Philip Wind Partners, LLC
Application for Energy Facility Permit

Haakon County, South Dakota

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TABLES

APPENDICES

ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

ADLS	Aircraft Detection Lighting System
AM	amplitude modulation
APE	area of potential effect
APLIC	Avian Power Line Interaction Committee
Application	Facility Permit Application
ARSD	Administrative Rules of South Dakota
Basin Electric	Basin Electric Power Company
BBCS	Bird and Bat Conservation Strategy
BCA	Beaver Creek Archaeology, Inc.
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	best management practice
CEF	Consistency Evaluation Form
cm	centimeter
CO_2	carbon dioxide
Collector Substation	230-kV Collector Substation
Commission	South Dakota Public Utilities Commission
CWA	Clean Water Act
dBA	A-weighted decibels
DoD	Department of Defense
EA	Environmental Assessment
ECPG	*Eagle Conservation Plan Guidance*
EMF	electric and magnetic fields
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERP	Emergency Response Plan
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FE	federally listed endangered
FEMA	Federal Emergency Management Agency
FM	frequency modulation
FONSI	finding of no significant impact
FR	*Federal Register*
Gen-Tie Line	generation tie line
HUC	hydrologic unit code
Hz	Hertz
IBAs	Important Bird Areas
Invenergy	Invenergy LLC
IPaC	Information for Planning and Consultation
km	kilometer
Ksat	saturated hydraulic conductivity
kV	kilovolt
L_{90}	Sound level exceeded 90% of the time during a measurement period

L_{eq}	Equivalent-continuous sound level
L_{max}	Maximum sound level
m	meter
m/s	meters per second
MET	meteorological
mG	milliGauss
mph	miles per hour
MRLC	Multi-Resolution Land Characteristics Consortium
MW	megawatt
MWh	megawatt hour
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NEXRAD	Next-Generation Radar
NHD	National Hydrography Dataset
NLCD	National Land Cover Database
NLEB	northern long-eared bat
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NWI	National Wetlands Inventory
O&M	operations and maintenance
OEM	original equipment manufacturer
PBA	Programmatic Biological Assessment
PE	proposed endangered
Permits	Energy Facility Permits
PGA	peak ground acceleration
Philip Wind or Applicant	Philip Wind Partners, LLC
Project	The 300-megawatt wind energy facility and 230-kilovolt transmission facility, which is the subject of this Facility Permit Application
Project Area	The 68,300-acre generalized area of land for referential and study purposes, of which 51,189 acres are leased for the Project, and within which all Project Facilities will be constructed
Project Facilities	All temporary and long-term Project components, including a switchyard, turbines, an electrical collection system, a collector substation, a generation tie line, an operations and maintenance facility, a supervisory control and data acquisition system, access roads, temporary and/or permanent meteorological towers, Aircraft Detection Lighting System towers; and temporary construction areas, including crane paths, public road improvements, construction laydown yards, staging areas, and concrete batch plant(s), as needed. The Project Area encompasses all Project Facilities.
PST	Pre-Screening Tool
PTRCS	property of traditional religious and cultural significance
ROW	right-of-way

RUA	Road Use Agreement
SCADA	supervisory control and data acquisition
SDBWG	South Dakota Bat Working Group
SDCL	South Dakota Codified Laws
SDDANR	South Dakota Department of Agriculture and Natural Resources
SDGFP	South Dakota Game, Fish, and Parks
SDGS	South Dakota Geological Survey
SDSHS	South Dakota State Historical Society
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SPP	Southwest Power Pool
Switchyard	A proposed 230-kV interconnection switchyard, also known as the Philip North Switchyard
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TWI	The Watershed Institute
UGP PEIS	Upper Great Plains Programmatic Environmental Impact Statement
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEIA	U.S. Energy Information Administration
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAPA	Western Area Power Administration
WAPA Tie-In Lines	Two new transmission tie-in lines
WEG	USFWS *Land-Based Wind Energy Guidelines*

1. Introduction

1.1 Project Overview

Philip Wind Partners, LLC (Philip Wind or Applicant), respectfully submits this Facility Permit Application (Application) to the South Dakota Public Utilities Commission (Commission) for Energy Facility Permits (Permits) to construct and operate a wind energy facility, as defined under South Dakota Codified Law (SDCL) 49-41B-2(13), and an associated transmission facility, as defined under SDCL 49-41B-2.1(1), in Haakon County, South Dakota. The wind energy facility will have a nameplate capacity of up to 333 megawatts (MW) and deliver up to 300 MW to the point of interconnection. The wind energy facility will include up to 87 wind turbines located on 91 potential turbine locations. The transmission facility will operate at 230 kilovolts (kV) and be up to 7 miles in length. The wind energy facility and transmission facility are collectively referred to as the "Project."

The Project is located northwest of the town of Philip in Haakon County, South Dakota, as shown in Figure A-1 in **Appendix A**. The Project will be located on privately owned land within the 68,300-acre general Project Area (Project Area), of which 51,189 acres are leased for the Project. The Project will include the following facilities (Project Facilities):

- Up to 87 wind turbines (located on 91 potential turbine locations);
- A 34.5-kV electrical collection system;
- A 230-kV collector substation (Collector Substation);
- An approximately 7-mile-long, 230-kV generation transmission tie line (Gen-Tie Line);
- An operations and maintenance facility (O&M Facility);
- A supervisory control and data acquisition (SCADA) system;
- Access roads;
- Up to three temporary and/or permanent meteorological (MET) towers;
- Up to three Aircraft Detection Lighting System (ADLS) towers; and
- Temporary construction areas, including crane paths, public road improvements, three general construction laydown yards, staging areas, and concrete batch plant(s), as needed.

The preliminary Project Layout is shown in Figure A-2 in **Appendix A**. The Project will also be supported by a short (less than 1 mile) extension of an existing 230-kV line owned by Basin Electric Power Company (Basin Electric). Basin Electric will separately permit and construct this transmission line. In addition, the Western Area Power Administration (WAPA) will construct the 230-kV Philip North Switchyard (Switchyard) and two tie-in lines to interconnect the Project into WAPA's existing Oahe to New Underwood 230-kV transmission line.

The Project is made possible by collaborating with local landowners who are interested in harnessing the area's rich wind resources and Philip Wind's' development expertise.

The Project represents a significant investment in Haakon County that will support the local economy while simultaneously generating clean, renewable energy. The Project is anticipated to create approximately 200 new jobs during construction and approximately 12 new jobs during operations. Over its anticipated 30-year operational life, the Project is estimated to generate:

- Over $85 million in payments to landowners and existing agricultural producers.
- Over $50 million in new property tax revenue which will increase funding for schools, roads, and municipal services.
- State and local sales tax for the state of South Dakota and Haakon County are currently estimated to be more than $10 million dollars.

Haakon County is unzoned and has no ordinances relating to wind energy facilities or transmission lines at the time of submittal of this Application. Philip Wind has entered into a Road Use Agreement (RUA) from Haakon County.

Philip Wind requests that the Commission grant the requested facility permits subject to the proposed conditions set forth in **Appendix B**.

1.2 Project Background

The Project has been in development for more than 8 years. Philip Wind was purchased by Southern Power Company in 2017 and then acquired by Invenergy in 2019. Since the beginning of the Project development process, Philip Wind has been engaged in ongoing agency coordination and has performed a thorough suite of environmental studies, engineering analyses, and other development activities to refine the Project. Many of those environmental studies are described in later chapters of this Application and accompanying appendices. As a result of Philip Wind's agency coordination and environmental analysis, the scope of the Project Area has changed over the years to further avoid and minimize potential Project impacts.

Before Invenergy's acquisition of Philip Wind in 2019, representatives of Philip Wind met variously with the U.S. Fish and Wildlife Service (USFWS); South Dakota Game, Fish, and Parks (SDGFP); WAPA; and interested Tribes to discuss the Project environmental and cultural surveys. Philip Wind also completed surveys for eagle use, eagle nests, prairie grouse leks, cultural resources, and bat acoustics, as well as a whooping crane habitat assessment and grassland assessment mapping. When Invenergy acquired Philip Wind, the Project Area encompassed approximately 71,000 acres and was designed with a layout focused on maximizing energy production. Since then, the Project Area has been modified to address comments from regulatory agencies and the public to avoid, minimize, or mitigate potential adverse impacts to environmental resources based on collected field data. For example, Philip Wind refined Project design to shift turbine locations to avoid unbroken grasslands. Philip Wind also removed four turbine locations from the layout due to proximity to prairie grouse leks and Tier 3 modeled priority sharp-tailed grouse habitat. Additional detail on agency coordination is included in **Section 22.2**, and the results of the surveys and studies conducted for the Project are reflected throughout this Application. In addition, **Appendix C** includes additional information regarding Philip Wind's commitments for this Project; the appendix includes Table 1-1, Figure 1-3, and Table 2-3 from WAPA's Environmental Assessment (EA) (WAPA 2023).

