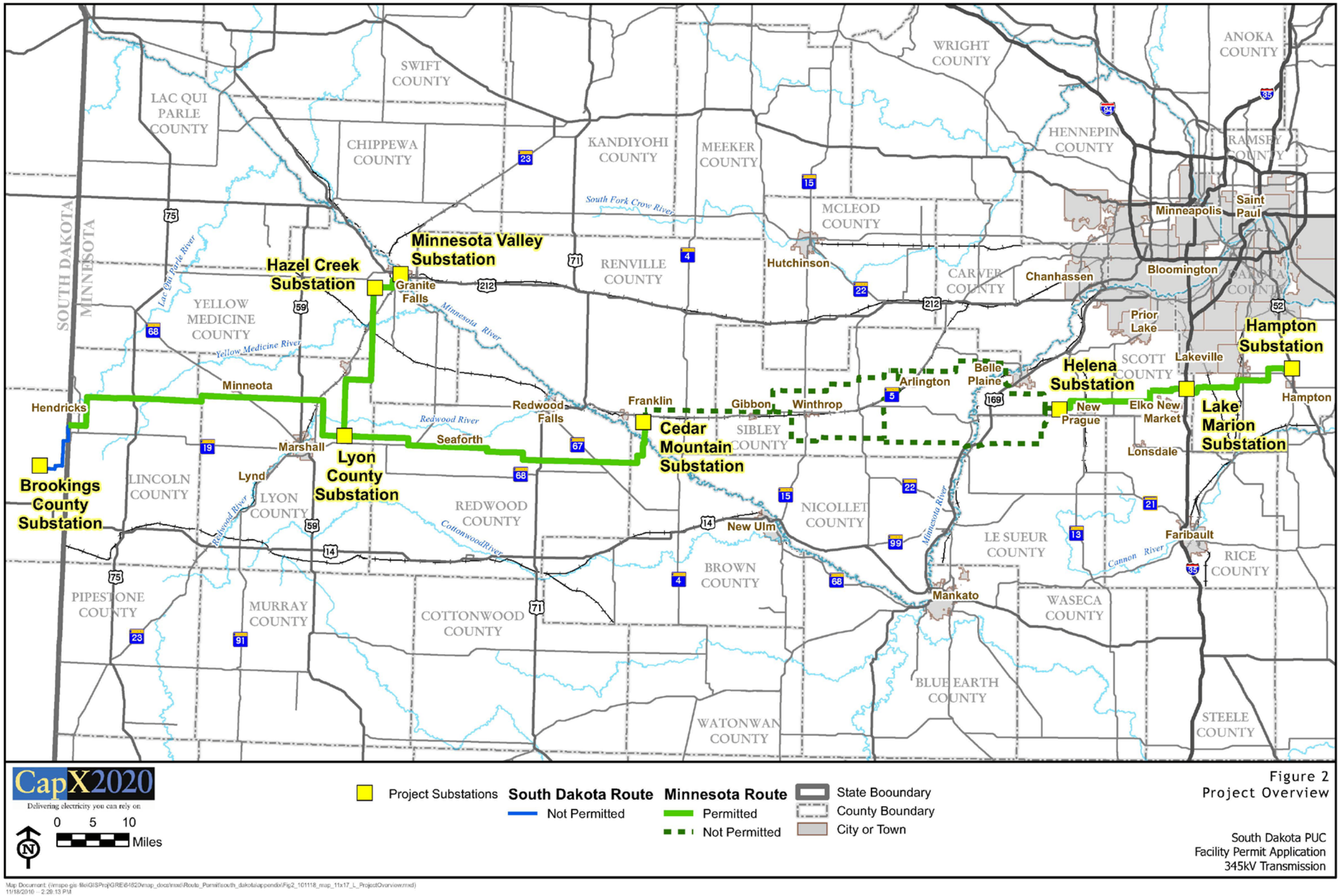

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Table 1. Completeness Checklist

SDCL	ARSD	Required Information	Location
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.	4.0
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.	4.0
49-41B-11(8)	20:10:22:08	**Purpose of facility.** The applicant shall describe the purpose of the proposed facility.	5.0
49-41B-11(12)	20:10:22:09	**Estimated cost of facility.** The applicant shall describe the estimated construction cost of the proposed facility.	6.0
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.	7.0
49-41 B-11(2)	20:10:22:11	**General site description.** 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.	8.0
49-41B-11(6),	20:10:22:12	**Alternative sites.** The applicant shall present information related to its 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; (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.	9.0

SDCL	ARSD	Required Information	Location
49-41B-11(11); 49-41B-22	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 affect of the environment as a result of their construction or operation in the transmission site or siting area.	10.0 – 18.0
49-41B-11(11); 49-41B-22	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 proposed plant 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 siting area 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 plan or transmission site; (5) A description of the soil type at the plant 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 siting area or 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.	11.0

SDCL	ARSD	Required Information	Location
49-41B-11(11); 49-41B-22	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: (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 definition 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.	12.0
49-41B-11(11); 49-41B-22	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.	13.0
49-41B-11(11); 49-41B-22	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.	14.0

SDCL	ARSD	Required Information	Location
49-41B-22	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 siting area and transmission site identifying existing land use according to the following 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 districts; 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.	15.0
49-41B-22	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 preempt 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.	16.0
49-41B-11(11); 49-41B-22	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.	17.0
49-41B-11(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.	18.0
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.	19.0

SDCL	ARSD	Required Information	Location
49-41B-11(10); 49-41B-22	20:10:22:23	**Community impact.** The applicant shall include an identification and analysis of the effects the construction, operation, and 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.	20.0
49-41B-11(4)	20:10:22:24	**Employment estimates.** The application shall contain the estimated number of jobs and a description of job classifications, together with the 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 county and the township in which the facility is located after construction is completed.	21.0
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.	22.0
49-41B-11(2)	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.	23.0

SDCL	ARSD	Required Information	Location
49-41B-11(2)	20:10:22:35	**Information concerning transmission facilities.** If a transmission 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 overhead 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.	24.0
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		N/A
	20:10:22:38		N/A
	20:10:22:39	**Testimony and exhibits.** Upon the filing of an application pursuant to SDCL 49-41B-11, an 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.	26.0

3.0 DESCRIPTION OF THE NATURE AND LOCATION OF THE PROPOSED TRANSMISSION FACILITY

The Facility includes a 10.6-mile 345 kV double circuit transmission line between the Brookings County Substation near White, South Dakota and the South Dakota/Minnesota border and associated modifications at the Brookings County Substation. The Facility is part of the larger Brookings County – Hampton 345 kV Project.

Proposed Route

The proposed route for the Facility is located entirely in Brookings County, South Dakota. From the Brookings County Substation, the route enters/exits the substation to the east, turns south at 484th Avenue, and then turns east and parallels 207th Street. At County Road 35, the route turns north for a half mile before turning east to cross a property/field line to 487th Avenue. The route then turns north along 487th Avenue (which eventually becomes County Road 35) before turning east along State Highway 30. At the South Dakota/Minnesota border, the proposed route parallels 487B Avenue, which is an abandoned roadbed. Near the end of 487B Avenue, the route turns west for approximately 500 feet before turning north to follow a property/farm field line to 201st Street. At 201st Street, the line turns east, crossing into Minnesota. Once in Minnesota, the proposed transmission line will follow the MPUC approved route. See Order Granting Route Permit, *In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota,* MPUC Docket No.: ET-2/TL-08-1474, Sept. 14, 2010.

This South Dakota/Minnesota border crossing was proposed by Applicants in the Minnesota Route Permit proceeding after extensive public involvement to minimize overall impacts of the Project in South Dakota and Minnesota. The crossing was selected, in part, to avoid potential conflicts with extensive existing and planned development of wind turbines and associated facilities, including feeder lines. Figures 1 and 2 show the proposed Facility route and connection with the permitted route in Minnesota. Figure 3 shows a basic schematic and comparable transmission line structure for the proposed Facility, and Figure 4 shows the typical concrete pier foundation used for a 345 kV transmission line.

Brookings County Substation

The Brookings County Substation will require expansion of the fence line up to 150 feet to the north on property currently owned by Northern State Power Company. The addition of up to six new breakers will be needed to accommodate the new 345 kV line termination.

Figure 3. Double Circuit 345 kV Structure with ROW

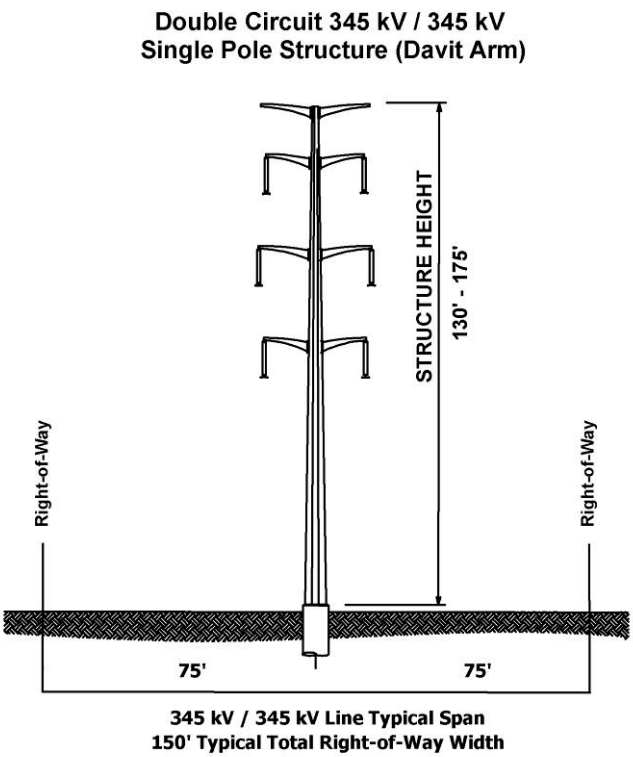


Figure 4. Pier Foundation

4.0 NAME OF OWNER, MANAGER, AND PARTICIPANTS (ARSD 20:10:22:06)

CapX2020 is a joint initiative of 11 transmission-owning utilities in South Dakota, North Dakota, Minnesota, and Wisconsin, with the goal to study, develop, permit, and construct transmission infrastructure needed to implement long-term and cost-effective solutions for customers to meet the growth in energy demand expected and to assist the states in meeting energy policy objectives.

Great River Energy is the "lead" utility or "development manager" for the Brookings County – Hampton 345 kV Project and as such is responsible for obtaining major permits and developing and implementing the Project if construction is authorized. Great River Energy is coordinating and managing the permitting process, engineering, procurement and future construction of the proposed 345 kV transmission line facilities. Great River Energy will also construct all of the Facility except the Brookings County Substation expansion. Xcel Energy will make all modifications to and will own and operate the Brookings County Substation.

The transmission line portion of the Facility will be owned jointly by CapX2020 utilities. Final ownership interests will be determined in accordance with a Project Development Agreement ("PDA") that was executed in February 2007 by Great River Energy, Xcel Energy, Central Minnesota Municipal Power Agency ("CMMPA"), Missouri River Energy Services ("MRES"), Otter Tail Power Company ("OTP") as part of the CapX2020 Transmission Initiative.

CMMPA is a joint action agency of 12 members located in south central Minnesota. MRES is a not-for-profit joint-action agency headquartered in Sioux Falls, South Dakota, with 60 member communities in Iowa, Minnesota, North Dakota, and South Dakota. OTP is an investor-owned electric utility headquartered in Fergus Falls, Minnesota that provides electric service to approximately 128,000 customers in North Dakota, South Dakota, and Minnesota.

The transmission systems of Great River Energy, Xcel Energy, CMMPA, MRES, and OTP's are operated and administered by the Midwest Independent Transmission System Operator ("Midwest ISO").

The ownership of the proposed transmission facilities will be determined once all critical permits have been obtained. At that time, the CapX2020 participants will have the opportunity to decide whether to take an ownership stake in the transmission line. Each CapX2020 participant will have the option to (i) take ownership up to a designated level, (ii) take some lesser percentage to minimize capital expenditures or (iii) "opt out" of ownership entirely. The Project development percentages (and potential/non-binding ownership percentages) are identified in Table 2.

Table 2. Current Project Development Agreement Percentages

Utility	Applicable Project Development Percentage
Xcel Energy	72.1
Great River Energy	16.5
MRES	5.1
OTP	4.1
CMMPA	2.2
Total	**100**

If a participant does not elect to invest in the Project, the PDA has established procedures by which other participants may take on that investment percentage share. Agreements pertaining to the construction, operation, ownership and maintenance of each transmission line are being negotiated and participants will continue to refine the commercial arrangements as the regulatory process proceeds.

The Applicants and individuals authorized to receive communications relating to this Application on behalf of Great River Energy and Xcel Energy are shown below. Great River Energy is the Project lead and it is preferred that any requests for information or notification of schedule be directed to Daniel Lesher of Great River Energy, the Routing Lead for the Project and Brett Koenecke as Counsel for the Applicants.

Great River Energy Daniel Lesher 12300 Elm Creek Boulevard Maple Grove, MN 55369-4718 1-888-473-2279 brookingsinfo@CapX2020.com	**Xcel Energy** Timothy Rogers P.O. Box 9437 Minneapolis, MN 55440-9437 1-888-473-2279 brookingsinfo@CapX2020.com	**May, Adams, Gerdes & Thompson** Brett Koenecke PO Box 160 Pierre, SD 57501 1-605-224-8803 koenecke@magt.com

5.0 PURPOSE OF THE TRANSMISSION FACILITY (ARSD 20:10:22:08)

The purpose of the Brookings County – Hampton 345 kV Project is to provide generation outlet capability in eastern South Dakota and southwestern Minnesota to support the increasing amounts of proposed generation, including wind generation, in the Coteau des Prairies and Buffalo Ridge area. The Project is also intended to improve community service and electric reliability. Additionally, the Project is one of four CapX2020 high voltage transmission projects designed to improve the reliability of the bulk electric system serving South Dakota, North Dakota, Minnesota, and Wisconsin.[1] Further discussion of the purpose of the Project is included in Section 7.0.