The Project has been the subject of federal National Environmental Policy Act (NEPA) review by WAPA as part of WAPA's review of the Project's interconnection request. Philip Wind worked with WAPA to support consultation with federally recognized Tribes early in the planning process. As part of the NEPA process, WAPA held public scoping meetings in January 2023, issued a Draft EA in February 2024, and a Final EA in May 2025, along with a Finding of

No Significant Impact (FONSI). The FONSI noted that "the Project will not significantly impact the environment because of its commitment to avoidance and minimization measures." Where relevant, this Application discusses the findings of the NEPA process and the FONSI is included as **Appendix D**.[1]

Philip Wind has committed to the best management practices (BMPs) based on the resource-specific BMPs identified in the Upper Great Plains Programmatic Environmental Impact Statement (UGP PEIS) (WAPA and USFWS 2015). Philip Wind also presented to the USFWS the Project's proposed approach to Endangered Species Act (ESA) compliance pursuant to the USFWS's Programmatic Biological Assessment (PBA), which provides for expedited programmatic ESA Section 7 consultation through adherence to the BMPs and conservation measures in the PBA, as documented in the PBA Consistency Evaluation Forms (CEFs). A project applicant's voluntary commitment to implement the measures in the PBA CEFs results in an effects determination of "no effect" or "not likely to adversely affect" pursuant to the ESA Section 7 process. Between September 2022 and April 2023, Philip Wind worked with the USFWS and WAPA to ensure the Project's adherence with the PBA's CEFs to address ESA compliance. The PBA CEFs were finalized and signed by Philip Wind, the USFWS, and WAPA in April 2023; updated CEFs were signed again in April 2025.

1.3 Summary of Potential Impacts

As a result of the agency coordination, surveys, and studies discussed in **Section 1.2** and throughout this Application—which occurred over the course of years—Project Facilities have been sited to avoid and minimize impacts to sensitive environmental resources.

Overall, approximately 1,199 acres of temporary ground disturbance is expected during construction of the Project, about 115 acres of which will be long-term to host Project Facilities for the operational life of the Project (approximately 0.1% of the total land within the Project Area). For reference, there are approximately 1,127,222 acres of farmland in Haakon County (U.S. Department of Agriculture [USDA] 2023).

The Project Facilities are primarily sited in areas of previously disturbed cropland, minimizing any impact to high-quality habitat, wetlands, and waterways. During final engineering, habitat, wetland, and waterway impacts will be minimized to the extent practicable and, if necessary, permitted in compliance with applicable laws.

There are no Project Facilities sited on state-owned or federal-managed conservation lands. There are no USFWS wildlife refuges, USFWS conservation easements, USFWS wetland management district properties, USDA Agricultural Conservation Easement Program lands, SDGFP properties, or State of South Dakota School and Public Land parcels in the Project Area. There is one Bureau of Land Management (BLM) inholding within the Project Area; however, no infrastructure would be sited on the BLM inholding. There is one cemetery located within the Project Area; however, all Project Facilities will avoid the cemetery.

[1] The impact calculations presented in the EA and FONSI represent "maximum potential" impacts, and include not only the Project but also facilities that will be constructed by WAPA and Basin Electric. As such, the impact calculations from the EA and FONSI will differ from the specific Project calculations included in this Application.

A Level I cultural resource records review for the Project Area identified previously recorded archaeological and historic resources located within or near the Project Area. A Level III intensive pedestrian inventory and cultural resources survey within the Project disturbance footprint (direct area of potential effect [APE]) was completed by archaeologists with Beaver Creek Archaeology, Inc. (BCA), in September 2023. Based on the results of the 2023 records search and field survey, no previously recorded cultural resources were documented within the 2-mile record search radius surrounding the current direct APE (BCA 2023, 2024a). Project Facilities have been sited to avoid impacts to sites identified as potentially eligible for listing on the National Register of Historic Places (NRHP).

The Project coordinated with the South Dakota State Historic Preservation Office (SHPO) to ensure that the survey met SHPO requirements as well as any additional Tribal Historic Preservation Office survey requirements of the participating Tribal Cultural Specialists.

BMPs will be implemented during construction to avoid or minimize impacts to habitat and water resources present in the Project Area. During construction, fugitive dust emissions will increase due to vehicle and equipment traffic in the area. The additional particulate matter emissions will not exceed the National Ambient Air Quality Standards (NAAQS). Wind turbines do not produce air emissions during operation.

Noise from construction activities will be temporary. There are no noise-related federal, county, or local regulations that apply to the Project. However, Philip Wind is committed to implementing BMPs derived from the UGP PEIS as well as additional voluntary protection measures to minimize noise impacts (see **Section 11.3**).

In addition to the avoidance and minimization measures discussed previously in **Section 1.2** and reflected in **Appendix C**, additional impact avoidance and minimization measures planned for the Project include the following:

- The Project has been designed to meet the goal of a 45-A-weighted decibel (dBA) noise limit at non-participating residents and 50 dBA at participating residences.
- The Project will not exceed 30 hours of shadow flicker per year at residences unless a waiver is obtained.[2]
- The Project will meet or exceed the turbine tower setback from surrounding property lines required by state law.
- The Project will employ up to three ADLS towers, as required per SDCL 49-41B-25.2 as authorized by the Federal Aviation Administration (FAA), to minimize visual impacts of the wind energy facility lights.
- The Project will locate access roads to minimize grading activities and utilize existing roads and field paths for access where practicable.
- The Project will reseed uncultivated areas temporarily disturbed during construction to blend with existing vegetation.
- No turbines will be sited on native (unbroken) sod grasslands.

[2] The Applicant has acquired a shadow flicker waiver from one participating landowner that had 33 modeled hours of shadow flicker under one of the turbine models.

- The Project will limit the establishment and spread of invasive species through industry BMPs.
- The Project will implement BMPs during construction to control erosion and prevent or minimize impacts to wetlands, waterways, and drainageways in accordance with the Project's Storm Water Pollution Prevention Plan (SWPPP).

1.4 Names of Participants, Owner, and Manager (ARSD 20:10:22:06, ARSD 20:10:22:07)

> ***ARSD 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.*
>
> ***ARSD 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.*

Philip Wind, an affiliate of Invenergy LLC (Invenergy), is currently the entity anticipated to own and operate the Project. Invenergy is headquartered at One South Wacker Drive, Suite 1500, Chicago, Illinois 60606. As a privately held company with a 20+ year track record of responsibly developing, building, owning, and operating wind, solar, energy storage, and natural gas generation facilities, Invenergy has developed more than 200 projects and 32 gigawatts of generating capacity in the Americas, Europe, and Asia. Invenergy is also developing transmission projects to build a more robust, resilient grid.

Philip Wind, provided it receives permits from the Commission, may directly or indirectly, through its affiliates, own, construct, and operate the Project by selling the power using long-term power purchase agreements or other available options. Alternatively, Philip Wind may sell or assign the Project, or a portion thereof, to one or more public utilities or other qualified entity or entities at any time. Any future buyer or assignee will be required to meet all permit conditions and any power purchase agreement obligations associated with the Project or portion thereof. As part of any such sale or assignment, Philip Wind or an affiliate may function as the engineering, procurement, and construction contractor to construct the Project and/or function as the O&M services provider to operate and maintain the Project.

Brianna Gries is the primary contact for the Project. Contact information for the individuals authorized to receive communications relating to the Application on behalf of Philip Wind is provided in **Table 1.4-1**.

Table 1.4-1. Contact Information

Brianna Gries Senior Associate, Renewable Development Invenergy LLC 1001 17th Street, Suite 1900	Alex Chandler Director, Renewable Development Invenergy LLC One South Wacker Drive, Suite 1500 Chicago, IL 60606

Denver, CO 80202 (303) 800-9342	(720) 907-2297 achandler@invenergy.com
Bristi Cure Senior Vice President, Renewable Development Invenergy LLC One South Wacker Drive, Suite 1500 Chicago, IL 60606 (303) 557-4489 bcure@invenergy.com	Lisa Agrimonti Attorney Fredrikson & Byron, P.A. 60 South 6th Street, Suite 1500 Minneapolis, MN 55402 (612) 492-7000 lagrimonti@fredlaw.com
Haley Waller Pitts Attorney Fredrikson & Byron, P.A. 60 South 6th Street, Suite 1500 Minneapolis, MN 55402 (612) 492-7000 hwallerpitts@fredlaw.com	

1.5 Application Content and Organization

In accordance with SDCL 49-41B and the Administrative Rules of South Dakota (ARSD) 20:10:22, this Application provides information on the existing environment; potential Project impacts; and proposed avoidance, minimization, and/or mitigation measures for the following resources:

- Physical (geology, economic deposits, and soils)
- Hydrology (ground and surface water) and water quality
- Terrestrial ecosystems (vegetation, wetlands, wildlife, threatened and endangered species)
- Aquatic ecosystems
- Land use (agriculture, residential, recreation, noise, aesthetics, and telecommunications)
- Air quality
- Communities (socioeconomics, cultural resources, and transportation)

In this Application, Philip Wind has addressed each matter set forth in SDCL 49-41B and ARSD 20:10:22 related to wind energy and transmission facilities.

Pursuant to SDCL 49-41B-22, the information presented in the Application establishes that:

1. The facility complies with all applicable laws and rules;
2. The facility will not pose a threat of serious injury to the environment nor the social and economic condition of inhabitants or expected inhabitants in the siting area;
3. The facility will not substantially impair the health, safety or welfare of the inhabitants; and
4. The facility will not unduly interfere with the orderly development of the region, with due consideration having been given to the views of governing bodies of affected local units of government.

1.5.1 Completeness Checklist

The contents required for an application with the Commission are described in SDCL 49-41B and further clarified in ARSD 20:10:22:01 (1) et seq. **Table 1.5.1-1** provides a Completeness Checklist that identifies where each rule requirement is addressed in the Application.

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
49-41B-11(1) through (12)	20:10:22:05	**Application contents**. The application for a permit for a facility shall contain the applicable information specified in §§ 20:10:22:06 to 20:10:22:25, inclusive, 20:10:22:36, and 20:10:22:39. If the application is for a permit for an energy conversion facility, it shall also contain the information specified in §§ 20:10:22:26 to 20:10:22:33, inclusive. If the application is for a permit for a transmission facility as defined in SDCL subdivision 49-41B-2.1(1), it shall also contain the information in §§ 20:10:22:34 and 20:10:22:35. If the application is for a permit for a transmission facility as defined in SDCL subdivision 49-41B-2.1(2), it shall also contain the information in §§ 20:10:22:37 and 20:10:22:38. If the application is for a permit for a wind energy facility, it shall also contain the information in §§ 20:10:22:33.01 and 20:10:22:33.02. The application for a permit for a facility shall contain a list of each permit that is known to be required from any other governmental entity at the time of the filing. The list of permits shall be updated, if needed, to include any permit the applicant becomes aware of after filing the application. The list shall state when each permit application will be filed. The application shall also list each notification that is required to be made to any other governmental entity.	Sections 1 through 24
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.	Section 1.4
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.	Section 1.4
49-41B-11(8)	20:10:22:08	**Purpose of facility.** The applicant shall describe the purpose of the proposed facility.	Section 2
49-41B-11(12)	20:10:22:09	**Estimated cost of facility**. The applicant shall describe the estimated construction cost of the proposed facility.	Section 3

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
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.	Section 2.1 and Section 2.2
49-41B-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.	Sections 4.1 and 11.2.1.3; Figures A-1, A-2, A-4, A-8, and A-10 in **Appendix A**
49-41B-11(6); 49-41B-21; 34A-9-7(4)	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, wind energy, 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.	Section 5
49-41B-1(2,11);	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	Sections 6 through 15

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
49-41B-21; 49-41B-22		changes in the existing environment that are anticipated to result from construction and operation of the proposed facility, and identification of irreversible changes that are anticipated to remain beyond the operating lifetime of the facility. The environmental effects shall be calculated to reveal and assess demonstrated or suspected hazards to the health and welfare of human, plant and animal communities, which may be cumulative or synergistic consequences of siting the proposed facility in combination with any operating energy conversion facilities, existing or under construction. The applicant shall provide a list of other major industrial facilities under regulation which may have an adverse effect on the environment as a result of their construction or operation in the transmission site, wind energy site, or siting area.	
49-41B-11(2,11); 49-41B-21; 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 or wind energy site or through which the transmission facility will pass; (2) A topographic map of the plant, wind energy, or transmission site; (3) A written summary of the geological features of the plant, wind energy, 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 plant, wind energy, or transmission site; (5) A description of the soil type at the plant, wind energy, or transmission site; (6) An analysis of potential erosion or sedimentation which may result from site clearing, construction, or operating activities and measures that will be taken for their control;	Section 7; Figures A-2, A-4, A-5, A-6, A-7, and A-11 in **Appendix A**

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
		(7) Information on areas of seismic risks, subsidence potential and slope instability for the plant, wind energy, 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.	
49-41B-11(2,11); 49-41B-21; 49-41B-22	20:10:22:15	**Hydrology.** The applicant shall provide information concerning the hydrology in the area of the proposed plant, wind energy, 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, wind energy, 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 off-site 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 groundwater; (5) A description of designs for storage, reprocessing, and cooling prior to discharge of heated water entering natural drainage systems; and (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 that may be affected.	Section 8; Figures A-8 and A-11 in **Appendix A**

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
49-41B-11(2,11); 49-41B-21; 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, wind energy 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.	Section 9; Figures A-2 and A-7 in **Appendix A**; **Appendices I through R**
49-41B-11(2,11); 49-41B-21; 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, including existing information resulting from biological surveys conducted to identify and quantify the aquatic fauna and flora potentially affected within the transmission site, wind energy 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.	Sections 8.2, 9.2, and 10
49-41B-11(2,11); 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 plant, wind energy, or 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 non-renewable resources; (g) Other major industries;	Sections 7.2.1.4, 11, and 15.2; Figure A-10 in **Appendix A; Appendices H and S**

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
		(h) Rural residences and farmsteads, family farms, and ranches; (i) Residential; (j) Public, commercial, and institutional use; (k) Municipal water supply and water sources for organized rural water systems; and (l) Noise sensitive land uses; (2) Identification of the number of persons and homes which will be displaced by the location of the proposed facility; (3) An analysis of the compatibility of the proposed facility with present land use of the surrounding area, with special attention paid to the effects on rural life and the business of farming; and (4) A general analysis of the effects of the proposed facility and associated facilities on land uses and the planned measures to ameliorate adverse impacts.	
49-41B-11(2,11); 49-41B-28	20:10:22:19	**Local land use controls.** The applicant shall provide a general description of local land use controls and the manner in which the proposed facility will comply with the local land use zoning or building rules, regulations or ordinances. If the proposed facility violates local land use controls, the applicant shall provide the Commission with a detailed explanation of the reasons why the proposed facility should 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.	Section 12
49-41B-11(2,11); 49-41B-21; 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.	Sections 8 and 13

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
49-41B-11(2,11); 49-41B-21; 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.	Section 14
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.	Section 4.4.1
49-41B-11(4, 10, 11); 49-41B-22	20:10:22:23	**Community impact.** The applicant shall include an identification and analysis of the effects the construction, operation, and 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.	Section 15; **Appendices S through AA**

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
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 10 years of commercial operation in 1-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.	Sections 15.1 and 16
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.	Section 17
49-41B-35(3)	20:10:22:33.01	**Decommissioning of wind energy facilities.** Funding for removal of facilities. The applicant shall provide a plan regarding the action to be taken upon the decommissioning and removal of the wind energy facilities. Estimates of monetary costs and the site condition after decommissioning shall be included in the plan. The Commission may require a bond, guarantee, insurance, or other requirement to provide funding for the decommissioning and removal of a wind energy facility. The Commission shall consider the size of the facility, the location of the facility, and the financial condition of the applicant when determining whether to require some type of funding. The same criteria shall be used to determine the amount of any required funding.	Section 18; **Appendix E**
49-41B-11(2,11)	20:10:22:33.02	**Information concerning wind energy facilities.** If a wind energy facility is proposed, the applicant shall provide the following information:	Section 20

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
		(1) Configuration of the wind turbines, including the distance measured from ground level to the blade extended at its highest point, distance between the wind turbines, type of material, and color; (2) The number of wind turbines, including the number of anticipated additions of wind turbines in each of the next five years; (3) Any warning lighting requirements for the wind turbines; (4) Setback distances from off-site buildings, rights-of-way of public roads, and property lines; (5) Anticipated noise levels at the exterior of all occupied residences located within the affected area during construction and operation; (6) Anticipated electromagnetic interference during operation of the facilities; (7) The proposed wind energy site and major alternatives as depicted on overhead photographs and land use culture maps; (8) Reliability and safety; (9) Right-of-way or condemnation requirements; (10) Necessary clearing activities; (11) Configuration of towers and poles for any electric interconnection facilities, including material, overall height, and width; (12) Conductor configuration and size, length of span between structures, and number of circuits per pole or tower for any electric interconnection facilities; and (13) If any underground connection facilities are placed, the depth of burial, distance between access points, conductor configuration and size, and number of circuits.	
49-41B-11	20:10:22:34	**Transmission facility layout and construction.** If a transmission facility is proposed, the applicant shall submit a policy statement concerning the route clearing, construction and landscaping operations, and a description of plans for continued right-of-way maintenance, including stabilization and weed control.	Sections 4.2.10, 4.5, 9.1.2, 19.2, and 21; Figures A-2 and A-3 in

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
			Appendix A
49-41B-11(2,11)	20:10:22:35	**Information concerning transmission facilities.** If a transmission facility is proposed, the applicant shall provide the following information: (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) ROW 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.	Section 21
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.	Section 22
49-41B-22	20:10:22:36	**Applicant's burden of proof.** The applicant has the burden of proof to establish that: (1) The proposed facility will comply with all applicable laws and rules; (2) The facility will not pose a threat of serious injury to the environment nor to the social and economic condition of inhabitants or expected inhabitants in the siting area;	Section 22.4

Table 1.5.1-1. Completeness Checklist			
SDCL	**ARSD**	**Required Information**	**Location**
		(3) The facility will not substantially impair the health, safety or welfare of the inhabitants; and (4) The facility will not unduly interfere with the orderly development of the region with due consideration having been given the views of governing bodies of affected local units of government.	
49-41B-11	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.	Section 23

2. Purpose of, and Demand for, the Facility (ARSD 20:10:22:08, 20:10:22:10)

ARSD 20:10:22:08. Purpose of facility. *The applicant shall describe the purpose of the proposed facility.*

ARSD 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.*

The purpose of the Project is to provide a source of domestic, clean energy to the power grid. Philip Wind is actively submitting bids for power purchase agreements through various utility, commercial, and industrial opportunities. The electricity generated by the Project will be transmitted onto the grid operated by Southwest Power Pool (SPP) where it will contribute to meeting electricity demand across the SPP service territory. Due to the nature of grid operations, it is not possible to trace electricity to its exact delivery point or final usage. By supplying zero-emission electricity to the grid, the Project will offer both environmental benefits and price stability. Further discussion on the demand for this energy and its associated benefits is provided in **Section 2.1**.

2.1 Renewable Energy Demand

The 2025 Lazard Levelized Cost of Energy Analysis (Lazard 2025) provides a comprehensive examination of the levelized costs associated with all types of electricity production, including both renewable and non-renewable energy sources. Based on this analysis, production of electricity from wind energy remains one of the most cost-effective options, making it an attractive investment for utility companies and large consumers of electricity. Construction of new wind energy generation facilities is more affordable than new non-renewable energy generation facilities, even without tax credit programs. **Table 2.1-1** provides a comparison of the unsubsidized levelized cost of energy for both renewable and non-renewable energy generation facilities. Overall, renewable energy generation facilities can provide lower costs per megawatt hour (MWh) of electricity than non-renewable energy generation facilities.