[1] The three other CapX2020 projects are: (1) a 345 kV transmission line from Fargo, North Dakota, to Monticello, Minnesota ("Fargo – Monticello"); (2) a 345 kV transmission line from Hampton, Minnesota to Rochester, to La Crosse, Wisconsin ("Hampton – Rochester – La Crosse"), and (3) a 230 kV transmission line from Bemidji, Minnesota to Grand Rapids, Minnesota ("Bemidji – Grand Rapids").

6.0 ESTIMATED COST OF FACILITY (ARSD 20:10:22:09)

The Facility costs include the survey, engineering, materials, construction, right-of-way ("ROW"), and project management associated with the transmission line and substation modifications. The cost of the total Project is estimated at $725 million (installed cost dollars). The cost associated with the Facility in South Dakota is estimated to be $25.6 million as referenced in Table 3.

Table 3. Facility Cost

Facility	Cost (millions)
Brookings County –Minnesota Border 345 kV Transmission Line[1]	$22.4
Brookings County Substation Modifications	$3.2
Total Facility Cost	**$25.6**

[1] The anticipated subtotal cost for the Brookings County – Minnesota Border 345 kV Transmission Line excludes the anticipated annual O&M costs because these costs are not affiliated with the total construction cost.

The primary operating and maintenance cost for transmission lines is the cost of inspections, usually done yearly by air and once every five years by ground. Annual operating and maintenance costs for transmission lines vary depending upon the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used and the age of the transmission line. For 345 kV transmission lines, past experience has shown that costs are approximately $300 to $500 per mile annually.

Substations require a certain amount of maintenance to keep them functioning in accordance with accepted operating parameters and the National Electric Safety Code ("NESC"). Transformers, circuit breakers, batteries, protective relays and other equipment need to be serviced periodically in accordance with the manufacturer's recommendation. The site itself must be kept free of vegetation and drainage must be maintained.

7.0 DEMAND FOR TRANSMISSION FACILITY (ARSD 20:10:22:10)

The demand for the Project is driven by the need to: (1) increase generation outlet; (2) improve community reliability; and (3) improve regional reliability. Each of these three needs is discussed in greater detail below.

7.1 GENERATION OUTLET

The Coteau des Prairies is an area of premier wind resources for South Dakota and Minnesota. Over the past decade, the amount of generation installed in the area has grown significantly and is placing increasing demands on the transmission system in the area to deliver wind power to customers.

The growth of wind energy development along the Coteau des Prairies/Buffalo Ridge has resulted in construction of transmission facilities to support the growing industry. In 2008, construction was completed on the first set of major transmission infrastructure improvements in the region. These improvements included several new transmission lines including two that extended into South Dakota: the Buffalo Ridge to White 115 kV transmission line (SD PUC Docket No. EL05-028) and the Split Rock to Lakefield Junction 345 kV Transmission Line (SD PUC Docket No. EL05-023) ("SW Minnesota 825 MW Facilities"). These projects increased the wind outlet capability of the region to 825 megawatts ("MW"). The next set of improvements in the region involved three new 115 kV transmission lines which were referred to as the Buffalo Ridge Incremental Generation Outlet ("BRIGO") Projects. These three 115 kV lines included: 1) a 16 mile, 115 kV transmission line between the Lake Yankton Substation near Balaton, Minnesota and a new Marshall Municipal Utilities substation near Marshall, Minnesota; (2) a 23 mile, 115 kV transmission line between the Fenton Substation near Chandler, Minnesota and the Nobles County Substation northwest of Worthington near Reading, Minnesota; and (3) a 13 mile, 115 kV transmission line between the Yankee Substation south of Hendricks, Minnesota and the Brookings County Substation near White, South Dakota (SD PUC Docket No. EL08-001).

The BRIGO Projects were completed in January 2010. With the addition of the BRIGO Projects, the existing transmission system is able to deliver approximately 1,200 MW of power from the Coteau des Prairies area. Even this increased capacity is insufficient to accommodate all of the generation projects proposed in the area. The demand for transmission far exceeds the capability of the transmission system. Generation in the area cannot be developed further without additional transmission infrastructure to deliver that power to customers. In September 2010, MISO reported that wind developers have made applications to connect 13,536 MW of additional wind generation in the Coteau des Prairies area by the end of 2015. The Brookings County – Hampton 345 kV Project will provide additional transmission capability to satisfy a portion of the generation interconnection requests arising from the area. Once constructed, the Brookings County – Hampton 345 kV Project will enable in excess of 1,000 MW of generation.

7.2 COMMUNITY RELIABILITY

The Project will also provide local community reliability benefits to the project area. Specifically, the Project will provide support to the underlying lower voltage transmission systems along the route with the installation of step-down transformers. The installation of the Brookings County – Hampton 345 kV Project establishes strong power sources at the step-down points along the route. Voltages on these systems will also be supported to provide better load service under contingent conditions involving local transmission systems.

As Figure 5 shows, many communities, including the City of Brookings, lie within the area benefited by installation of the Brookings County – Hampton 345 kV Project.

7.3 REGIONAL RELIABILITY

Generally speaking, a higher voltage transmission grid provides the backbone necessary for regional reliability. Regional reliability is related to the efficient transfer of bulk power across regions and between regions. By constructing new 345 kV transmission lines, the regional system is benefited as a whole because those additional connections provide for a more robust transmission system that is better able to withstand system contingencies. A more robust bulk power system also promotes and supports fair and competitive wholesale electric markets to meet the needs of all regional market participants, rather than just those of the individual utility's customers or a specific generation resource type.

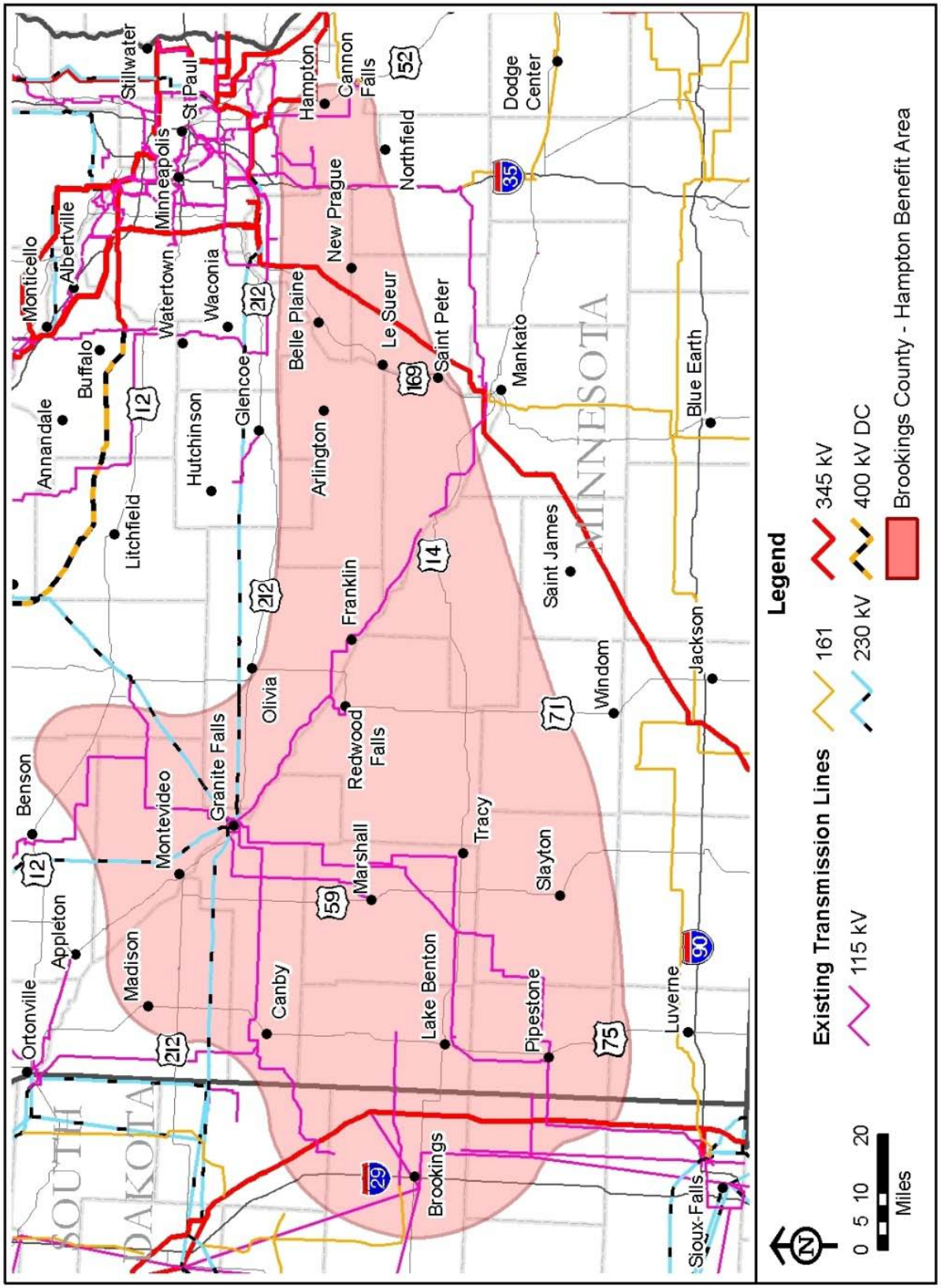
The CapX2020 projects, including the Brookings County – Hampton 345 kV Project, will assist in the development of a reliable high voltage regional network facilitating additional generation. The Brookings County – Hampton 345 kV Project will improve the reliability of the transmission grid in the region while ensuring compliance with national electric reliability standards and relieving congestion on the grid.

7.4 CONSEQUENCES OF DELAY OR TERMINATION OF PROJECT

The Brookings County – Hampton 345 kV Project is needed to increase generation outlet from the Coteau des Prairies area. This need will not be served if the Project is not permitted and built. In addition, the communities along the Project will not realize benefits from having a more robust electrical system made available by this line if the Project is not constructed. Moreover, regional reliability will not be enhanced if the Project is not constructed.

In addition, any delay of this Project will create corresponding delay in the development of additional generation.

Figure 5. Brookings County – Hampton 345 kV Project Benefit Area



8.0 GENERAL SITE DESCRIPTION (ARSD 20:10:22:11)

The South Dakota portion of the Project, for which this application is being made, includes an approximately 10.6 mile transmission line between the Brookings County Substation and the South Dakota/Minnesota border and is located entirely in Brookings County (Figure 1). The Facility also includes expansion of the Brookings County Substation, which is located near White, South Dakota. Table 4 provides the location of the proposed Facility by Township, Range, and Section identification numbers in South Dakota.

Table 4. Location of the Proposed Facility

Facility	County	Township Name	Township	Range	Section(s)
Brookings County to SD/MN Border 345 kV Transmission Line	Brookings	Sherman	T111N	R48W	25, 36
		Lake Hendricks	T112N	R47W	27, 34
		Lake Hendricks	T111N	R47W	3, 4, 9, 16
		Richland	T111N	R47W	21, 28, 29, 30

Source: U.S. Geological Survey, 2008

The Facility is a portion of the larger Brookings County – Hampton 345 kV Project that includes transmission line facilities and substation connections in South Dakota and Minnesota. Maps showing the Brookings County Project area are provided in Appendix A.

The ROW for the proposed Facility will be 150 feet wide (75 feet on either side of the transmission line center) for all sections of the transmission line that do not follow existing corridors. When the transmission line parallels other existing infrastructure ROW (e.g. roads, railroads, other utility corridors), an easement of lesser width may be required as parts of the ROW of the existing infrastructure can often be combined with the ROW needed for the transmission line. When paralleling existing ROW, the Applicants' typical practice is to place the poles on adjacent private property, a few feet off the existing ROW. With this pole placement, the transmission line shares the existing ROW, thereby reducing the size of the easement required from the private landowner. Throughout the route development process, the Applicants have sought to identify areas to share ROW with existing infrastructure, including transmission lines, highways and railroad ROW.

The Applicants' preferred structure type is a single pole steel structure, ranging in height between 130 and 175 feet. However, the final structure type and material will be determined based on further engineering analysis and environmental constraints. The transmission line will span 750 to 1,100 feet between structures.

In South Dakota, the proposed transmission line facility will consist of a new double circuit 345 kV line constructed from the Brookings County Substation east to the South Dakota/Minnesota border. The proposed Facility will predominantly parallel roadways but will be located entirely on private lands.

9.0 ALTERNATIVE SITES (ARSD 20:10:22:12)

9.1 ROUTE IDENTIFICATION AND SELECTION PROCESS

The route identified for the Facility was developed as part of the larger route development process for the Brookings County – Hampton 345 kV Project. This route selection process centered on a multi-faceted approach in which the Applicants considered state and federal requirements, public comments received at pre-filing public meetings, and extensive analysis of appropriate environmental data. Over the course of 24 months, the route development process was primarily driven by an extensive public participation and agency coordination program in both South Dakota and Minnesota aimed at minimizing overall impacts of the Project. The corridor defined in this Application is detailed in Figures A.2-1 through A.2-4 in Appendix A.

The Applicants began their analysis of potential route options by collecting Geographic Information System ("GIS") data from local, state, and federal agencies for a corridor from the Brookings County Substation in South Dakota to the Hampton Substation in Minnesota. The Applicants used these data, along with data collected during field visits to the Facility area (defined as the immediate land area surrounding the proposed Facility route), and qualitative data supplied by the public from CapX2020 sponsored open houses and workshops, to develop an initial base map of opportunities and constraints. The Applicants developed a "route corridor area" that specified the general location of the proposed Facility. Next, the Applicants devised a series of "route segments," typically short linear distances adjacent to roadways, section or quarter section field lines, or existing utility corridors that could potentially be used for a transmission line route. Roadways, section lines, and existing utility corridors were considered desirable facilities for the new transmission line to minimize impacts to open land areas, avoid impacts to homes, businesses, or wind energy facilities, and allow for easier access to transmission line facilities during and after construction for maintenance purposes. The feasibility of using these segments was then evaluated on an individual basis. Once evaluation of the route segments was completed, the segments were linked together into numerous alternative potential transmission line routes. The routes were then evaluated by the Applicants, measured against several transmission line routing factors (listed below) and sensitive and important resources identified by the public and natural resource agencies. The factors that were analyzed in the route selection process include the following:

- Minimizing impacts to humans and human settlements, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services;
- Considering effects on public health and safety;
- Following existing ROW (roadway or other utility ROW) or close to property and/or section lines to minimize impacts to land-based economies, including, but not limited to, agricultural fields, forested areas, tourism, and mining facilities;
- Minimizing effects on archaeological and historic resources;
- Avoiding impacts to rare or endangered species and unique natural resources;
- Minimizing the total length;
- Avoiding airports or other land use conflicts; and

- Applying design options that maximize energy efficiencies, mitigate adverse environmental effects, and accommodate expansion of transmission or generating capacity.

Public open houses organized by CapX2020 were held on June 16, 2008 and August 25, 2009 in White, South Dakota. During these open houses, the public identified several criteria that were also considered in the routing process. These criteria include:

- Minimizing impacts to agricultural fields by constructing the transmission lines near existing road ROW or close to property or section lines;
- Avoiding placement of transmission lines any closer to residences than existing transmission lines are in the area;
- Allowing for the movement of farm equipment by placing structures near the road ROW or section lines; and
- Avoiding diagonal traverses across agricultural fields wherever possible.

The Applicants have addressed all those matters set forth in SDCL Chapter 49-41B and in ARSD chapter 20:11:22 (entitled Energy Facility Siting Rules). Pursuant to SDCL 49-41B-22, the information contained in this Application here establishes that:

1. The proposed transmission line facilities comply with all applicable laws and rules;
2. The facilities will not pose a threat of serious injury to the environment or to the social and economic condition of inhabitants in the siting area;
3. The facilities will not substantially impair the health, safety, or welfare of the inhabitants; and
4. The facilities will not unduly interfere with the orderly development of the region, giving consideration to the view of the government bodies of the local affected units of government.

9.2 ALTERNATIVES CONSIDERED AND SELECTED

Based on the factors outlined above, the Applicants initially considered multiple alternatives for the proposed transmission line facility in South Dakota. The process for selecting a route was influenced in part by the MPUC's routing process. Both of the routes identified in the Minnesota route permit application considered the feasibility of routing the proposed transmission line in South Dakota to connect with the Brookings County Substation. The route selected by the MPUC crosses the South Dakota/Minnesota border beginning immediately south of Hendricks, Minnesota, along 290th Street in Lincoln County.

The Applicants further evaluated possible transmission line routes in South Dakota pursuant to the factors listed above and the comments received from the public. Through this process the Applicants identified the transmission line route which is proposed in this Application, which was selected in an effort to minimize adverse impacts to human settlements and the natural environment, minimize transmission line corridor congestion entering and exiting the substation, improve the reliability of the regional electrical system, and minimize transmission line miles.

10.0 ENVIRONMENTAL INFORMATION (CHAPTERS 11 THROUGH 18) (ARSD 20:10:22:13)

Sections 11 through 18 provide a description of the existing environment at the time of submission of this Application, anticipated changes to the existing environment as a result of construction and operation of the proposed Facility, and irreversible changes that are anticipated to remain beyond the operating lifetime of the Facility. Anticipated impacts from construction, operation, and maintenance for each environmental feature are noted, along with appropriate mitigation steps to be taken by the Applicants during construction and operation of the proposed Facility.

11.0 EFFECT ON PHYSICAL ENVIRONMENT (ARSD 20:10:22:14)

11.1 EXISTING ENVIRONMENT

11.1.1 DESCRIPTION OF LAND FORMS

The Facility lies in the Coteau des Prairies division of the Great Plains Physiographic Province. The Coteau des Prairies is the most conspicuous landform of eastern South Dakota and consists of a highland area (an erosional remnant) between the Minnesota-Red River Lowland and the James River Lowland to the west (Patterson et. al. 1995). This landform is part of a plateau that extends through North Dakota into Canada. It is drained to the south by the Big Sioux River, whose tributary streams enter mainly from the east. West of the Big Sioux River, the surface of the Coteau des Prairies is dotted with lakes and depressions, while very few lakes occur east of the river. The Coteau des Prairies slopes gently to the south and west with eastern and western slopes that are steep at the northern end and taper off on the south (Northern State University 2010). Elevations along the route range from 2,000 feet (610 m) above sea level in the north to about 1,600 feet (488 m) in the south.

11.1.2 GEOLOGICAL FEATURES

During the Ice Age, the Coteau des Prairies was covered by glaciers that deposited glacial drift over its surface. Glacial cover in the Facility area is thicker than the surrounding regions. Drift thicknesses in the Facility area range from 600 to 700 feet (Patterson et. al. 1995). It is comprised of till from the Des Moines lobe deposited during the Late Wisconsin period. The northern half of the route is underlain by Bemis End Moraine deposits and the southern half by Toronto Till Plain deposits. Portions of the route are also dissected by glacial outwash deposits that are found along Deer Creek and its tributaries. The Bemis End Moraine and Toronto Till Plain deposits are both described as a heterogeneous mixture of boulders, gravel, sand, silt, and clay. Their geomorphology differs in that the moraine deposits make up a linear ridge-like landform that is highly dissected and has a very high relief, and a rugged, hummocky surface, while the till deposits have medium relief that is also dissected by many streams (Schultz and Jarrett 2009.)

The Facility area is underlain by undifferentiated Cretaceous bedrock and deeper Precambrian Sioux Quartzite. The uppermost bedrock in the Facility area is the Niobrara Formation (Schultz and Jarrett 2009). This formation is characterized as primarily a limestone with white to dark gray argillaceous chalk, marl, and shale. It weathers yellow to orange and contains thin, laterally continuous bentonite beds, chalky carbonaceous shale, minor sand, and small concretions (Martin et. al 2004). Thickness for this unit ranges from 160-225 feet (49-69 m).

11.1.3 ECONOMIC DEPOSITS

Based on a review of topographic maps and data provided by the South Dakota Department of Environment and Natural Resources and Minnesota Department of Transportation, 23 gravel pits were identified within five miles of the route. The locations and status of the gravel pits are shown in Table 5.

Table 5. Gravel Pits within Five Miles of the Proposed Facility

Township	Section	Type	Status
Hendricks (T112, R46)	7	Gravel	2 Inactive Sites
Hendricks (T112, R46)	17	Gravel	Active
Hendricks (T112, R46)	18	Gravel	2 Inactive Sites
Lake Hendricks (T112, R47)	30	Gravel	Inactive
Shaokatan (T111, R46)	2	Gravel	Inactive
Shaokatan (T111, R46)	3	Gravel	Inactive
Shaokatan (T111, R46)	28	Gravel	2 Inactive Sites
Shaokatan (T111, R46)	33	Gravel	Inactive
Shaokatan (T111, R46)	31	Gravel	Active
Lake Hendricks (T111, R47)	6	Gravel	Inactive
Lake Hendricks (T111, R47)	7	Gravel	Inactive
Lake Hendricks (T111, R47)	8	Gravel	Active
Lake Hendricks (T111, R47)	9	Gravel	Inactive
Lake Hendricks (T111, R47)	18	Gravel	Inactive
Richland (T111, R47)	30	Gravel	Inactive
Sherman (T111, R48)	12	Gravel	Inactive
Sherman (T111, R48)	35	Gravel	Active
Sherman (T111, R48)	36	Gravel	Active
Drammen (T110, R46)	9	Gravel	Active
Alton (T110, R48)	9	Gravel	Inactive

Source: South Dakota Department of Environment and Natural Resources and the Minnesota Department of Transportation, 2010.

11.1.4 SOIL TYPES

Soils within the proposed transmission line route can be grouped by soil associations. An association is a group of individual soil series that occur together in a characteristic geographic pattern or a distinctive pattern of soils, relief, and drainage. Each soil association is typically composed of one or more major soils and one or more minor soil components. Soil associations are defined by each county's Natural Resources Conservation Service ("NRCS") office. Within the Facility area, four soil associations occur (Schaefer, 1995):

- **Buse-Barnes-Lamoure Association:** Soils within this association are generally well drained, somewhat poorly drained and poorly drained and of loamy and silty textures. They occur on level to steep slopes and are typically located in floodplains and on moraines. This association would be crossed by the proposed transmission line facility east and northeast of Deer Creek along the moderate to steep slopes of the stream valleys in these areas.
- **Kranzburg-Brookings Association:** Soils within this association are generally well drained and moderately well drained and of a silty texture. They occur on nearly level to gentle slopes on till plains. This association would be crossed by the proposed transmission line facility east of the Deer Creek Stream Valley on gently sloped uplands.

- **Lamoure-Moritz-Divide Association:** Soils within this association are generally poorly drained to somewhat poorly drained and of loamy and silty textures. They occur in level to nearly level areas in floodplains. This association would be crossed by the proposed transmission line facility in the vicinity of the Deer Creek Stream Valley.
- **Singsaas-Buse-Waubay Association:** Soils within this association are moderately well drained to well drained and of silty and loamy textures. They occur in nearly level to gently sloped till plains and moraines. This association would be crossed by the proposed transmission line facility where it parallels the South Dakota/Minnesota border, in the vicinity of South Dakota Highway 30.

The proposed transmission line facility would cross 32 soil series. Kranzburg-Brookings Silty Clay Loams, Singsaas-Waubay Silty Clay Loam and Singsaas-Buse Complex are the most common soil types, comprising approximately one-third of the footprint of the proposed Facility in South Dakota. A brief description of each soil series is included in Appendix B.

Approximately 57 percent of the land within the proposed transmission line ROW is listed as prime farmland, approximately 11 percent of the soil is listed as prime farmland if drained, and a negligible percentage is prime farmland if irrigated. Prime farmlands are determined by the South Dakota NRCS to have adequate potential of hydrogen ("pH"), water supply, growing season length and temperature for growing crops and are not excessively erodible or wet throughout the growing season.

11.1.5 SEISMIC RISKS

Seismic risk of the Facility area is considered low. No earthquakes have been reported in Brookings County since 1872. The closest seismic event was recorded in Moody County, the county south of Brookings County, in 1982. This earthquake measured 3.6 on the Richter magnitude scale.

11.2 POTENTIAL IMPACTS

The geologic characteristics of the Facility area are not likely to impact the design, construction, or operation of the proposed Facility. Bedrock is over 600 feet below ground surface in the Facility area and overlying glacial cover is not highly erodible.

The Brookings County digital Soil Survey data do not contain information regarding the potential for erosion or sedimentation associated with specific soil series. In general, areas with steep slopes, dry soils and/or minimal vegetative cover are at greatest risk of erosion. Within the Facility area, the potential for erosion is highest along steep stream banks along Deer Creek, tributaries, or seasonal water channels. However, the proposed transmission line would easily span these water features, and the placement of poles on slopes, in or around surface water bodies, or in areas where erosion may occur naturally would be avoided.

11.3 MITIGATION

The proposed Facility has been routed to minimize impacts to land forms, geology, and economic deposits. Significant impacts to soil types are not anticipated, although the placement of pier structures in the ground will have a minor impact to the underlying geologic conditions.

Available geologic data indicate that the proposed Facility will not significantly affect soil conditions or bedrock geology. Seismic activity is not anticipated to affect the performance of the transmission line structures. Best Management Practices ("BMPs") will be used during construction of the proposed Facility to minimize adverse effects to the existing environment from the time the initial excavation begins until the transmission facility is operational.

12.0 HYDROLOGY (ARSD 20:10:22:15; ARSD 20:10:22:20)

12.1 EXISTING ENVIRONMENT

The terrain in the vicinity of the South Dakota section of the proposed transmission line facility is characterized by moderate to steeply sloped coulees and ridgelines along linear drainage features. Outside of these coulees, the terrain is more undulated and lacking steep slopes. Hydrologic features are generally linear and limited to the toe slopes and stream valleys where intermittent or perennial streams are present. However, many depressional basins/wetlands are concentrated along the north/south segment of the proposed Facility between the unnamed Deer Creek tributary (approximately 3.2 miles northeast of the Brookings County Substation) and State Highway 30. Figure A.3 of Appendix A shows the hydrologic resources discussed in this section.

The South Dakota section of the proposed transmission line facility is almost entirely located within the Deer Creek – Medary Creek and the Lake Hendricks watersheds. The Deer Creek – Medary Creek watershed flows southwest towards the Big Sioux River, while the Lake Hendricks watershed drains to the northeast into the Lac Qui Parle River. Approximately 0.4 miles of the proposed Facility, where it parallels State Highway 30, is located within the County Ditch #8 Watershed that drains to the Minnesota River.