Table 2.1-1. Unsubsidized Levelized Cost of Energy		
Energy Source	**Generation Type**	**Levelized Cost ($/MWh)**
Renewable	Wind	$37–$86
	Solar Photovoltaic	$38–$78
Non-Renewable	Coal	$71–$173
	Gas Combined Cycle	$48–$109
	Gas Peaking	$149–$251
	Nuclear	$141–$220

Source: Lazard (2025)

2.1.1 National Demand

In 2024, the total amount of electricity consumed in the United States was approximately 4.097 trillion kilowatt-hours, the highest amount recorded of annual electricity consumption for the Country. In its Annual Energy Outlook 2025, the U.S. Energy Information Administration (USEIA) estimated that electricity demand will increase by 50% by 2050 (USEIA 2025).

Demand for renewable energy from wind remains strong despite a shifting federal policy landscape under the current U.S administration. Market forces and state-level policies continue to drive growth in the wind sector. Wind energy remains cost-competitive, with increasing capacity and continued support from state renewable portfolio standards and corporate demand for renewable energy (U.S. Department of Energy 2022). Most, if not all, of regional power producers' resource plans call for increasing the use of fixed-cost resources, such as wind energy, with zero fuel cost, pollution, and carbon emissions as a necessity to provide cost-effective electricity to their customers. Utility, industrial, and commercial customers are still entering long-term power purchase agreements or acquiring wind energy facilities outright to hedge against volatile fuel prices and stabilize electricity prices for consumers.

Even the USEIA's most modest projections forecast wind energy generation capacity to grow by over 195 gigawatts by 2050 (USEIA 2025). Wind energy generation is an inexhaustible source of clean electricity that can help effectively address the identified capacity deficit while avoiding the emission of particulate matter, heavy metals, and greenhouse gases caused by non-renewable combustion-based energy generation.

2.1.2 Regional and State Demand

Similar to the national trends, at the regional and state level, significant increase in energy consumption is forecasted based on expanding data center loads, electrification, and increased manufacturing activity. Within SPP, the regional grid operator for the Project's location, Load Responsible Entities forecast a 10% increase in the summer 2029 Net Peak Demand vs. 2024 summer peak (SPP 2024). SPP is projected to have a capacity deficit of 5,950 MW by summer 2029, which is driven by the 10% rise peak load and planned retirement of 2,389 MW of coal and natural gas resources by 2029 (SPP 2024). This capacity deficit will need to be remedied by a combination of additional generators constructed, revised retirements, or reduced peak load.

South Dakota has some of the nation's greatest wind resources, corroborated by the 55% in-state net generation rate provided by wind energy (USEIA 2023). The Project site, in particular, boasts an abundance of wind resources, enabling significant energy production with no fuel costs. Electricity generated by the Project can be sold at more competitive prices compared to other forms of energy projects that rely on purchasing fuel for generation. This translates to cost-effective electricity for power purchasers and energy customers within the SPP service territory.

Once online, up to 300 MW of electrical generation will be delivered to the SPP regional transmission system, which will be distributed and used to service electrical demand in the WAPA service territory. Philip Wind is actively marketing the sale of electricity from the Project to utility, commercial, and industrial customers. Local utilities have expressed interest in acquiring renewable electricity generation in the area. Basin Electric, an electric generation cooperative, has announced its intent to procure 350 MW of renewable capacity in 2024. Xcel Energy, a regional electric utility company, aims to have an energy mix consisting of 44% wind energy by 2030 (Xcel Energy 2024). The Project may sell electricity produced by the Project through a power purchase agreement or other available options. The Project, or a portion thereof, may instead be directly acquired by a customer with electrical load servicing needs.

2.1.3 Local Benefits

The Project will provide numerous local and regional economic benefits. The Project Area is largely dependent on an agricultural-based economy. Agricultural economies are sensitive to commodity prices and weather, among other variables. Because only a small portion of the land under lease will be used to host aboveground Project Facilities, agricultural operations in the Project Area will be able to continue largely undisturbed.

Wind energy facilities provide consistent payments to existing farm operations, increase local tax revenue, and create job opportunities during both the short-term construction and the long-term operational phases. In addition to the employees directly involved in the construction and operation of the Project, numerous other jobs are created through indirect supply chain purchases, services required, and the higher spending that is induced by employees and landowners. Local businesses, such as restaurants, grocery stores, hotels, and gas stations, will see increased business from construction workers. Local industrial businesses, including aggregate and cement suppliers, welding and industrial suppliers, hardware stores, automotive and heavy equipment repair, electrical contractors, and maintenance providers, will also likely benefit from construction of the Project.

The Project is anticipated to create approximately 200 new jobs during construction and up to approximately 12 new jobs during operations. Over the anticipated 30-year operational life of the Project, Philip Wind is estimated to create the following local benefits for Haakon County:

- Over $85 million in payments to landowners and existing agricultural producers.
- Over $50 million in new property tax revenue, which will increase funding for schools, roads, and municipal services.
- State and local sales tax for the state of South Dakota and Haakon County are currently estimated to be more than $10 million.

The anticipated economic benefits to be produced by the Project are discussed at length in **Section 15.1.2**.

2.2 Consequences of Delay

As established in **Sections 2.1.1** and **2.1.2**, there is demand for the renewable energy that the Project will supply. Delays will increase the Project's exposure to fluctuations in equipment and contractor pricing, which may increase construction costs. Additionally, the development terms in the Project's lease agreements are susceptible to expiration, and delays could jeopardize the necessary property rights to site the Project. Furthermore, delays in Project development could result in environmental and engineering studies becoming outdated, thus necessitating duplicative efforts. Finally, Philip Wind's Generator Interconnection Agreement which was executed in 2023 and the Haakon County RUA which was executed in 2024 will be subject to expiry, adding further need to adhere to the Project schedule as delay could impact the validity of these agreements. Delay will also postpone the addition of a carbon-free energy generation source in the state and the significant local economic benefits identified in **Section 2.1.3**.

3. Estimated Cost of the Facility (ARSD 20:10:22:09)

> ***ARSD 20:10:22:09. Estimated cost of facility.*** *The applicant shall describe the estimated construction cost of the proposed facility.*

The current estimated capital cost of the Project is approximately $750 million based on indicative construction and wind turbine pricing cost estimates. This estimate includes lease acquisition, permitting, engineering, financing, procurement, and construction of the Project Facilities.

4. General Site and Facility Descriptions (ARSD 20:10:22:11, 20:10:22:33:02)

ARSD 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.*

4.1 Project Area

The Project is located approximately 15 miles northwest of the town of Philip in Haakon County, South Dakota, as shown in Figure A-1 in **Appendix A**. The Project will be located on privately owned land within the 68,300-acre general Project Area, of which 51,190 acres are leased for the Project. **Table 4.1-1** lists the county, townships, ranges, and sections within the Project Area.

Table 4.1-1. Project Area

County Name	Township	Range	Sections
Haakon	03N	18E	1, 2, 10, 11, 12, 13, 14
	03N	19E	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 17, 18
	03N	20E	1, 2, 3, 4, 5
	03N	21E	6
	04N	18E	12, 13, 24, 25
	04N	19E	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35
	04N	20E	4, 5, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
	04N	21E	8, 17, 19, 20, 21, 28, 29, 30, 31, 32, 33
	05N	19E	14, 15, 22, 23, 24, 25, 26, 27, 28, 29, 32, 33, 34, 35, 36
	05N	20E	30, 31, 32

4.2 Project Description

The Project will have a nameplate capacity of up to 333 MW and deliver up to 300 MW to the point of interconnection. The Project will include the following Project Facilities:

- Up to 87 wind turbines (located on 91 potential turbine locations);
- A 34.5-kV electrical collection system;
- A 230-kV Collector Substation;
- A 230-kV Gen-Tie Line;
- An O&M Facility;
- A SCADA system;
- Access roads;
- Up to three temporary and/or permanent MET towers;
- Up to three ADLS towers; and
- Temporary construction areas, including crane paths, public road improvements, three general construction laydown yards, staging areas, and concrete batch plant(s), as needed.

Philip Wind has performed a thorough suite of environmental studies, engineering analyses, and other development activities to refine the Project. The Project has been sited to avoid or minimize potential impacts. As will further be addressed later in this Application, the final Project Layout will account for a variety of interrelated factors. For example, unforeseen circumstances may arise just before or during construction that may require a turbine location to be slightly adjusted. For these reasons, Philip Wind respectfully requests that the Permit allow turbines to be shifted within 250 feet of their currently proposed locations, so long as they are located on leased land, specified noise and shadow flicker thresholds are not exceeded, cultural resource impacts and documented habitats for listed species are avoided, and wetland impacts are avoided or are in compliance with applicable U.S. Army Corps of Engineers (USACE) regulations. If turbine shifts are greater than 250 feet, exceed the noted thresholds, or do not meet the other limitations specified, Philip Wind will either use an alternate turbine location or obtain Commission approval for the proposed turbine location change.

Adjustments to the location of transmission structures for the Gen-Tie Line may also be necessary. Therefore, Philip Wind respectfully requests that the Permit allow Gen-Tie Line transmission structures to be shifted within the 150-foot-wide Gen-Tie Line right-of-way (ROW) as needed, so long as the transmission structures are located on leased land, cultural resources are avoided or mitigated in consultation with SHPO; wetland impacts are avoided or are in compliance with applicable USACE regulations; and all other applicable regulations and requirements are met.

Adjustments to the location of the electrical collection and SCADA systems, Collector Substation, O&M Facility, access roads, MET towers, ADLS towers, and temporary construction areas may also be necessary. Therefore, Philip Wind respectfully requests that the Permit allow the location of these facilities to be adjusted, as needed, so long as they are located on leased land, cultural resources are avoided or mitigated in consultation with SHPO; documented habitats for listed species are avoided; wetland impacts are avoided or are in compliance with applicable USACE regulations; and all other applicable regulations and requirements are met.