The most significant drainage feature crossed by the proposed transmission line facility is Deer Creek, approximately one-half mile southeast of the Brookings Substation. This feature is contained within a distinct stream valley with steep slopes, and a flat valley floor approximately 0.4 miles wide. Some emergent wetlands are identified by the National Wetlands Inventory ("NWI") within this stream valley. These wetlands are identified as palustrine emergent temporarily or seasonally flooded (U.S. Fish and Wildlife Service, 2008).

Another feature is an unnamed tributary to Deer Creek, crossed approximately 3.2 miles northeast of the Brookings County Substation between Poles 32 and 33. This stream is located within a stream valley with similar characteristics of the main channel of Deer Creek. However, the NWI has identified more extensive emergent wetlands along this tributary. These wetlands are similar to those along the main channel of Deer Creek; however, some wetlands along this unnamed tributary have been identified as palustrine forested wetlands with temporary or seasonally flooded conditions.

The proposed transmission line facility will also cross several other coulees that contain minor tributaries to Deer Creek or the unnamed tributary discussed in the previous paragraph. While not mapped on the NWI, some of these coulees may contain areas that would qualify as wetlands.

12.2 POTENTIAL IMPACTS

Given the flexibility of pole locations and a spanning distance between 750 to 1,100 feet, the proposed transmission line facility can span any NWI wetland and thus avoid any potential impacts. Linear drainage features in its vicinity would be spanned.

Permanent impacts to municipal, private, and agricultural water users will not occur, and permanent impacts to surface water and groundwater will also not occur. No municipalities or center pivot irrigation systems are located in the vicinity of the proposed line. Brookings-Deuel County Rural Water has been contacted and indicated to the Applicants that rural water facilities are located in the area the proposed Facility will be located. Coordination with Brookings-Deuel County Rural Water will continue as engineering designs become final.

The proposed Facility will require the temporary installation of a timber bridge across a tributary of Deer Creek, approximately 0.5 miles east of the Brookings County Substation to install a transmission line pole. The timber bridge will allow temporary access by construction vehicles and personnel to the pole site location. Once construction of this pole is completed, the timber bridge will be removed and the tributary restored to pre-construction conditions to the greatest extent practicable. The Applicants will continue to work directly with the South Dakota Game, Fish and Parks ("SDGFP") department and the United States Fish and Wildlife Service ("USFWS") to implement appropriate mitigation strategies for impacts resulting from the use of the temporary timber bridge.

Impacts to recreation resources will be minimal and should not impose any restrictions on outdoor recreation activities. No public parks or Wildlife Management Areas ("WMA") are located in the area. One walk-in area that provides public access to land on private property was identified.

Fish and aquatic wildlife will not be negatively impacted by the Facility as surface waters would be spanned. To limit runoff to aquatic habitats, a Stormwater Pollution Prevention Plan ("SWPPP") will be implemented.

Impacts to water storage, reprocessing, cooling, or deep well injection will not occur, as these uses are limited/not present in the area. If these water uses were to be developed in the future, poles may present isolated siting issues.

12.3 MITIGATION

Mitigation will generally not be required as all wetlands and linear drainage features (streams) will be avoided by pole placement. A SWPPP will be implemented for this Facility to limit impacts to hydrologic resources caused by stormwater runoff. This SWPPP will include construction BMPs such as using mats while operating machinery in wetland areas, installing silt fences or other devices designed to prevent sediment runoff such as coir rolls or straw bales, and using native species to re-vegetate disturbed areas.

13.0 EFFECT ON TERRESTRIAL ECOSYSTEMS (ARSD 20:10:22:16)

13.1 EXISTING ENVIRONMENT

The terrain in the vicinity of the proposed transmission line facility is characterized by moderate to steeply sloped coulees and ridgelines along linear drainage features. Outside of these coulees, the terrain is more level to gently undulating and lack steep slopes. Land uses are generally dictated by the terrain of a given area. Level stream valley floors are used for pasture or held in Conservation Reserve Program ("CRP") with few areas being planted in crops. Steeper areas are maintained as pasture or held in CRP, and more level lands are utilized for crop production. Roadways generally follow section or half-section lines where the terrain allows. Farmsteads are typically located along roadways and feature woody groves or wind breaks. Figure A.4 in Appendix A illustrates the topography in the Facility area.

13.1.1 FLORA

Ecologically unique plant communities are present on steeper slopes and adjacent to streams within the proposed transmission line route. Natural plant communities were preserved where steep terrain and wet soil conditions prevented conversion to agricultural uses. Native plant communities were identified during a 2008 survey of prairie resources along the route. While often used for pasture, native plants persist and are often dominated by big bluestem, little bluestem, indian grass, prairie cordgrass, gray headed coneflowers, purple coneflower, and cup plant.

13.1.2 FAUNA

The Facility area supports native fauna associated with the tallgrass prairie region, and would likely have higher densities of avian use than areas used for row crop production. Additionally, these areas may provide habitat characteristics preferred by prairie obligate butterflies such as the Dakota skipper. Outside of these areas, native characteristics are generally absent and row crop production has diminished the quality of habitat available to grassland species. Appendix C includes the results of the North American Breeding Bird Survey. The species included in this survey are indicative of agricultural landscapes converted from tallgrass prairie. While this survey area is located in Tyler, Minnesota, species are likely to be similar because the underlying landforms in the Tyler area are similar to those in the Facility area.

While the proposed transmission line facility has been routed to avoid wetland features, they are relatively numerous in the vicinity of Deer Creek, its unnamed major tributary, in the vicinity of Lake Hendricks, and near Lake Shaokatan. These features may attract high numbers of migratory waterfowl to the area. Flyways are likely present along stream valleys and between lakes, wetlands, and agricultural fields that can serve as feeding areas.

The prevalence of pasture and grasslands in the Facility vicinity provides moderate to high quality habitat for soaring raptors, such as Swainson's and red-tailed hawks. Existing perching opportunities in these areas are generally limited to deciduous trees located at farmsteads, fence posts, and existing distribution and transmission line poles.

A review of the USFWS South Dakota Field Office list of endangered species by county (2010), indicated that federally listed threatened, endangered, or candidate species present within Brookings County are the Western Prairie Fringed Orchid (T), the Topeka shiner (T) and the Dakota skipper (C). Given the native characteristics found along portions of the proposed route, it is possible that listed species may be found in these areas. See the potential impacts section for a more detailed discussion of impacts to listed species and their habitats.

SDSFP was also contacted to obtain a list of rare and listed (state and federal) species in the Facility vicinity. Table 6 provides a list of those species observed within one mile of the proposed route.

Table 6. Special Status Species

Common Name	Scientific Name	Federal Status	South Dakota Status	State Conservation Rank
Blue Cohosh	*Caulophyllum thalictroides*	Not Listed	Not Listed	S3
Kalm's Lobelia	*Lobelia kalmii*	Not Listed	Not Listed	S1
Small Fringed Gentian	*Gentianopsis procera*	Not Listed	Not Listed	S2
Tall Cottongrass	*Eriophorum angustifolium*	Not Listed	Not Listed	S3
Broadleaf Water-milfoil	*Myriophyllum heterophyllum*	Not Listed	Not Listed	S1
Small White Lady's-slipper	*Cypripedium candidum*	Not Listed	Not Listed	S1
Northern Redbelly Snake	*Storeria occipitomaculata occipitomaculata*	Not Listed	Not Listed	S3
Topeka Shiner	*Notropis topeka*	Endangered		

Source: South Dakota Natural Heritage Database, South Dakota Game, Fish and Parks, 2010

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.

13.2 POTENTIAL IMPACTS

Temporary impacts to terrestrial communities will include increased human use and heavy equipment activity during construction. As part of these activities, vehicle traffic could also increase between pole locations, which would likely compact soils, trample vegetation, or create areas of exposed soil.

Impacts to native communities and listed species will be minimized by avoiding pole placement within native habitat to the extent practicable. To this end, the proposed route is located

adjacent to road ROW for approximately 8.6 miles and within tilled agricultural fields for approximately 1.25 miles. This distance totals approximately 95% of the total distance of the route within South Dakota.

Approximately 0.5 mile of the alignment is located within pasture. These areas may contain appropriate habitat for listed species, but are included in the route due to several residences located to the south of this area. To reduce impacts to the interior of habitats, approximately 0.28 miles of the route within pastureland is located along a field edge. Pole footprints would slightly reduce the amount of available habitat. Disturbed areas of native habitat in the vicinity of poles will be restored.

The Facility will be routed across two stream valleys. Lake Hendricks is the largest body of standing water near the proposed Facility route, but much of the landscape is rolling agricultural land. Stream valleys can serve as resting areas, foraging areas and as flyways, while Lake Hendricks could serve as a resting area as well as providing foraging opportunities for some species. Many avian species will also use agricultural fields for foraging. Due to this matrix of habitat types in the Facility area, there may be daily movements between areas used for roosting, nesting, and foraging. The transmission line could create an aerial obstacle for avian species moving daily between these areas as well as those species using stream valleys as flyways during migration.

The proposed transmission line facility will introduce additional perching opportunities that could attract hunting raptors. Electrocution of large birds, such as raptors, is a concern typically related to distribution lines. Electrocution occurs when birds with large wingspans come in contact with either two conductors or a conductor and a grounding device. The Applicants' transmission line design standards provide adequate spacing to eliminate the risk of raptor electrocution. As such, electrocution is not a concern related to the Facility.

The Topeka shiner is a small minnow inhabiting slow-moving, small to mid-sized prairie streams with sand, gravel, or rubble bottoms that are consistent with the stream types crossed by the proposed Facility. They prefer pool and oxbow areas that are outside main channel courses. Pools occupied by this species are in contact with groundwater and usually contain vegetation and areas of exposed gravel.

The Topeka shiner has been documented in Deer Creek and some of its' associated tributaries. While the proposed Facility will not include the permanent placement of poles in any streams, tributaries, or coulees, construction of the Facility will require the temporary installation of a timber bridge at one location for trucks to cross a tributary and install a transmission line pole. This location is approximately 0.5 miles east of the Brookings County Substation, on the north side of 207th Street. This tributary has been identified as having suitable habitat conditions for the Topeka shiner; however, no documented occurrences of the species have been made to date in this tributary. The timber bridge would allow temporary access by construction vehicles and personnel to the pole site location. Once construction of this pole is completed, the timber bridge will be removed and the tributary restored to pre-construction conditions to the greatest extent practicable.

No permanent impacts to the Topeka shiner or aquatic species habitat are anticipated. Prudent construction activities, including BMPs, will help to minimize direct and indirect impacts to Topeka shiner and aquatic habitat. Direct impacts to the Topeka shiner would be avoided by spanning appropriate aquatic habitat. Indirect impacts will be minimized by utilizing erosion and sedimentation control measures that reduce or prevent sediment from reaching adjacent waterways. The Applicants continue to coordinate directly with the SDGFP and USFWS to apply appropriate strategies to minimize and mitigate any potential impacts to federally-listed species, including the Topeka shiner, during and after construction.

Impacts to the western-prairie fringed-orchid and candidate Dakota skipper are not anticipated. Potential western-prairie fringed-orchid habitat is limited to lowland prairie remnants and almost exclusively in remnant native prairies and sedge meadows. The majority of known sites in nearby Minnesota occur in full sunlight on moist, calcareous till or sandy soils. None of the sites where this species occurs have a significant history of cattle grazing, although a few have a history of intermittent mowing for wild hay (Minnesota Department of Natural Resources, 2010). A review of existing habitats along the route noted cattle grazing at every documented remnant prairie site. In general remaining prairie habitat with a significant native plant assemblage will be avoided when locating pole structures.

The Dakota skipper seems to prefer native dry-mesic to dry prairie where mid-height grasses, such as little bluestem (*Schizachyrium scoparium*), prairie dropseed (*Sporobolus heterolepis*), and side-oats grama (*Bouteloua curtipendula*), are a major component of the vegetation. Dakota skipper habitats are limited to remnant prairies located on steep slopes within the Facility route. These areas are generally difficult to utilize for pole installation and will be avoided where possible. However, some poles may be located in habitats with the potential to harbor this butterfly. No designated Dakota skipper critical habitat is present in the vicinity of the proposed Facility.

13.3 MITIGATION

In-stream work, pole location, and disturbance to Topeka shiner stream environments will be avoided. Once the design is final, the Applicants will coordinate with USFWS for all proposed stream crossings within the watershed where the Topeka shiner are found. The Applicants will not place transmission pole structures in Topeka shiner streams. Mitigation measures for Topeka shiners will involve the reduction or prevention of the amount of sediment reaching adjacent waterways. Additionally, construction crews will receive training to avoid Topeka shiner habitat.

Western-prairie fringed-orchid habitat is not known to occur along the Facility route and impacts to sedge meadow or mesic prairie habitat will be avoided. No mitigation will be required as a result of construction within the Facility route. Native prairie remnants disturbed by pole placement or vehicle use will be restored using a native seed mix. The default seed mix will be a native seed mix, however landowners will be allowed to choose the seed mix type in coordination with appropriate agency requirements.

Access to and from pole locations within suitable Dakota skipper habitat will be limited to those areas where disturbance to suitable habitat has already occurred and where access limits damage to the prairie habitat. Neither a take permit, nor additional mitigation practices will be required for this candidate species. The Applicants will address avian collision issues and other potential

areas of concern by working with the SDGFP and USFWS to identify any areas that may require marking transmission line shield wires in certain areas and/or to use alternate structures to reduce the likelihood of collisions.

14.0 EFFECT ON AQUATIC ECOSYSTEMS (ARSD 20:10:22:17)

14.1 EXISTING ENVIRONMENT

The primary aquatic ecosystems within proximity of the proposed transmission line Facility area are Deer Creek, and several unnamed tributaries and coulee streams. Other seasonal streams and coulees may form during spring melting conditions, but are otherwise non-flowing streambeds. The USFWS NWI maps indicate that there are 16 wetlands within the proposed transmission line ROW, comprising approximately six acres. NWI areas and water resources are shown on the hydrology map (Figure A.3 in Appendix A). These wetlands are primarily palustrine wetlands, although several are associated with streams and Deer Creek. None of the wetlands are greater than 700 feet in length, and therefore can be spanned by the transmission line, and would not require the placement of a pole structure in a wetland.

The South Dakota Natural Heritage Database does not list any occurrences of state threatened, endangered, rare, or special concern aquatic species within one mile of the proposed transmission line.

14.2 POTENTIAL IMPACTS

During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading, and construction traffic. Once the Facility is completed, it will have no impact on surface water quality. Maintaining water quality during construction of the Facility will minimize potential impacts to rare and common aquatic organisms and the aquatic environment.

14.3 MITIGATION

The Applicants will avoid major disturbance of individual wetlands and drainage systems during construction. All wetlands along the facility corridor can be spanned by the transmission lines, which will have span lengths between 750 to 1,100 feet (depending on geologic or engineering constraints determined in final design). No construction will occur within the tributary to Deer Creek. The waterway will be spanned by the transmission lines, and construction activities are not anticipated to impact this water feature. In the event construction activities could cause a disturbance, the Applicants will ensure best management construction practices are utilized to minimize all impacts to the tributary.

To minimize potential impacts to wetlands, the Applicants will implement appropriate BMPs to minimize the amount of erosion and sedimentation in the wetland areas. Temporary erosion and sediment control methods will be properly placed, monitored, and maintained adjacent to water resources. These erosion control methods will remain in place until work areas become re-vegetated or are stable. BMPs may include silt fencing, mulching, seeding, and hay bales. Where appropriate, the Applicants will re-vegetate disturbed areas as close to pre-construction conditions as possible in consultation with the landowner and public agencies.

15.0 LAND USE (ARSD 20:10:22:18)

The following section discusses the existing environment, potential impacts, and mitigation measures to land use features within or adjacent to the proposed transmission line Facility. It includes a discussion of land use, displacement, noise, communication facilities, and aesthetics. Land use and land cover in the Facility area are shown in Figure A.5 of Appendix A.

15.1 CURRENT LAND USE

15.1.1 EXISTING ENVIRONMENT

The prevailing land use surrounding the proposed transmission line Facility is cultivated agricultural land used for planted row crops and pasturelands. In eastern South Dakota, the land crossed may be characterized as a mixture of flat and rolling hillside terrain. Small patches of trees are clustered around rural homes and a few natural water features near the Facility area. Planted row crops include corn and soybeans, along with other undefined crops. The proposed Facility will also cross some lands used for open pasture and grazing.

The transmission line route mostly parallels roads and field lines to minimize impacts to farm fields. The eastern region of Brookings County is lightly populated. Rural residential development is widely dispersed across the county landscape. Some residences are found along each of the roads paralleled by the proposed route. Housing densities average less than one home per linear mile (0.28 homes/linear mile) within 1,000 feet of the proposed Facility along the roadways that the proposed Facility would parallel. There are a total of 39 homes within a one-mile radial distance of the proposed route (3.5 homes/square mile). Commercial and industrial lands are mainly located closer to urban centers of the counties. The proposed transmission line route is not anticipated to affect the use or operation of any commercial or industrial establishment. Some industrial land uses for agribusiness commercial activities are located in ex-urban locations of the county, but no commercial facilities have been identified along the proposed transmission line route.

In recent years, the growth of the wind energy industry in eastern South Dakota has contributed to the industrial development of the landscape. This Facility will assist in the outlet of additional generation in the region. The Coteau des Prairies region is the premier wind resource in both South Dakota and Minnesota. Over the past decade, the amount of generation installed in the area has grown exponentially and places increasing demands on the transmission system to deliver that power to customers.

Wind generation has been growing in the area, as have requests to interconnect with the existing electric substations in the area. Within the past 10 to 15 years, over 150 new wind turbines have been or are being developed near the Brookings County substation as part of the Buffalo Ridge II wind energy project, and between 70 and 110 turbines are currently being platted as part of the Buffalo Ridge III project, to be constructed at a later date.

In eastern Brookings County, many rural residences and farmsteads are served by Brookings-Deuel Rural Water, Inc., along with other utility systems providing services to rural residents and communities. Brookings-Deuel Rural Water, Inc. provides water services to rural residences or has waterlines extending in portions of each township, range, and section identified in Table 4.

Most rural residences and farmsteads are served by on-site septic systems for wastewater effluent. The Applicants intend to work with the rural utility providers prior to the start of construction to identify the locations of rural water and utility systems to avoid impacts to service operations.

15.1.2 POTENTIAL IMPACTS

Land uses close to the proposed transmission line facility are not expected to change as a result of construction and operation of the line. Agriculture is the principal land use surrounding the proposed Facility, and the majority of land under or adjacent to the transmission line can still be used for agricultural practices following construction. The current county land use plan and zoning ordinance indicate that agriculture will continue to be the predominant land use in the future.

The proposed transmission line facility will be located on private land that is zoned as agricultural, regulated by the Brookings County zoning ordinance and land use control policies (Appendix D). No other land use changes are anticipated to occur beyond the immediate footprint of the Facility. Planned future changes to land uses close to the transmission line may be for the expansion of wind turbine facilities, a use that is considered consistent and compatible with high voltage transmission lines ("HVTLs"). The transmission line route parallels roadways for approximately 8.6 miles of the 10.6-mile length. Pole placement in areas where cross-country easements are necessary has been planned to minimize impacts to farming operations. While several wind turbines are located in proximity to the proposed transmission line route, the proposed transmission line would not impact the operation of any wind turbine facility. The Applicants have worked with wind energy developers to ensure that the proposed transmission line Facility does not impact existing or planned future wind turbine facilities.

15.1.3 MITIGATION

The Facility will be located primarily on private land that is zoned as agriculture under the Brookings County Zoning Ordinance. No land use changes will occur beyond the immediate footprint of the Facility.

The Facility is compatible with the existing land uses in the area. Pole placement siting in areas where the Facility will cross agricultural fields following section lines has been planned to minimize impacts to farming operations.

Short-term construction impacts to agricultural lands resulting from construction are anticipated. The Applicants will purchase ROW easements for private property crossed by the transmission lines pursuant to State and federal land acquisition requirements, which will be recorded as part of the property record. Agricultural impacts are discussed further in Section 20.3.

15.2 DISPLACEMENT

15.2.1 EXISTING ENVIRONMENT

Displacement results from ROW acquisitions that require the use of property occupied by a residence or business. A displacement was defined by the Applicants as any home or business

whose structure fell within the ROW of the proposed transmission line. In this case, a structure that is within 75 feet of the proposed route centerline would constitute a displacement.

Residences near the proposed Facility were identified through field observation, analysis of high resolution aerial photography, and comments received at CapX2020 sponsored public meetings and open houses. To identify potential displacements, parcels located within 75 feet of the proposed Facility were identified using GIS software.

The transmission line route comes within 500 feet of one home. The home is approximately 210 feet from the transmission line.

15.2.2 POTENTIAL IMPACTS

No homes or businesses will be displaced by the proposed Facility.

15.2.3 MITIGATION

No mitigation is proposed.

15.3 NOISE

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

Transmission conductors and transformers at substations produce audible noise under certain conditions. The level of noise or its loudness depends on conductor conditions, voltage level, and weather conditions. In foggy, damp, or rainy weather conditions, transmission lines can create a subtle crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain, the general background noise level is usually greater than the noise from a transmission line and therefore audible noise is not noticeable during heavy rain. During light rain, dense fog, snow, and other times when there is moisture in the air, transmission lines may produce audible noise higher than rural background levels but similar to household background levels. During dry weather, audible noise from transmission lines is a faint, sporadic crackling sound. The Facility as planned is not anticipated to exceed 55 dBa at the edge of the ROW based on the L5 (5% of the sound level measurements exceed this level over time) noise descriptor.

15.3.1 EXISTING ENVIRONMENT

The primary land use surrounding the Facility is rural agricultural land. Noise-sensitive receptors near the proposed Facility include rural residences where either sleep or outdoor activities occur. No school or daycare facilities, churches, or park areas are located within either 1,000 feet or one mile of the proposed Facility. Current average noise levels in these areas are typically in the 30 to

40 dBA range and are considered acceptable for residential land use activities. Ambient noise in rural areas is commonly made up of rustling vegetation and infrequent passing vehicles. Higher ambient noise levels, typically 50 to 60 dBA, will be expected near roadways, urban areas, and commercial and industrial properties in the Facility area.

15.3.2 POTENTIAL IMPACTS

It is not expected that noise from the Facility will exceed the typical background noise levels in the Facility area. According to noise modeling completed for the Facility, transmission line audible noise levels are not predicted to exceed ambient noise levels surrounding the proposed Facility.

15.3.3 MITIGATION

No mitigation is proposed for the audible noise generated by the proposed Facility.

15.4 SATELLITE, CELLULAR, RADIO, TV, AND GPS RECEPTION

Corona from transmission line conductors can generate electromagnetic "noise" at the same frequencies that radio and television signals are transmitted (corona consists of the breakdown or ionization of air within a few centimeters of conductors and hardware). This noise can cause interference with the reception of these signals depending on the frequency and strength of the radio and television signal. Tightening loose hardware on the transmission line usually resolves this problem if such a problem exists.

If radio interference from transmission line corona does occur, satisfactory reception from AM radio stations can be restored by appropriate modification of (or addition to) the receiving antenna system. Moreover, AM radio frequency interference typically occurs immediately under a transmission line and dissipates rapidly within the ROW to either side.

FM radio receivers usually do not pick up interference from transmission lines because:

- Corona-generated radio frequency noise currents decrease in magnitude with increasing frequency and are quite small in the FM broadcast band (88-108 Megahertz), and
- The interference rejection properties inherent in FM radio systems make them virtually immune to amplitude-type disturbances.

A two-way mobile radio located immediately adjacent to and behind a large metallic structure (such as a steel pole) may experience interference because of signal-blocking effects. Movement of either mobile unit so that the metallic structure is not immediately between the two units should restore communications. This would generally require a movement of less than 50 feet by the mobile unit adjacent to a metallic pole.

Television interference is rare but may occur when a large transmission structure is aligned between the receiver and a weak distant signal, creating a shadow effect. Loose and/or damaged hardware may also cause television interference. If television or radio interference is caused by or from the operation of the proposed facilities in those areas where good reception is presently obtained, the Applicants will at their cost inspect and repair any loose or damaged hardware in the transmission line, or take other necessary action to restore reception, including the appropriate modification of receiving antenna systems if deemed necessary.

15.4.1 EXISTING ENVIRONMENT

One Federal Communication Commission ("FCC") licensed communication tower is within 1,000 feet of the proposed Facility. In addition to this tower, one additional FCC licensed communication tower is located within one mile of the proposed Facility.

15.4.2 POTENTIAL IMPACTS

The proposed transmission line hardware will be designed and maintained to minimize gap and corona discharges. There is a potential for interference impacts to occur to omnidirectional communication towers. The height of the transmission line may interfere with beam paths.

15.4.3 MITIGATION

If interference occurs, the Applicants will work with the microwave tower owner to mitigate the impacts. If interference from transmission line corona does occur for an AM radio station that is within the station's primary coverage area and that had good reception before the Facility was built, satisfactory reception can be returned by appropriate modifications of the receiving antenna system.

The transition to digital TV broadcasts was completed June 12, 2009. Digital reception is in most cases more tolerant of "noise" and somewhat less resistant to multipath reflections (i.e., reflections from structures) than analog broadcasts. Although digital reception is more tolerant of radio frequency noise, if the noise levels or reflections are great enough, they will impact digital television reception. In the rare occasion where the construction of the Facility may cause interference within a television station's primary coverage area, the Applicants would work with the affected viewers to correct the problem at the Applicants' expense. This problem can usually be corrected with the addition of an outside antenna.

15.5 AESTHETICS

Determining the relative scenic value or visual importance of an area is a complex process involving both the philosophical and/or psychological response to what may be perceived as beautiful by the individual. Generally, landscapes that incorporate a balanced mixture of diversity and harmony have the greatest potential for high scenic value and may be considered important to persons living in or traveling through a region. Viewer response is based on the sensitivity and exposure of the viewer to a particular viewshed. Sensitivity relates to the magnitude of the viewer's concern for the viewshed, while exposure is a function of the type, distance, perspective, and duration of the view. The discussion of visual quality and aesthetics contained in this section is based on a qualitative review of the existing landscape environment surrounding the Facility area. Visual and aesthetic resources within the Facility area were identified through discussions with State and local agency officials, review of county comprehensive land use plans and other regional plans, comments received from participating citizens at CapX2020 sponsored public meetings or open houses, and through a review of high-resolution aerial photography and field observation. Generally, visual and aesthetic resources within the area include historic residential or commercial structures, open space areas, and water resources.

15.5.1 EXISTING ENVIRONMENT

The visual character and quality along the route are characterized by open agricultural fields to rolling hills broken by small streams and small wetland areas. Dispersed rural residences, existing transmission lines, and wind turbines are also part of the human-made elements in the vicinity of the proposed transmission line. Within the Facility area, the dominant visual characteristic is agricultural land, comprising over 75.6 percent of the land use. The remaining 24.4 percent of the land area is a mixture of open, undeveloped grasslands, wetland, and water features.