4.2.1 Turbine Models

The Project Layout shown in Figure A-2 in **Appendix A** identifies 91 proposed turbine locations. The actual number that will be constructed depends on the nameplate capacity(s) of the turbine model(s) procured (**Table 4.2.1-1**) but will not exceed 87 turbines. Final turbine model selections must account for various factors, including some factors that are beyond the ability of Philip Wind to control. Such factors include, among others, turbine availability, advancements in turbine technology, and permitting timelines. Philip Wind developed this Application with a set of proposed turbine locations that can accommodate the turbine models identified in **Table 4.2.1-1**. Turbine locations were sited in accordance with industry-standard spacing. Philip Wind will coordinate with original equipment manufacturers (OEM) to conduct mechanical loads analyses and will ensure that all final turbine locations are deemed suitable. All 91 proposed turbine locations in the Project Layout were modeled for sound and shadow flicker and all locations can accommodate all turbine models identified in **Table 4.2.1-1**. Philip Wind respectfully requests that the Permit allows for the use of turbine models of comparable capacity and specifications, provided conditions specified in the Permit can be complied with.

Table 4.2.1-1. Turbine Models and Specifications

Turbine Model	Nameplate Capacity (MW)	Expected Number of Turbines	Hub Height		Rotor Diameter		Tip Height	
			Feet	Meters	Feet	Meters	Feet	Meters
General Electric 3.8–154	3.8	87	322	98	506	154	575	175
Nordex 163-5.9	5.9	56	355	108	535	163	624	190
Vestas 163-4.5	4.5	74	322	98	535	163	590	180

4.2.2 Turbine Foundations

Philip Wind plans to use a spread footing foundation design for the turbines. Foundation size will vary based on turbine model and will have a depth of up to 15 feet. Except for approximately 12 inches that will remain aboveground to allow turbine towers to be bolted to the foundations, the foundations will be underground. Turbine foundations will be constructed from concrete and rebar to support the turbine structures. The final foundation designs will be engineered for the specific turbine model, soils, and subsurface conditions at each turbine location and stamped by a registered professional engineer.

4.2.3 Turbine Towers

Turbine towers will be self-supporting, tubular steel towers connected to turbine foundations by anchor bolts. The towers will be painted a non-glare white, off-white, or gray to comply with FAA regulations. Access to the turbines will be through a lockable steel door at the base of each tower. Within the tower, access to the nacelle will be provided by a ladder connecting platforms and equipped with a fall-arresting safety system. The turbine's tubular tower has a 5-foot radius,

surrounded by a 50-foot gravel pad, resulting in a 55-foot radius of long-term disturbance. In total, 14 acres of long-term ground disturbance impact is anticipated to result from site turbine structures.

4.2.4 Turbine Nacelles

Turbine nacelles will house the main mechanical components that transform the wind's kinetic energy into electricity. The nacelle will be connected to the tower by a yaw system. Motors power rotation of the yaw drive assembly consists of a machine base frame mounted on a roller or sliding bearing that is attached to the tower via a bolted yaw ring. The rotation of the yaw drive allows for the turbine to be oriented into the direction of the wind to maximize energy production.

The main components inside the nacelles are the main shaft, gearbox, and generator. Mechanical and/or ultrasonic anemometers and weathervanes will be externally mounted at the rear of the nacelle to provide real-time wind speed and direction data to the controller. Based on the data collected, the turbine yaw system constantly rotates the nacelle, hub, and blades into the wind, while the blade pitch system continuously adjusts the pitch of the blades to optimize the output of the generator based on wind speeds. The gearbox adjusts shaft speed to maintain generator speed in low and high wind speeds.

4.2.5 Turbine Hubs

Turbine hubs will connect the three rotor blades to the main shaft. The hubs will be mounted directly to the main shaft and house three electrically actuated hydraulic blade pitch systems. In addition to optimizing the output of the generator, the pitch systems act as the main braking system for the turbines. Braking under normal operating conditions will be accomplished by pitching the blades perpendicular to the wind. The turbine control system will automatically adjust the pitch of the blades and brake as necessary in high wind conditions. A backup power system ensures the blades can be pitched in the event of grid loss. The control system will also alert the turbine when the wind is strong enough to begin turning the generator and producing electricity at the "cut-in" wind speed. The turbines will also be equipped with a mechanical brake located at the output shaft of the gearbox to stop the hub's rotation in the event of a storm, fault, or maintenance.

4.2.6 Turbine Rotor Blades

Turbine rotor blades will be connected to the hub and capture kinetic energy from the wind. The rotor blades will be non-metallic and equipped with a sophisticated lightning protection system designed to conduct lighting from the receptors at the tip of each blade, down through the blade, hub, and tower, and then finally dissipated via the earthing insulation system incorporated into the foundation.

4.2.7 Turbine Transformers

Electricity produced by the generators will be routed through insulated cables in the power rail to a safety switch and then to a transformer, which will increase the voltage to 34.5 kV. The

transformer may be located internally to the turbine towers or externally at the base of the towers. External transformers will require a small, concrete slab foundation within the gravel area at the turbine base for support. The exact dimensions of the transformers and concrete slab will depend on transformer manufacturer specifications and site-specific engineering requirements. Typically, a pad-mounted transformer has dimensions of approximately 10 feet by 10 feet and a height of 8 feet. After the voltage of the electricity is increased to 34.5 kV, it will be fed into the electrical collection system.

4.2.8 Electrical Collection and SCADA Systems

Electricity will be routed from the turbine transformers to the Collector Substation through an electrical collection system that aggregates the electricity of groups of turbines. The electrical collection system will be comprised of underground collector circuits and aboveground junction boxes as required for connections or splices. The electrical collection system will be designed for operation at 34.5 kV and terminate at the Collector Substation.

Up to 109 miles of underground collector circuits will be installed, depending on the final Project Layout. The footprint of an aboveground junction box, including a gravel pad and bollards, will be up to 5 by 5 feet. In total, less than 1 acre of long-term ground disturbance impact is estimated to site aboveground junction boxes associated with the electrical collection system. A preliminary electrical collection system layout is provided in Figure A-2 in **Appendix A**.

The Project will be monitored by a SCADA system that will provide telemetry, control, and communication among the turbines, Collector Substation, Gen-Tie Line, O&M Facility, ADLS, and transmission system, enabling the Project to be monitored in real-time by technicians as well as staff at a 24/7 off-site operations facility. The SCADA system will utilize fiber optic cables that will primarily be installed concurrently with the electrical collection system.

4.2.9 Collector Substation

The Collector Substation will increase the voltage from the electrical collection system to that of the transmission system at the point of interconnection (230 kV). The Collector Substation will include two 34.5-kV to 230-kV main power transformers, a transformer containment area, control enclosure, overhead bus and associated structures, circuit breakers, disconnect switches, relay panels, surge arresters, battery banks, grounding system, and relaying, metering, and communication equipment. Fencing around the Collector Substation will likely be a chain link design 7 feet high topped with 1 foot of barbed wire to comply with the National Electric Safety Code. The Collector Substation is estimated to have 8 acres of long-term ground disturbance impact. A preliminary Collector Substation location is provided in Figure A-2 in **Appendix A**.

4.2.10 Gen-Tie Line

The Gen-Tie Line will transmit electricity approximately 7 miles from the Collector Substation to the point of interconnection. The Gen-Tie Line will be an overhead 230-kV transmission line of a three-phase, single-circuit, monopole design. H-frame structures may be used where necessary to reduce the height of the structures and to meet code clearances at utility crossings. The final Gen-Tie Line structure types and locations will be determined during final engineering and will be dependent on a variety of constraints, including but not limited to crossing

agreements, environmental constraints, landowner constraints, and geotechnical conditions. The conductor will be sized to carry the electricity of the Project and meet any thermal stability, vibration resistance, or other specific technical criteria required. Fiber optic cable will run the length of the Gen-Tie Line for communications. The Gen-Tie Line will require a 150-foot-wide ROW and is routed on land under long-term lease agreements and easements that allow for the construction of all Project Facilities. The proposed Gen-Tie Line route has been presented to landowners and there was no opposition to the location and is provided in Figure A-2 in **Appendix A.**

Tangent transmission structures will be approximately 80 to 135 feet tall and turning and dead-end transmission structures will be approximately 90 to 150 feet tall. The transmission structures will be single pole or H-frame structures, likely made of weathered steel. Transmission structures will be placed approximately 900 feet apart with conductors approximately 25 to 30 feet above ground level, meeting applicable National Electric Safety Code requirements. Transmission structures will utilize a delta or vertical cross-arm configuration. Transmission structures will either be secured using concrete foundations or directly embedded and backfilled with crushed rock or native soils. Transmission structures that are considered medium angle, heavy angle, or dead-end structures will have concrete foundations. Tangent and light angle structures may be placed on poured concrete foundations or directly embedded. Each directly embedded transmission structure will have approximately 30 to 40 square feet of long-term ground disturbance impact. Each concrete foundation for a transmission structure will have approximately 50 to 110 square feet of long-term ground disturbance impact. In total, the Gen-Tie Line transmission structures are estimated to have less than 0.1 acre of long-term ground disturbance impact.

Bird flight diverters and marking devices specified in the PBA CEFs would be installed on all constructed overhead lines following Avian Power Line Interaction Committee (APLIC) recommendations (APLIC 2006, 2012; see Table 2-3 in **Appendix D**). The markers would be maintained for the life of the Project.

An access road would be required to each structure location for construction, typically to be built within the 150-foot Gen-Tie Line ROW. Details about access roads can be found in **Section 4.2.12**. Typical transmission structure designs are provided in Figure A-3 in **Appendix A**.