The highest elevations in the Facility area occur around Deer Creek, which carves a small valley through the Facility area with some forested areas around the creek. The visual characteristics of these lands are rock outcroppings, rolling hills, grasslands and wetlands.

15.5.2 POTENTIAL IMPACTS

The new transmission line will create a new visual element within the vicinity of the route, but the degree to which the transmission line will be visible will vary by location. The Applicants have not identified any unique aesthetic resources that would be impacted by this transmission line. The visual impact of the transmission line could affect landowners who live along or near the roads the route would parallel, or community residents who travel along these roads regularly. The natural landscape is often characterized as rolling or flat terrain used for agricultural purposes. Depending on a viewer's physical location, the terrain conditions, and natural landscape features such as tree cover, the transmission line structures could be visible for distances between 1.5 and two miles. A viewer's degree of discernable detail decreases as physical distance from an object increases. Beyond two miles in physical distance, the outline of pole structures may be seen. The transmission line wiring is unlikely to be seen clearly beyond distances of one-half to three-quarters of one mile.

During CapX2020 sponsored public open houses, residents of eastern South Dakota identified the importance of trees for privacy, shade, and wind screen protection around rural residences and farmsteads. Throughout the routing process, the Applicants have sought to minimize the removal of trees. Much of the land area crossed by the transmission line is open agricultural land. Most of the tree cover in proximity to the Facility is located around water features or on lands deemed unsuitable for farming. For the safe operation and maintenance of the transmission line, trees within the transmission line easement will need to be removed. In an effort to avoid agricultural impacts or impacts to wildlife corridors through the removal of tree canopy, the transmission line may share portions of the road ROW where paralleled. Where tree cover will need to be removed pursuant to easement requirements, the Applicants intend to work with the landowners to minimize the removal of trees to the greatest extent possible.

15.5.3 MITIGATION

The Applicants will continue to work with landowners and public agencies to identify concerns related to the transmission line and aesthetics. In general, mitigation includes enhancing positive effects as well as minimizing or eliminating negative effects. Potential mitigative measures include the following:

- Where feasible, the location of pole structures, easements, and other disturbed areas will be determined by considering input from landowners or land management agencies to minimize visual impacts.
- Structure types (designs) will be uniform to the extent practical. The Applicants propose to use single pole steel structures, double circuited, ranging in height from approximately 130 to 175 feet. The height of the structure may be reduced, as feasible, to minimize impacts within areas of high scenic importance. H-frame structures would potentially allow for lower structure height.
- Structures will be placed at the maximum feasible distance from scenic highway, waterway, and trail crossings, within the limits of structure design.
- Care will be used to preserve the natural landscape; construction and operation will be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work.
- New transmission lines will parallel existing ROW to the extent practicable to minimize visual impacts to farmlands or open spaces.

16.0 LOCAL LAND USE CONTROLS (ARSD 20:10:22:19)

The proposed transmission line facility will be constructed on agricultural land regulated by the Brookings County zoning ordinance and land use control policies specified in county plans or specific ordinances (Appendix D). Construction of the transmission line will require a conditional use permit from Brookings County.

17.0 WATER QUALITY (ARSD 20:10:22:20)

17.1 EXISTING ENVIRONMENT

The Clean Water Act requires states to release, every two years, a list of streams and lakes that are not meeting their designated uses because of excess pollutants (impaired waters). The list, known as the 303(d) list, is based on violations of water quality standards. Impaired waters require studies to determine the total amount of pollution, or total maximum daily load ("TMDL"), that a water body can receive before water quality standards are violated. The proposed Facility will span approximately four streams, tributaries, or coulees, the most notable of which is Deer Creek. Several tributaries and coulees near the proposed Facility are seasonal drainage waterways that allow farm fields to drain during spring snow thaws and do not retain water during the summer months beyond occasional storms. None of the streams, tributaries, or coulees near the proposed Facility is considered to be impaired waterways, and none are considered navigable waterways used for recreation or transportation.

17.2 POTENTIAL IMPACTS

During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading, and construction traffic. This could potentially affect water quality if the erosion is not controlled.

17.3 MITIGATION

Because all streams, tributaries, and coulees will be spanned by the transmission line structures, and no structures will be located within these features, direct impacts to these features are not anticipated. However, to prevent sedimentation and the potential introduction of sediment and pollutants to surface waterbodies during construction, the Applicants will employ BMPs during construction. The practices for protection of streams and water banks will be detailed in the National Pollutant Discharge Elimination System ("NPDES") permit and the SWPPP that will be completed prior to the start of construction. Once the Facility is completed, there will be no significant impact on surface water quality because wetland and waterway impacts will be minimized and mitigated, disturbed soil will be restored to previous conditions or better, and the amount of land area converted to an impervious surface will be small.

The Applicants will maintain sound water and soil conservation practices during construction and operation of the Facility to protect topsoil and adjacent water resources and minimize soil erosion. Construction will be completed according to NPDES permit requirements. Practices may include:

- Containment of stockpiled material away from stream banks and shorelines.
- Stockpiling and respreading topsoil.
- Reseeding and revegetating disturbed areas as required by the NPDES permit.
- Implementing erosion and sediment controls as required by the NPDES permit.
- Locating structures and disturbed areas 300 feet from rivers and lakes, where possible.

- Waste water from concrete batching or other construction operations will not enter streams, tributaries, or coulees without using turbidity control methods. Waste waters discharged will be free of settleable material.

18.0 AIR QUALITY (ARSD 20:10:22:21)

18.1 EXISTING ENVIRONMENT

South Dakota has adopted the federal government's ambient air quality standards regarding permissible concentrations of ozone and nitrogen dioxide ("NO_2"). ARSD 74:36:02:02. The National Ambient Air Quality Standards ("NAAQS") are presented in Table 7.

The entire area of the proposed Facility is currently in attainment for both national and South Dakota Ambient Air Quality Standards. The nearest Ambient Air Quality Monitoring Site is located at the Brookings City Hall in Brookings County, South Dakota, which is southwest of the Facility.

Table 7. National Ambient Air Quality Standards

Pollutant	Level	Averaging Time
Nitrogen Dioxide	0.053 ppm	Annual (Arithmetic Mean)
Ozone	0.075	8-hour

Source: Environmental Protection Agency, 2009a

18.2 POTENTIAL IMPACTS

No impacts to air quality due to the operation of the transmission line are anticipated.

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

The national standard for ozone is 0.075 ppm on an eight-hour averaging period (40 CFR Part 50). Calculations done, using the Bonneville Power Administration ("BPA") Corona and Field Effects Program Version 3 for a standard single circuit 345 kV transmission line, predicted that the maximum one-hour concentration during foul weather (worst case) would be 0.0007 ppm. This is well below the federal and South Dakota standards. Most calculations for the production and concentration of ozone assume high humidity or rain, with no reduction in the amount of ozone due to oxidation or air movement. These calculations would therefore overestimate the amount of ozone that is produced and concentrated at ground level. Studies designed to monitor the production of ozone under transmission lines have generally been unable to detect any increase due to the transmission line facility.

Temporary air quality impacts caused by construction-vehicle emissions and fugitive dust from ROW clearing and construction are expected to occur. Exhaust emissions from diesel equipment will vary during construction, but will be minimal and temporary. The magnitude of these emissions is influenced heavily by weather conditions and the specific construction activity taking place. Appropriate dust control BMP measures, such as covering trucks, watering of roads, and the use of magnesium chloride will be utilized during construction.

18.3 MITIGATION

No mitigation is proposed beyond the BMP measures to control dust during construction.

19.0 TIME SCHEDULE (ARSD 20:10:22:22)

The Applicants propose that the entire transmission line between Brookings County and Hampton will be in-service in the second quarter of 2015. A preliminary permitting and construction schedule for the Facility in South Dakota is provided below:

Submit PUC Route Permit Application	November 2010
Applicants Desired PUC Route Permit	June 2011
ROW Easement Option Acquisition Complete	November 2010
Survey	Second Quarter 2011
Final Transmission Line and Substation Connection Design	Third Quarter 2013
ROW Easement Acquisition Complete	Third Quarter 2013
Construction Start	Fourth Quarter 2013
In-Service Operations	Second Quarter 2015
Final ROW Contacts, Settlements, and Cleanup	Third Quarter 2015

This schedule is based on information known as of the date of this filing and upon planning assumptions that balance the timing of implementation with the availability of crews, materials and other practical considerations. This schedule may be subject to adjustment and revision as further information is developed.

20.0 COMMUNITY IMPACT (ARSD 20:10:22:23)

This section describes the primary community characteristics within the Facility area, and identifies all impacts of the Facility with respect to socioeconomics, community resources, agriculture, transportation, and cultural resources. Socioeconomic factors analyzed include population, race and ethnicity, poverty, and per capita income. U.S. Census data were used for this evaluation and are summarized at the Census Block Group level, City of Brookings, and State of South Dakota geographic levels. Due to the predominantly rural nature of the Facility area, the Census tracts will include persons and households living outside of the Facility area. The socioeconomic analysis contained in this report was conducted using U.S. Census 2000 data, the most recent socioeconomic data available. The Census 2010 data will not be available until spring of 2011 at the earliest.

20.1 SOCIOECONOMIC AND COMMUNITY RESOURCES

The entire Facility is located in Brookings County on land used for agricultural purposes. The largest residential areas near the Facility are in the City of Brookings, South Dakota. Residential dwellings along the roads paralleled by the proposed transmission line route are dispersed at densities of one home per mile or less. Table 8. provides a comparison of demographic characteristics of the Facility area.

Table 8. Demographic Characteristics of the Facility Area

Location	Population	Race Percentage (White)	Percentage of Population Below Poverty Level	Per Capita Income
Block Group 460119586001	1,306	98.6	8.4	$15,278
City of Brookings	18,504	95.5	18.5	$17,028
Brookings County	28,220	96.4	14.0	$17,586
South Dakota	754,844	88.7	13.2	$17,562

Source: U.S. Census Bureau, Summary File 1 (SF 1) and Summary File 3 (SF 3), 2001

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 provides 3-year population estimates for Brookings County and the State of South Dakota. These statistics are provided in Table 9. for comparison with Table 8.

Table 9. Population Demographic Forecasts

Location	Population	Race Percentage (White)	Percentage of Population Below Poverty Level	Per Capita Income
Brookings County	27,949	95.3	16.3	$21,837
South Dakota	795,757	87.1	13.2	$23,798

Source: U.S. Census Bureau, American Community Survey, 3-Year Population Estimates, 2006-2008

The proposed Facility is not located close to any public facilities or resources such as schools, recreational facilities, fire or police stations, hospitals, or airports.

20.2 SOCIOECONOMIC AND COMMUNITY RESOURCE IMPACTS AND MITIGATION

The proposed transmission line Facility 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, fire or police facilities, schools, or recreational facilities. Therefore, no mitigation is proposed. The proposed Facility will share ROW with roads, but the poles will not be located within the road ROW. Engineering will be sensitive to planned or programmed future improvements to area roadways to ensure sufficient road ROW is maintained for future roadway widening.

There will be some long-term beneficial impacts to the area from the new transmission line. These benefits include an increase to the counties' tax base resulting from the incremental increase in revenues from utility property taxes, which are based on the value of the Facility. The availability of reliable power in the area will have a positive effect on local businesses and the quality of service provided to the general public. Also, the capability of the transmission line to transmit energy generated from renewable energy resources could spur further growth of the renewable energy industry in this region, resulting in additional economic gains to the county and landowners. Although the Facility owners will pay taxes on the Facility and the Facility will increase the Brookings County tax base, the Facility will not result in any significant impact to the affected taxing jurisdiction. The Facility is not anticipated to significantly impact the population, although landowners with whom easements are being or have been negotiated will receive a one-time payment for the transmission line easement to cross their property. Construction and operation of the proposed Facility is not anticipated to affect occupational distribution or community cohesion.

20.3 AGRICULTURE

According to the U.S. Census Bureau, Brookings County has a total land area of 805 square miles, with 795 square miles of land and 10 square miles of water (rounded to the nearest whole number). According to the Census of Agriculture for 2007, approximately 723 square miles (91 percent) of the county were used for agricultural purposes. The number of full-time farms increased by 2.5 percent from 2002 to 2007, and the number of land acres used for farming increased by 10.6 percent. The average farm size also grew by 7.8 percent. Sales of farm goods (including grain, crops, and livestock) in 2007 totaled $186,725,000, an increase of 91 percent from 2002. Crop sales were primarily corn, soybean, and wheat, while cattle and hogs comprised the majority of livestock sales.

20.4 AGRICULTURE IMPACTS AND MITIGATION

The proposed transmission line facility will create temporary and permanent impacts to farmland along the route; however, no impacts are anticipated to livestock operations. Permanent impacts to agricultural lands are primarily the result of structure placement along the route centerline. To

the greatest extent possible, the proposed route has avoided the placement of pole structures in open farm fields or forested areas. Construction of the Facility is anticipated to result in a permanent loss of 69.4 acres of agricultural land. Where the proposed route does not parallel roads, farm field lines and section lines have been used to minimize impacts to agriculture lands and the need to create new access paths for maintenance purposes.

During construction, temporary impacts such as soil compaction and crop damages within the easement area are likely to occur. These temporary impacts may occur from construction staging areas or temporary material laydown locations that would predominantly be located along roadways and farm field lines. Temporary laydown areas may be required for additional storage space during construction. These areas will be selected for their location, access, security and ability to efficiently and safely warehouse supplies. The areas are chosen to minimize excavation and grading. The temporary laydown areas outside of the transmission line easement will be obtained from affected landowners through rental agreements. The Applicants will compensate landowners for any crop damage and soil compaction that may occur during construction. Areas disturbed during construction will be repaired and restored to pre-construction contours as required so that surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural re-vegetation and prevent erosion.

Anticipated impacts to agricultural operations will be minimal. During construction small amounts of land may be temporarily taken out of production. By aligning the transmission line along existing ROW such as roads and quarter-section and farm field lines, impacts can be minimized. Landowners commented at the CapX2020 open houses that they would prefer structures as close to the field lines and roadways as possible. Some landowners use Global Positioning System ("GPS") navigation systems on farm equipment. Once the Facility is complete, the transmission line poles will have GPS coordinates that the Applicants will provide to the landowners, if requested. Additional information on portable electronic devices and transmission lines may be found in Section 16.4.

No impacts to center pivot irrigation systems will occur.

Tile lines may be present along the transmission line route. The Applicants will work with the landowners to identify locations of drainage tiles along the route and will minimize interference with tiling, where possible.

20.5 TRANSPORTATION

Much of the proposed Facility parallels existing surface transportation routes, including county roads and township streets. Approximately 76% of the proposed transmission line route parallels roads. The transportation network that may be used during the Facility's construction and for maintenance during operation is comprised largely of rural "farm-to-market" or section line roadways. No urban areas exist within the proposed Facility area. No active railroad lines or airport facilities are present within proximity of the proposed Facility. The location of the transmission line poles would not disrupt the aviation operations of the Brookings Regional Airport that is more than 14 miles southwest of the proposed Facility location in Brookings, South Dakota.

20.6 TRANSPORTATION IMPACTS AND MITIGATION

The proposed transmission line will not result in any permanent impacts to the area's transportation resources. Therefore, no mitigation is proposed. There may be some temporary impacts to local roads during construction phases of the Facility. The Applicants propose to enter into highway use agreements with the appropriate jurisdictions and will rely upon bonds set forth by PUC. There will be no impacts to rail infrastructure or aviation facilities.

20.7 CULTURAL RESOURCES

This section presents the results of an archival review of previously recorded cultural resources within one mile of the center line of the proposed transmission line, and a brief visual inspection of the proposed Facility area. It includes a discussion of known cultural resources and provides general information on cultural features identified during a 19th-century Public Land Survey ("PLS") map review. State and federal guidelines protecting cultural and historic resources stipulate that applicants do not disclose the location of sensitive resources. Appendix E contains the results of the cultural resources literature search and field visit notes taken for the proposed Facility location.

The Applicants conducted a literature search report of known cultural resources within a one mile radial distance surrounding the proposed Facility. The Applicants requested previous survey data and information on known archaeological resources in the Facility area from the Archaeological Research Center in Rapid City, South Dakota ("SDARC"). The 19th-century PLS maps for the Facility area were acquired from the Bureau of Land Management Montana State Office. A preliminary archaeological field review was conducted along parcels where access was granted, approximately 80% of the proposed route. The purpose of this inspection was to identify archaeological and cultural resources located within the proposed Facility ROW or immediately adjacent and to identify potential impacts to these resources. During the survey, selected structures and buildings of potential significance located within or directly adjacent to the proposed route were photographed and documented.

20.7.1 EXISTING ENVIRONMENT

The literature review of documented cultural resources identified 50 inventoried structures and/or buildings, 24 archaeological resources, other farm-related structures, bridge resources, and four other miscellaneous resources within one mile of the Facility. These resources appear to be focused on the Deer Creek drainage and tributaries.

The 50 previously inventoried structures and/or buildings in the Facility area include: four bridges, 34 farmstead structures, eight other farm-related facilities, two farmstead foundations, a town hall, and a light industrial structure. One of the bridge structures is documented by two SHPO resources numbers. None of these structures are listed on the NRHP. Of these structures, 26 are not evaluated for listing on the NRHP, 22 structures are not eligible for listing on the NRHP, and two have no status designation.

Of the 24 archaeological resources identified in the Facility area, the proposed transmission line crosses one archaeological resource. This resource is a prehistoric artifact scatter and is not considered eligible for listing on the National Register of Historic Places ("NRHP"). The

remaining 23 archaeological resources within one mile of the proposed route include other prehistoric artifact scatters, prehistoric isolated finds, prehistoric stone circles, prehistoric stone alignments, cairns, a Euro-American artifact scatter, a Euro-American dump, Euro-American isolated finds, and Euro-American farmstead ruins. Of the 23 sites within one mile, 14 are not evaluated and nine are not eligible for listing on the NRHP.

The four miscellaneous resources are represented by a farmstead structure that has an inventory structure number, historic artifact scatters, and isolated finds. These miscellaneous resources provide additional indications that the area has a high probability of containing additional resources of this nature and type.

The review of the 19th-century PLS maps document the Euro-American history of development and settlement of the western United States. None of the sections reviewed for the proposed Facility route documented any features that would suggest early Euro-American or contact occupation of the Facility area as of the 1870's. The preliminary archaeological field review covered approximately four miles of ground inspection and nine miles of visual inspection along public rights-of-way. One prehistoric cairn arrangement location consisting of four rock features was identified. Additionally, four abandoned buildings were visibly identified, along with one additional building that could not be seen from the roadway, but is suspected because of a tree shelterbelt. Based on these findings, it is possible that additional resources would be identified during a formal inventory survey.

The prehistoric cairn arrangement is located on the north side of an eastern tributary of the Deer Creek drainage system, a portion of which is under the proposed transmission line route. Archaeologists identified four features associated with this arrangement. The main cairn is located at the edge of the ridge extending over an eastern tributary of the Deer Creek drainage system. The drop from this cairn to the creek floor is an abrupt 20-30 feet. The remaining three cairns are located north of the main cairn by approximately 60 meters.

Four abandoned buildings were found under or immediately adjacent to the proposed Facility. One of the abandoned structures has a SHPO resource number, and was visually inspected. Three buildings are farmsteads or other structures associated with farming activities, and the fourth structure is a municipal building, either a school or town hall. A fifth building may also exist in the north section, but could not be verified during the field inspection. In the event a structure is affected by the proposed transmission line, the Applicants will work with the landowners and consult SHPO to assess the eligibility of the structure for listing on the NRHP and what actions may be taken to avoid or remove the structure if necessary.

20.7.2 POTENTIAL IMPACTS

Construction activities for the proposed Facility will occur in the vicinity of previously identified archaeological and historic resources, some of which have been evaluated for listing on the NRHP and determined ineligible, and other resources that have not been evaluated for listing. Resources are primarily located along the margins of Deer Creek and tributaries. Focusing on these areas, the Applicants will devise a survey methodology to document the existing conditions, identify existing archaeological resources and offer recommendations on resource avoidance, impact minimization, and mitigation measures, if necessary. The Applicants will

design a discovery plan to be in place should previously unknown archaeological resources or human remains be inadvertently encountered during construction. This plan will outline the framework for handling such discoveries in an efficient and legally compliant manner. The discovery plan may include the following topics: construction contractor training, identification of resources in the field, contact information for designated professionals to address discovery, procedures for avoidance, and associated tasks in the event of work stoppage.

If human remains are discovered during construction, work will cease on the site and appropriate authorities will be contacted in accordance with local and state law (SDCL Chapter 34-27).

20.7.3 MITIGATION

The Applicants will attempt to avoid impacts to NRHP-eligible cultural resources. In the event that an impact occurs, the Applicants will disclose the nature of the impact and work with the Commission and SHPO to determine the most appropriate course of action moving forward for the impacted resource. Avoidance of the resource will be accomplished by spanning sensitive areas. However, in locations where an avoidance alternative is unavailable and resources would be impacted, mitigation may include an effort to minimize direct impacts to the resource through additional documentation.

21.0 EMPLOYMENT ESTIMATES (ARSD 20:10:22:24)

The entire Brookings County – Hampton Project is estimated to employ between 200 and 250 personnel. No permanent employees in South Dakota are expected to be hired as a result of the Facility.

The following positions are expected to be temporarily employed during development and construction of the Facility:

Land Rights	1
Survey	2
Substation foundations	4 to 8
Substation apparatus	4 to 8
Substation relay	2 to 4
Line foundations	8 to 12
Line structures	8 to 12
Line stringing	8 to 12

Short-term positive economic gains will result from activities associated with construction. Local businesses will likely see an increase in revenues from construction of the Facility, and the number of workers hired from within and outside the Facility area may result in positive economic gains in the form of increased spending, lodging, meals, and other consumer goods and services. It is not anticipated that the Facility will create new permanent jobs, but it will create temporary construction jobs that will provide a one-time influx of income to the area.

Construction activities will provide a seasonal influx of additional dollars into the communities during the construction phase. Long-term beneficial impacts from the proposed transmission line and substation additions include local tax base resulting from the incremental increase in revenues from utility property taxes.

22.0 FUTURE ADDITIONS AND MODIFICATIONS (ARSD 20:10:22:25)

The Applicants are not aware of any system upgrades related to the proposed Facility that will be needed in the future, and present planning studies have not identified any additional modifications that will result from this Facility. The Facility may be constructed in phases with the initial circuit strung at the time of construction and the second circuit strung at a later date.

23.0 TRANSMISSION FACILITY LAYOUT AND CONSTRUCTION (ARSD 20:10:22:34)

23.1 ROUTE CLEARING

Prior to construction, individual property owners will be advised as to the construction schedule, needed access to the site and any vegetation clearing required for the proposed Facility. To maintain North American Energy Reliability Council ("NERC") reliability standards, the ROW will be cleared of the amount of vegetation necessary to construct, operate, and maintain the facility. Clear cutting (e.g. the removal of all trees, brush and other low-growing vegetation) will be used at construction and maintenance access roads and at structure erection sites. Trees outside of the easement area that present a danger to the safe operation of the transmission line facility will be removed or pruned back if those trees could, in falling, hit the transmission line. Other trees, which are decayed or leaning that could become a potential hazard to the transmission line, will also be removed. Disposal of timber, tree tops, limbs, and slash will comply with state and local ordinances. Wood from the clearing operation will be offered to the landowner or removed from the site.

23.2 TRANSMISSION CONSTRUCTION PROCEDURES

Construction will begin after all federal, state, and local approvals are obtained, property and easements are acquired, soil conditions are established and final design is complete. The precise timing of construction will consider various requirements that may be in place due to permit conditions, system loading issues and available workforce. The actual construction will follow standard construction and mitigation best practices that were developed from past project experiences. These best practices address easement clearing, staging, erecting transmission line structures and stringing transmission lines.

Site preparation will begin in communication and coordination with landowners prior to construction. Site preparation includes clearing the easement area of vegetation that would interfere with the safe operation of the transmission line. Any vegetation that would prevent construction will also be removed. Additionally, any underground utilities will be identified in cooperation with local utility companies to minimize conflicts to the existing utilities along the route. All materials resulting from the clearing operations will either be chipped on site or stacked in the easement area with landowner agreement for their use. If temporary removal or relocation of fences is necessary, installation of temporary or permanent gates will be coordinated with the landowner. During the construction process, the Applicants may ask the property owner to temporarily remove or relocate equipment and livestock from the easement area.

Transmission line structures are generally designed for installation at existing grades. Typically, structure sites with 10 percent or less slope will not be graded or leveled. Therefore, structure sites will not be graded or leveled, unless it is necessary to provide a reasonably level area for construction access and activities. For example, minor grading might be performed where the immediate terrain near the structure is such that vehicles or installation equipment could not safely access or perform construction operations properly. At sites with more than 10 percent

slope, working areas will be graded level or fill will be brought in for working pads. If the landowner permits, it is preferred to leave the leveled areas as is and working pads in place for use in future maintenance activities, if any.

Typical construction equipment consists of tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, concrete trucks, and various construction trailers. Many types of excavation equipment are set on wheel or track-driven vehicles. Poles are transported on tractor-trailer trucks.

Structures will be erected by auguring or excavating a hole typically 30 to 50 feet deep and 6 to 12 feet in diameter for each pole. Any excess soil from the excavation will be offered to the landowner or removed from the site.

Steel structures are delivered to construction staging areas that typically occupy approximately one acre of land along the roadside. At the staging areas, steel structure sections are connected, the Davit arms are attached, and the structure is then loaded onto a structure trailer. The structure is delivered to the staked location and placed within the easement area until the structure is set. Insulators and other hardware are attached while the steel structure is on the ground. The structure is then lifted and placed onto the concrete pier buried in the ground. In some cases temporary laydown areas may be required. These areas will be selected based on location, access, security, and ability to efficiently and safely warehouse supplies. The areas are chosen to minimize excavation and grading. Any temporary laydown areas that are outside of the transmission line easement area will be obtained from affected landowners through rental agreements.

After the structures have been erected, conductors are installed by establishing stringing setup areas within the easement area . These stringing setup areas are usually located every two miles along a project route and usually occupy approximately 15,000 square feet of land. Conductor stringing operations also require brief access to each structure to secure the conductor wire to the insulators or to install shield wire clamps once final sag is established. Temporary guard or clearance structures are installed as needed over existing distribution or communication lines, streets, roads, highways, railways or other obstructions, after any necessary notifications are made or permits obtained. This ensures that conductors will not obstruct traffic or contact existing energized conductors or other cables. In addition, the conductors are protected from damage. During construction, the most effective means to minimize impacts to water areas will be to span all streams and rivers with structures. The Applicants will not allow construction equipment to drive across waterways except under special circumstances and after discussion with the appropriate resource agency. Where waterways must be crossed to pull in the new conductors and shield wires, workers may walk across, use boats, or drive equipment across ice in the winter. In areas where construction occurs close to waterways, BMPs help prevent soil erosion and ensure that equipment fueling and lubricating occur at a distance from waterways. Refer to Section 17.0 for a discussion of water quality mitigation.