In addition, the Project would require the extension of the existing Basin Electric transmission line from its current interconnection point at the Philip Tap to the new Switchyard being constructed by WAPA, approximately 1 mile. This will be permitted by Basin Electric in a separate docket. No other lines would be upgraded as part of the Project.

4.2.11 O&M Facility

The O&M Facility will be a two-story building that would house operating personnel, offices, operations and communication equipment, and storage for parts and maintenance. Construction tools, materials, equipment, and vehicles would be stored at the laydown yard until needed for construction activities. The O&M Facility would include a gravel parking area and an outdoor storage area for larger equipment and materials, which would be fenced in for safety and security. The building would also have running water provided by the existing rural system and a

septic system will be installed. The O&M Facility is estimated to have 5 acres of long-term ground disturbance impact. A preliminary O&M Facility location is provided in Figure A-2 in **Appendix A**.

4.2.12 Access Roads

Where practicable, existing public roads, private roads, and field paths will be utilized to access the Project. Existing roads may require improvements before, during, or after construction. Where necessary, new access roads will be constructed and maintained to facilitate year-round access to the Project. Access roads connected to turbines will be all-weather, gravel surfaced, and approximately 16 feet wide. During construction, access roads may need to be temporarily widened to approximately 40 feet to accommodate transportation of the turbine erection crane and other large construction equipment. Total access road length across the entire Project shall not exceed 44 miles. In total, 84 acres of long-term ground disturbance impact is estimated to site access roads. Preliminary access road locations are provided in Figure A-2 in **Appendix A**.

4.2.13 MET Towers

Up to three MET towers may be installed to acquire wind data to confirm turbine performance. The MET towers will be self-supporting with heights not to exceed the hub height of the turbines. MET towers will be marked and lit as specified by the FAA. Final MET tower locations will depend on the final location of the turbines and specifications of the turbine manufacturer and financing parties. In total, less than 1 acre of long-term ground disturbance impact is estimated to site MET towers. Preliminary MET tower locations are provided in Figure A-2 in **Appendix A**.

4.2.14 ADLS Towers

The Project will comply with FAA marking and lighting standards to promote aviation safety. Turbine nacelles will be equipped with red lights to provide nighttime visibility to pilots. If approved by the FAA, an ADLS will be installed to minimize illumination time of the lights. An ADLS is an automated radar-based system that monitors airspace and activates lighting when an aircraft is detected at or below 1,000 feet above turbine tip height and approaching within 3 miles of a turbine location. When an aircraft exits the detection zone, the ADLS will turn the lights off. Philip Wind will work with the FAA to seek to implement an ADLS that is compliant with SDCL 49-41B-25.2.

ADLS towers are up to 200 feet tall and are equipped with a Doppler X-band radar mounted to the top of the tower. The size of the tower and its foundation design will depend on the tower location and proximal topography. An outdoor cabinet containing ADLS equipment will be located at the base of the tower. The ADLS will be powered by the nearest turbine or local distribution line; a generator may be installed for backup power. If the system is shut down due to an event such as a power outage, turbine lighting will switch to default operational mode, which involves regular lighting per FAA requirements. Equipment at the base of the ADLS towers will be enclosed by fencing, with a footprint of approximately 35 by 35 feet. In total, less than 1 acre of long-term ground disturbance impact is estimated to site three ADLS towers. A preliminary ADLS tower location is provided in Figure A-2 in **Appendix A**.

4.3 Right-of-way or Condemnation Requirements (ARSD 20:10:22:33.02 and 20:10:22:35)

Philip Wind has entered into long-term, voluntary lease and easement agreements for the placement of Project Facilities with private landowners within the Project Area that provide for a total operating period of 30 years. Philip Wind has not requested, nor will it seek to utilize eminent domain powers to acquire easements for the Project. All Project Facilities will utilize private land, federally authorized land, and public road ROWs.

4.4 Wind Energy Facility Construction, Restoration, and Operation and Maintenance Procedures (ARSD 20:10:22:22)

> ***ARSD 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.*

4.4.1 Construction Schedule

Construction of the Project is planned to begin in June 2026 and be completed by the end of 2027, pending successful completion of permitting, agency approvals, and other development and preconstruction activities. Delays in material procurement, etc., could extend the timeframe for commencing operation. **Table 4.4.1-1** identifies the preliminary construction schedule for the Project. The construction schedule may be impacted by events outside of Philip Wind's control, such as unanticipated issues with equipment procurement, contracting, weather, or other scheduling factors.

Table 4.4.1-1. Preliminary Construction Schedule

Activity	Start	End
Construction mobilization	May 2026	
Site Preparation	August 2026	November 2026
Access Roads	August 2026	November 2026
Turbine Foundations	September 2026	April 2027
Electrical Collection System	October 2026	July 2027
Turbine Deliveries	April 2027	August 2027
Turbine Installation	April 2027	August 2027
Turbine Wiring	July 2027	September 2027
Mechanical Completion	July 2027	October 2027
Backfeed	July 2027	July 2027
Commissioning	August 2027	November 2027
Substantial Completion	November 2027	November 2027
Commercial Operations	December 2027	

4.4.2 Mobilization and Site Preparation

The first step in construction will be to survey, stake, and prepare workspaces for clearing. Erosion control measures will be installed in accordance with the Project's SWPPP and applicable permit conditions. Environmentally sensitive areas will be marked off using colored flagging or tape to signify them as avoidance areas. Workspaces will then be cleared and graded, as necessary to provide construction access and the safe movement of equipment and personnel.

Up to three temporary general construction laydown yards will be developed, totaling approximately 35 acres, and will include construction trailers with administrative offices, employee parking, water service, power service, tool sheds, storage containers, and a laydown area for equipment and material delivery and storage. The general construction laydown yards may also include a temporary concrete batch plant to prepare foundations on-site. Following completion of construction, the temporary general construction laydown yards will be restored by removing the gravel and geotextile fabric (if installed), decompacting the subsoil, replacing the stored topsoil, and seeding in accordance with landowner or local agency requests. Preliminary temporary general construction laydown yard locations are provided in Figure A-2 in **Appendix A**.

Appropriate safety measures will be implemented before excavation begins, including notification through the South Dakota One-Call system to ensure third-party utilities are properly marked. During construction activities, dust control measures will be conducted in accordance with the RUA that has been obtained from Haakon County to manage dust along roads, the general construction laydown yard, and other construction workspaces.

Water and sanitary facilities will be established to support the construction crews on-site. Water will be provided from the existing rural water system. Sanitary facilities will be provided in the form of portable latrines. Some construction workspaces and the general construction laydown yard will be fenced as needed to prevent access by wildlife or unauthorized personnel.

4.4.3 Access Roads, Crane Paths, and Public Roads

Up to 44 miles of new access roads will be constructed to connect the Project to public roadways. Access roads will be utilized to access each turbine location, Collector Substation, O&M Facility, MET towers, and ADLS towers. During construction, access roads may need to be temporarily widened to approximately 40 feet to accommodate transportation of the turbine erection crane and other large construction equipment.

Access roads will be constructed by first removing a layer of topsoil and organic material and storing the topsoil. The subgrade will then be compacted and constructed according to civil design requirements. Subgrade work will likely include cement stabilization or other treatments as needed to create a suitable base, such as geotextile fabric and compacted aggregate base course material. Temporary culverts and field approaches will be installed where needed to maintain adequate access and drainage during construction. In total, 122 acres of temporary ground disturbance impact are estimated during construction of site access roads. Following completion of construction, the temporary portions of access roads (122 acres) will be restored by removing the gravel, decompacting the subsoil, replacing the stored topsoil, and seeding in

accordance with landowner or local agency requests. Following construction, access roads would be maintained at 16 feet wide for a permanent disturbance total of 84 acres.

Large construction cranes will be utilized to erect the turbines. Temporary crane paths approximately 75 feet wide on participating land will be utilized between turbine locations to facilitate cross-country movement of the turbine erection cranes. Where cranes are required to travel across sensitive areas (soft ground, roads, pipelines), cribbing, bedding, or mats will be placed to support the weight of the crane, minimizing impacts to the underlying ground. The cribbing, bedding, or mats will be removed immediately following passage of the crane, to be re-used ahead of the crane or elsewhere in the Project Area. Total crane path length is estimated to be approximately 46 miles. In total, 237 acres of temporary ground disturbance impact is estimated during construction to facilitate movement of turbine erection cranes. Following completion of construction, crane paths will be restored by decompacting the soil and seeding in accordance with landowner or local agency requests.

Public roads may require improvements to allow for the safe and efficient access of trailers carrying turbine components and construction equipment to the Project Area. Philip Wind is in the process of identifying the optimal haul route to the Project Area and where existing road improvements may be required. Final haul routes will be selected in consultation with the Haakon County Road Department. Philip Wind will work with the appropriate federal, state, and/or local agencies as necessary to obtain the permits required for these improvements.

4.4.4 Turbines

Philip Wind will initiate the construction of the turbines by clearing, removing, and stockpiling the topsoil and subsoil at each turbine site. Topsoil and subsoil will be stored separately in a semicircle around the turbine foundations. Turbine foundations will be constructed by excavating an approximately 100-foot-diameter hole, placing reinforcing steel, and pouring concrete into the excavation. Next, the subsoil will be replaced over most of the concrete foundation, followed by the topsoil, leaving only the pedestal of the foundation above surface grade.