The Applicants employ standard construction and mitigation practices that were developed from experience with past practices as well as industry-specific BMPs. These BMPs address easement

clearance, erecting transmission line structures, and stringing transmission lines. BMPs for each specific project are based on the proposed schedules for activities, prohibitions, maintenance guidelines, inspection procedures and other practices. In some cases, these activities are modified to incorporate BMP construction that will assist in minimizing impacts for sensitive environments. Contractors are advised of these BMP requirements during the bid process and will be required to follow them once under contract.

23.3 RESTORATION PROCEDURES

During construction, limited ground disturbance at the structure sites will occur. The construction contractor establishes a main staging area for secure, temporary storage of materials and equipment. Typically, a previously disturbed or developed area is used. Such an area includes sufficient space to laydown materials and pre-assemble some structure components or hardware. Other staging areas located along the ROW are limited to the structure site areas for structure laydown and framing, prior to structure installation. Additionally, stringing setup areas are used to store conductors, stringing equipment and other equipment needed for stringing operations. Disturbed areas are restored to their original condition to the maximum extent practicable, or as negotiated with the landowner.

Unless otherwise requested by the landowner, all storage and construction buildings, including concrete footings and slabs, and all construction materials and debris will be removed from the site once construction is complete. Post-construction reclamation activities also include removing and disposing of debris; dismantling all temporary facilities (including staging areas); employing appropriate erosion control measures and reseeding areas disturbed by construction activities with vegetation similar to that which was removed.

As part of the easement acquisition process, a restriction list/database will be compiled to identify specific requirements on each individual parcel of property. Once construction is completed, landowners will be contacted by the Applicants to determine if the restriction list requirements have been followed. If damage has occurred to crops, fences or the property, the Applicants will compensate the landowner as appropriate to restore the property and pay for damages. The Applicants will also comply will all state laws and any conditions of the permit.

23.4 MAINTENANCE PROCEDURES

Access to the easement of the completed transmission line is required periodically to perform inspections, conduct maintenance and repair damage. Regular maintenance and inspections will be performed during the life of the facility to ensure its continued integrity. Generally, the Applicants will inspect the transmission line by air at least once per year with a ground inspection one every five years. Inspections will be limited to the easement and areas where obstructions or terrain may require off-easement access. If problems are found during inspections, repairs will be performed and the landowner will be compensated for any potential damage as a result.

The easement area will be managed to remove vegetation that interferes with the operation and maintenance of the transmission line. Native shrubs that will not interfere with the safe operation of the transmission line facility will be allowed to reestablish in the easement area. The

Applicants' practice provides for the inspection of major transmission lines (230 kV and above) annually to determine if clearing is required. Clearing practices include a combination of mechanical and hand clearing, along with herbicide application where allowed to remove or control vegetation growth. Noxious weed control with herbicides will be conducted on a two-year cycle around structures and anchors.

24.0 INFORMATION CONCERNING TRANSMISSION FACILITIES (ARSD 20:10:22:35)

HVTLs consist of three phases, each at the end of a separate insulator string, which are all physically supported by structures. Each phase consists of one or more conductors. When more than one conductor is used to make up a phase, the term "bundled" conductors is used. Conductors are metal cables consisting of multiple strands of steel and aluminum wire wound together. There are also two shield wires strung above the electrical phases to prevent damage from lighting strikes. These shield wire cables are typically less than one inch in diameter. The shield wire can also include fiber optic cable that allows a path for substation protection equipment to communicate between terminals on the transmission line. A double circuit transmission line carries two circuits or six phases and normally two shield wires. There are two different types of structures used for transmission lines, including single steel pole structures and H-frame structures. Transmission lines are constructed within an easement area, the width of which is typically 150 feet.

24.1 CONFIGURATION OF POLES

The Applicants propose to use single pole, self-weathering steel double circuit structures for the Facility (refer to Figure 3), unless engineering or environmental conditions require the use of H-frame structures. Self-weathering steel oxidizes or rusts to form a dark reddish-brown surface coating to protect the structure from further weathering. Single steel pole structures are typically placed on concrete pier foundations. The size of the foundation ranges in diameter from 6 to 12 feet (refer to Figure 4). H-frame poles may be required in certain limited circumstances. For example, H-frame structures are sometimes required near environmentally sensitive areas, including areas of significant bird activity. These structures consist of two steel poles with cross bracing. Concrete pier foundations may be used for angle structures or if soil conditions are poor. Advanced engineering will determine whether H-frame structures are necessary for the proposed Facility; however, the Applicants currently are proposing to use only single pole steel structures. Table 10 summarizes the structure design for the line.

Table 10. Structure Design Summary

Line Type	Structure Type	Structure Material	ROW Width (feet)	Structure Height (feet)	Structure Base Diameter (inches)	Foundation Diameter (feet)	Span Between Structures (feet)	Pole to Pole Span on Single H-Frame Structure (feet)
345 kV/ 345 kV Double Circuit	Single Pole Davit Arm	Steel	150	130-175	36-48 (tangent structures) 48-72 (angle structures)	6-12	750-1,100	N/A
	H-Frame	Steel	150-180	105-125	30-42 (tangent structures)	5.5-9	750-1,100	27

The proposed transmission line will be designed to meet or surpass all relevant local and State codes, NESC and NERC requirements and Applicant standards. Appendix F provides photographs of existing 345 kV transmission line structures and a structural drawing of the proposed Facility structure type.

24.2 CONDUCTOR CONFIGURATION

Each phase will consist of bundled conductors composed of two 954 ACSS cables or conductors of comparable capacity. Each conductor is 954,000 circular mils or approximately 1.2 inches in diameter. ACSS stands for Aluminum Conductor Steel Supported and consists of seven steel wires at the center surrounded by 54 aluminum strands.

24.3 PROPOSED TRANSMISSION SITE AND MAJOR ALTERNATIVES

The proposed Facility is discussed in Section 8 and shown in aerial photos in Appendix A. Section 9 outlines the route identification and selection process.

24.4 RELIABILITY AND SAFETY

24.4.1 TRANSMISSION LINE RELIABILITY

NERC defines minimum transmission system performance requirements that must be met for different system conditions. NERC defines different types of system events and groups them into four different categories:

- Category A – System Performance Under Normal (No Contingency) Conditions
- Category B – Performance Following Loss of a Single Bulk Electric System Element
- Category C – System Performance Following Loss of Two or More Bulk Electric System Elements
- Category D – System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements

For each of the different categories of contingencies, each reliability region is allowed to expand on the NERC requirement to make them more stringent. This 345 kV transmission line Project is in the Midwest Reliability Organization ("MRO") reliability region. NERC Category C (contingency C5) includes the loss of "any two circuits of a multiple circuit towerline" with an exclusion for multiple circuit towers used over short distances in accordance with regional exemption criteria. In the MRO region, if the transmission line is operated at a voltage of 100 kV or higher and if the overall distance that transmission lines are double circuited is greater than one mile, then it falls under the NERC Category C contingency definition.

NERC reliability standards require utilities to plan a transmission system to be able to survive all Category C contingencies without system performance violations. Double circuit construction has been found to be acceptable if the power system can reliably withstand simultaneous failure of both circuits on a common structure.

Common outages for double circuit transmission lines could be caused by:

- Electrical failure of transmission line insulation due to lightning strike
- Mechanical failure of one or more structures

- Broken shield wire falling into power conductors
- Wind-blown debris causing conductor-conductor short circuits
- Insulator contamination due to road salt, soot or agricultural chemicals
- Wind, sleet and ice conditions
- Contact with aircraft or construction equipment (cranes, dump trucks)
- Protective relaying malfunction ("sympathetic tripping" due to fault on adjacent circuit)

These common failure mechanisms have all occurred on the transmission system within the northern MRO transmission system on double circuit transmission lines.

24.4.2 SAFETY

Proper safeguards will be implemented for construction and operation of the facility. The facility will be designed to meet the local, state, NESC and the Applicants' standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials and ROW widths. Construction crews will comply with local, state, NESC and the Applicants' standards regarding installation of facilities.

The proposed transmission line will be equipped with protective devices to safeguard the public from the transmission line if an accident were to occur and if a structure or conductor were to fail. The protective devices are breakers and relays located where the transmission line connects to the substation. The protective equipment will de-energize the transmission line should such an event occur. In addition, the substation will be fenced and access limited to authorized personnel. These measures are standard practice for the Applicants.

24.4.3 ELECTRIC AND MAGNETIC FIELDS

The term electromagnetic field ("EMF") refers to electric and magnetic fields that are coupled together such as in high frequency radiating fields. For the lower frequencies associated with power lines, EMF should be separated into electric fields ("EFs") and magnetic fields ("MFs"), which arise from the flow of electricity and the voltage of a line and are measured in kilovolts per meter ("kV/m") and milliGauss ("mG"), respectively. The intensity of the electric field is proportional to the voltage of the line, and the intensity of the magnetic field is proportional to the current flow through the conductors. Transmission lines operate at a power frequency of 60 hertz (cycles per second).

Electric Fields

The electric field from a transmission line can couple with a conductive object, such as a vehicle or a metal fence, if the object is in close proximity to the line. This could induce a voltage on the object. The magnitude of the voltage is dependent on many factors, including the weather condition, object shape, object size, object orientation, object to ground resistance, object capacitance, and location along the ROW. If objects are insulated or semi-insulated from the ground and if a person were to touch them, a small current would pass through the person's body to the ground. This might be accompanied by a spark discharge and mild shock, similar to what can occur when a person walks across a carpet and touches a grounded object or another person.

Magnetic Fields

Current passing through any conductor, including a wire, produces a magnetic field in the area around the wire. The magnetic field associated with a HVTL surrounds the conductor and decreases rapidly with increasing distance from the conductor. The magnetic field is expressed in units of magnetic flux density, expressed as gauss ("G").

Considerable research has been conducted throughout the past three decades to determine whether exposure to power-frequency (60 hertz) magnetic fields causes biological responses and health effects. Epidemiological and toxicological studies have shown no statistically significant association or weak associations between MF exposure and health risks. The possible impact of exposure to MFs upon human health has also been investigated by public health professionals for the past several decades. While the scientific consensus is that electric fields pose no risk to humans, the question of whether exposure to magnetic fields can cause biological responses or health effects continues to be debated.

24.4.4 STRAY VOLTAGE

"Stray voltage" is a condition that can occur on the electric service entrances to structures from distribution lines — not transmission lines. 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. Appropriate measures will be taken to address potential stray voltage issues on a case by case basis.

24.4.5 FARMING OPERATIONS, VEHICLE USE, AND METAL BUILDINGS NEAR POWER LINES

All normal and current farming operations in the location are compatible with the construction and operation of the proposed Facility.

24.4.6 RIGHT-OF-WAY OR CONDEMNATION REQUIREMENTS

Right-of-Way Width

The ROW for the proposed Facility will generally be 150 feet wide (75 feet on either side of the transmission line center) for all sections of the transmission line that do not follow existing corridors. When the transmission line parallels other existing infrastructure ROW (e.g. roads, railroads, other utility corridors), an easement of lesser width may be required as parts of the ROW of the existing infrastructure can often be combined with the ROW needed for the transmission line. When paralleling existing ROW, the Applicants' typical practice is to place the poles on adjacent private property, a few feet off the existing ROW. With this pole placement, the transmission line shares the existing ROW, thereby reducing the size of the easement required from the private landowner. Throughout the route development process, the Applicants have sought to identify areas to share ROW with existing infrastructure, including transmission lines, roads and railroad ROW. Appendix F provides a structural drawing of the transmission line structure proposed for the Facility, and displays the general ROW width.

Construction of the proposed Facility will require the acquisition of easements to cross private property and the coordination with appropriate State agencies where the line shares ROW with other public utilities or roads. Easement procurement agreements with landowners of parcels crossed by the proposed transmission line are currently underway.

In the event soil investigation is required to assist with the design of the foundations, the Applicants will inform the landowners at the initial survey consultation that soil borings may occur. An independent geotechnical testing company will take and analyze these borings. Survey crews will also work with local utilities to identify underground utilities along the route. This minimizes conflicts or impacts to existing utilities along the route.

Where possible, staging and laydown areas will be located within the easement area and limited to previously disturbed or developed areas. When additional property is temporarily required for construction, temporary limited easements ("TLE") may be obtained from landowners for the duration of construction. TLE will be limited to special construction access needs or additional staging or laydown areas required outside of the transmission line easement area.

24.4.7 NECESSARY CLEARING ACTIVITIES

The Applicants do not anticipate that the Facility will require extensive tree clearing. Where tree cover would need to be removed pursuant to easement area requirements, the Applicants will minimize the removal of trees to the greatest extent possible. Wood from the clearing operation 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 23.1.

24.4.8 UNDERGROUND TRANSMISSION

No portion of the Facility will be undergrounded. Because of the significantly greater expense associated with underground transmission construction, the use of underground technology is limited to locations where the impacts of overhead construction are completely unacceptable or where physical circumstances allow for no other option. The Applicants concluded that the environmental and land use setting does not warrant underground construction on any portion of the Facility.

25.0 ADDITIONAL INFORMATION IN APPLICATION (ARSD 20:10:22:36)

The Applicants believe that this Application, including appendices, contains all the information required to meet Applicants' burden of proof specified in SDCL 49-41B-22. The Applicants have provided correspondence and meeting notes pertinent to the project in Appendix G which outline the coordination efforts taken with the State of South Dakota and federal agencies to date.

26.0 TESTIMONY AND EXHIBITS (ARSD 20:10:22:39)

The following witnesses will provide testimony:

Mr. Daniel Lesher, Routing Lead
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