Philip Wind will clear, grade, and develop an up to 225-foot radius construction workspace around each turbine site, including a 100 by 100-foot crane pad area extending from the access road to the turbine location that will be used to erect the turbine. In total, 296 acres of temporary ground disturbance impact are estimated during construction for installation of the turbine structures. The construction workspace will be used to lay down turbine components and maneuver the turbine erection crane during turbine assembly. Turbine components will be transported to the Project Area by semi-truck and then assembled by the turbine erection crane. The typical assembly process includes the following steps:

1. The tower sections are assembled and bolted to the foundation.
2. The hub and nacelle are mounted on the yaw ring attached to the top tower section.
3. The rotor blades are connected to the hub via anchor bolts, then connected to the main shaft protruding from the nacelle.

Each turbine will require approximately 4 to 5 days to erect. Once installed, Philip Wind will mark and light the turbines to comply with FAA requirements. Following completion of

construction, the temporary construction workspace around each turbine will be restored by decompacting the subsoil, replacing the topsoil, and seeding in accordance with landowner or local agency requests.

4.4.5 Electrical Collection and SCADA Systems

To install the electrical collection and SCADA systems, Philip Wind will trench, plow, or where needed, directionally bore the collector circuits and fiber optic cables underground. Directional boring will be used in locations where circuits and cables cross wetlands, waterways, and sensitive environmental features. Trenching and plowing are anticipated to be the primary methods of installation. Where trenching is appropriate, topsoil and subsoil will be excavated and segregated prior to installation. In total, 411 acres of temporary ground disturbance impact is estimated during construction for installation of the electrical collection and SCADA systems. After installation, subsoil will be backfilled, followed by topsoil, to preserve soil stratification and continued agricultural use, as appropriate. Collector circuits will be installed at least 48 inches below ground surface and buried with marking tape and tracer wire. Philip Wind will register the appropriate underground facilities with the South Dakota One-Call system.

4.4.6 Collector Substation

The Collector Substation will require civil and grading work to prepare for construction and create positive drainage for the facility. Grounding, conduit, foundations, and base aggregate will be installed prior to aboveground construction of bus work and installation of major electrical equipment. All associated safety, electrical, and controls equipment will be installed using applicable utility standards. Pre-operational testing will begin once the system(s) are energized. Once the Project is fully operational, all systems will be rechecked and final site civil work completed. All ground disturbance associated with the Collector Substation is not anticipated to exceed 8 acres.

4.4.7 O&M Facility

The O&M Facility will require civil and grading work to prepare for construction and create positive drainage for the facility. Construction of the O&M Facility will be similar to that of a small-scale commercial building, adhering to the same building codes and safety regulations. Gravel aggregate will be installed to create the O&M Facility storage area, which will house the equipment necessary to operate and maintain the Project. Water will be supplied from the existing rural water system and a septic system will be installed. All ground disturbance associated with the O&M Facility will be long-term and is not anticipated to exceed 5 acres; therefore, no temporary ground disturbance is anticipated for installation of the O&M Facility.

4.4.8 MET Towers

MET towers will be erected using a crane and bolted to 10 by 10-foot concrete foundations. A 150-foot radius temporary construction workspace will be required for installation of each MET tower. In total, 4 acres of temporary ground disturbance impact during construction is estimated to install three MET towers. MET towers will comply with all FAA marking and lighting requirements.

4.4.9 ADLS Towers

ADLS towers will be erected using a crane, depending on the final height of the towers. Foundation sizing will depend on the final height of the towers. A 150-foot radius temporary construction workspace will be required for installation of each ADLS tower. In total, 4 acres of temporary ground disturbance impact during construction is estimated to install three ADLS towers. A validation aircraft will be flown after installation to confirm design performance and operational safety of the ADLS.

4.4.10 Restoration Procedures

Following completion of construction, all temporary construction workspaces will be cleaned up and restored to preconstruction conditions pursuant to the lease and easement agreements. Construction workspaces will be restored by removing gravel (where applicable unless the landowner requests the gravel remain), decompacting the subsoil, and replacing stored topsoil. Where necessary, temporary and permanent stabilization measures will be implemented, including mulching, seeding with an appropriate seed mix, and installing slope breakers. Erosion control practices will be maintained until disturbed areas are stabilized.

4.4.11 Operation and Maintenance Procedures

Philip Wind will manage O&M of the Project. The Project will have a full-time staff of up to 12 positions that include technicians, a facility manager, and other personnel as necessary. On-site O&M activities include routine inspections, regular preventative maintenance, and unscheduled maintenance and repair to Project Facilities.

All major components of turbines will undergo routine maintenance in accordance with the schedules established by the OEM. Examples of such activities include lubrication filter replacements, gear oil changeouts, adding coolant, greasing, and applying paints or coatings for corrosion control. Over the life of a turbine, some mechanical components may also require repair or replacement.

Other O&M activities include snow removal, regrading, and gravel replacement on access roads, routine electrical inspections, and the application of herbicides to control noxious and invasive weeds. Philip Wind will also conduct routine preventative maintenance testing of on-site emergency power generators and maintain fuel levels of on-site propane and fuel tanks.

As described in **Section 4.2.8**, the Project will be monitored by a SCADA system that will provide telemetry, control, and communication among the turbines, Collector Substation, Gen-Tie Line, O&M Facility, ADLS, and transmission system, enabling the Project to be monitored in real-time by technicians as well as by staff at a 24/7 off-site operations facility. O&M staff will be on-site during normal working hours to monitor operations and conduct maintenance activities. Philip Wind will communicate regularly with local first response agencies and coordinate training meetings in accordance with the Project's Emergency Response Plan (ERP) once established. Should any aspect of the Project construction or operations present unfamiliar situations for first responders, Philip Wind will arrange for adequate professional training to address those concerns.

4.5 Transmission Facility Construction, Restoration, and Operation and Maintenance Procedures (20:10:22:34)

ARSD 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.*

4.5.1 Mobilization and Site Preparation

Construction of an overhead transmission line generally follows a sequence of preconstruction surveying, ROW clearing, mat placement (if necessary), foundation installation, structure assembly and erection, conductor and shield wire installation, ground rod installation, and site restoration and demobilization.

Surveyors will stake the construction ROW and transmission structure locations in preparation for the construction crew. Erosion control measures will be installed in accordance with the Project's SWPPP and applicable permit conditions. Environmentally sensitive areas will be marked off using colored flagging or tape to signify them as avoidance areas. Workspaces will then be cleared and graded, as necessary, to provide for construction access and safe movement of equipment and personnel. Temporary culverts and field approaches will be installed where needed to access the construction workspace and to maintain adequate access and drainage during construction. Appropriate safety measures will be implemented before excavation begins, including notification through the South Dakota One-Call system to ensure third-party utilities are properly marked.

Water and sanitary facilities will be established to support the construction crews on-site. Water will be provided from the rural water system and sanitary facilities will be provided in the form of portable latrines. Some construction workspaces and the general construction laydown yard may be fenced as needed to prevent access by wildlife or unauthorized personnel.

4.5.2 Gen-Tie Line Construction Procedures

Transmission structures are generally designed for installation at existing grades. Typically, structure sites with 10% or less slope will not be graded or leveled. Sites with more than 10% slope will have working areas graded level or fill brought in for working pads. Philip Wind anticipates that only minimal grading will be required for the Gen-Tie Line because the ROW has very little elevation change. Where grading is required, topsoil will be removed and stored for replacement after construction is complete. Construction mats may be placed in wet or soft soil locations and in narrow ditches to minimize disturbance.

The general construction laydown yard required for construction of the wind energy facility will be shared with the transmission facility. Transmission structures will be delivered to staging areas, sorted, and loaded onto structure trailers for delivery to the staked locations. When it is time to install the structures, the structures will be delivered to the staked location and placed within the Gen-Tie Line ROW until the structure is set. Insulators and other hardware will be attached while the structure is on the ground.

Transmission structures will either be secured using concrete foundations or directly embedded and backfilled with crushed rock or native soils. Transmission structures that are considered medium angle, heavy angle, or dead-end structures will have concrete foundations. Concrete foundation installation involves excavating and placing temporary steel casing, rebar, concrete and anchor bolt cages. The base of concrete foundations typically projects 1 to 2 feet above surface grade. Tangent and light angle structures may be placed on poured concrete foundations or directly embedded. Direct embedding involves drilling or digging a hole for each structure, filling the hole partially with crushed rock, and then setting the structure on the top of the rock base. The area around the structure is then backfilled with crushed rock or soil once the structure is set. Any excess soil from the excavation will be spread and leveled near the structure. Foundations may vary from approximately 3 to 8 feet in diameter and 20 to 30 feet or more in depth, both dimensions will depend on soil conditions observed during final geotechnical investigation.

For the medium angle, heavy angle, and dead-end structures, after the concrete foundation is set and properly cured, the structure will be assembled on the ground, erected, and then bolted to the foundation. For larger structures, the bottom section is bolted to the foundation independently and the upper structures are attached from the top down using a crane. For tangent and light angle structures, if the structure is placed on a poured concrete foundation assembly and erection will follow the same process as medium angle, heavy angle, and dead-end structures. If the structure is directly embedded, the structure will be assembled on the ground then installed into the hole prepared for the structure.

Conductor and shield wire installation will require temporary access to each structure to secure and string the wires between structures. Temporary guard or clearance structures will be installed as needed over existing distribution or communication lines, roads, waterways, or other obstructions after the necessary notifications are made or permits obtained. This effort will protect the wires from damage and ensure that installation will not obstruct traffic or contact existing energized distribution conductor or other overhead cable. Access to the Gen-Tie Line ROW will be made directly from existing roads that run parallel or perpendicular to the ROW. In some situations, private field or access roads may be used. In all cases where construction traffic and activities are within close proximity to state, county, or local roadways, the construction contractor will coordinate with the governing body on traffic control and safety measures.

Construction of the Gen-Tie Line will occur within the 150-foot ROW. The entire Gen-Tie Line ROW width may be temporarily disturbed in select locations for structure setting, stringing areas, and vegetation clearing. Any vegetation inconsistent with the safe and reliable construction, operation, and maintenance of the Gen-Tie Line will be removed and will not be allowed to revegetate. In total, 82 acres of temporary ground disturbance impact is expected to install the Gen-Tie Line and less than 1 acre of ROW would be retained for construction of the O&M Facility.

4.5.3 Gen-Tie Line Restoration Procedures

During construction, crews will limit ground disturbance wherever possible. However, areas will be disturbed during the normal course of work. Philip Wind will take steps to lessen the impact of the Gen-Tie Line on the surrounding environment by restoring areas disturbed by construction

in accordance with BMPs and the Project's permit conditions. Following completion of construction, all temporary construction workspaces will be cleaned up and restored to preconstruction conditions pursuant to the lease and easement agreements. Construction workspaces will be restored by decompacting the subsoil and replacing stored topsoil, where applicable. Where necessary, temporary and permanent stabilization measures will be implemented, including mulching, seeding with an appropriate seed mix, and installing slope breakers. Erosion control practices will be maintained until disturbed areas stabilized. Provided that the Gen-Tie Line ROW is on lands predominantly used for row crop agriculture, following construction of the Gen-Tie Line, landowners will be able to continue use of their land in accordance with their land management programs to the extent that it does not interfere with Project operations.

4.5.4 Gen-Tie Line Operation and Maintenance Procedures

Transmission lines are designed to operate for decades and typically require minimal maintenance. The transmission facility may remain in use or be repurposed after the operational life of the wind energy facility. Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent.

Inspections will be conducted to ensure that the Gen-Tie Line is fully functional and in compliance with utility best practice prescribed clearances. During operation, vegetation in the Gen-Tie Line ROW will be maintained to avoid interference with the conductors, allow for ground-based inspection, and enable access to the transmission structures when maintenance is required. Vegetation management may include activities such as tree pruning, tree removal, mowing, and mastication. Herbicides will be used to control noxious and invasive weeds as required. Agricultural land uses will be allowed to resume post-construction around the structures.

5. Alternative Sites and Siting Criteria (ARSD 20:10:22:12)

> ***ARSD 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, wind energy, 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.*

Development of a wind energy facility is an iterative process that involves site identification, Project Area refinement, and micrositing of Project infrastructure. Wind energy facilities must be located in an area where landowners are willing to grant leases and easements on commercially reasonable terms and conditions and where land use provides sufficient space for optimum turbine spacing. Additionally, access to electric transmission must be available so that the power generated by the facility can be delivered to the grid. The following sections describe the criteria that were considered in determining the development potential of the site, identifying the appropriate Project Area to develop, and designing the Project Layout within the Project Area.

5.1 Project Area Selection

The general location of the Project is situated in an area of "excellent" wind energy resource with "high suitability" for wind energy development (WAPA and USFWS 2015). When Invenergy acquired Philip Wind (and with it the Project) from Southern Power Company in September 2019, the former Project Area encompassed approximately 71,000 acres and was designed with a layout focused on maximizing energy production. Since Invenergy's acquisition of Philip Wind, Invenergy has modified the Project Area to address comments from regulatory agencies and the public to avoid, minimize, or mitigate potential adverse impacts to environmental resources based on collected field data. For example, through design refinements, Philip Wind has shifted all turbine locations to avoid unbroken grasslands within the Project Area.

Philip Wind selected the Project Area based primarily on:

- Available wind energy resource;
- Access to transmission infrastructure suitable for interconnection;
- Land use and environmental compatibility with wind energy development; and
- Landowner and community support for wind energy development.

5.1.1 Wind Resource

A strong wind resource is key for development of a competitive, economically viable wind energy facility. To obtain an accurate representation of the wind resource within the Project Area, Philip Wind performed a comprehensive analysis incorporating the following data:

- On-site data collected at five temporary MET towers;
- Project Area topographic and land cover data;
- 91 proposed turbine locations;
- Turbine locations from operational wind energy facilities in the area and respective turbine technology power curves;
- Power curves from OEMs for the turbine models under consideration; and
- State standards.

Results of the wind resource analysis determined the Project Area to have a strong wind resource suitable for the Project. Wind resources in the Project Area surpass those of an average site in the upper Great Plains, giving the Project a competitive advantage in the region. Areas with an annual average wind speed of approximately 6.5 meters per second (m/s) and over 80 meters (m) in height are typically considered to be ideal for wind energy development. According to the National Renewable Energy Laboratory (2023), wind resources within the Project's region range from 6.0 to 9.0 m/s at a 100-m hub height, making it a highly favorable wind resource for economical, sustainable, and reliable production of power. The proposed hub heights of the turbine models under consideration for the Project are well positioned to capitalize on the anticipated wind resource.

5.1.2 Interconnection

Access to transmission infrastructure suitable for interconnection and market access is critical for the development of a wind energy facility. A new Switchyard will be constructed by WAPA at the northeast corner of the Project Area along South Dakota Highway 73 and 213th Street. The Switchyard's location would be approximately 1 mile east of the existing Philip Tap (see Figure A-2 in **Appendix A**), which is the interconnection point for the Basin Electric 23-kV transmission line to WAPA's Oahe to New Underwood 230-kV transmission line. To accommodate both the existing Basin Electric interconnection and the Project interconnection, and to improve access to the Switchyard, WAPA proposes to construct the new Switchyard at the more accessible location within the Project Area. This location was also selected by WAPA to minimize environmental impacts such as tree clearing, and to accommodate existing uses on some of the lands. The Switchyard would replace the existing Philip Tap, and both the Project and the Basin Electric transmission lines would interconnect at the proposed Switchyard. The electricity generated by the Project will be transmitted onto the grid operated by SPP where it will contribute to meeting electricity demand across the SPP service territory.

5.1.3 Land Use and Environmental Compatibility

The Project Area was selected following a review of regional land use and environmental constraints. The Project is compatible with the existing primarily agricultural land uses in the Project Area. Wind energy facilities are particularly compatible with agricultural land because

crops can be grown, and livestock can graze, up to the turbines, transmission structures, and other aboveground Project Facilities. Wind energy facilities enable agricultural operators to diversify their operations with minimal disruption to existing agricultural uses.

Once the initial site had been selected, the Project Area was refined over time, based on landowner interest, as well as considerations for avoidance of sensitive environmental resources based on consultations with federal and state agencies. Philip Wind has voluntarily followed the USFWS *Land-Based Wind Energy Guidelines* (WEG) (USFWS 2012) and the USFWS Region 6 *Wildlife Buffer Recommendations for Wind Energy Projects* (USFWS 2020a) to minimize risks to species of concern.

5.1.4 Public Outreach and Communication

Philip Wind recognizes the importance of community outreach and engagement in the siting and development process. Philip Wind's outreach efforts have included meeting with landowners, state and federal agencies, Haakon County officials, and the general public to discuss the Project. Through these engagements, Philip Wind has solicited and incorporated feedback into the Project's design, permitting, construction, and operation plans. Below is a summary of public outreach efforts since March 2017.

- Landowners: Project representatives have been meeting with landowners on both an individual and group basis to discuss the Project since 2017. Participating landowners have received welcome packets, update mailings, and notification letters since joining the Project. Announcements for scoping meetings for the Draft EA were published in the local Pioneer Review newspaper and sent to all landowners. Comment submissions were received by two landowners during public scoping and the public comment review period for the Draft EA.
- Tribes: Philip Wind supported WAPA's consultation with interested Tribes. Representatives from Tribes participated in 2018 cultural resource surveys and were invited to participate in 2023 surveys.
- State and Federal Agencies: Project representatives have held consultations with staff from the Commission, USFWS, South Dakota State Historical Society (SDSHS), SHPO, SDGFP, and the South Dakota Department of Agriculture and Natural Resources (SDDANR) to discuss the Project. Further details regarding Philip Wind's agency coordination are provided in **Section 22.2**.
- Haakon County officials: Project representatives made presentations to the Haakon County Commissioners, Board of Adjustment, and Haakon County Highway Department, and engaged with many members of county and City of Philip staff to discuss the Project.
- Local Stakeholders: Haakon County Conservation District, Haakon County Historical Society, Midland Historical Society, and West River Historical Society were contacted during the EA scoping process.
- State Stakeholders: The Governor's Office of Economic Development, South Dakota House of Representatives District 27, South Dakota Office of the Governor, South Dakota School and Public Lands, and South Dakota Senate District 27 have been contacted throughout the development process, and during the EA scoping process.
- Online: Philip Wind maintains a website (https://philipwind.invenergy.com) to provide additional information about the Project and create another opportunity for members of the public to contact the Project.

Philip Wind is committed to delivering community-centered benefits. During the development of the Project, this commitment has been demonstrated through the following initiatives:

- Membership in the Philip Chamber of Commerce
- Annual sponsor of the Philip Bronc Match
- Annual sponsor of Scotty Philip Days
- Regular donations to the Philip Volunteer Fire Department

5.2 Project Layout & Site Configuration Alternatives

The Project Layout includes 91 proposed turbine locations. The Project Layout reflects an optimal configuration for a competitive Project within the Project Area, while avoiding or minimizing impacts to residences, cultural resources, wetlands, waterways, grasslands, and sensitive species and their habitats. As discussed in **Section 1.2**, since Invenergy acquired Philip Wind, it has conducted substantial agency coordination and environmental analysis; as a result of that multi-year effort, the Project Area and facility locations have been refined to further avoid and minimize impacts to sensitive resources, while complying with state and county siting requirements. For example, four turbine locations were removed from the layout due to proximity to prairie grouse leks and Tier 3 modeled priority sharp-tailed grouse habitat, and six turbine locations were relocated to comply with BMPs identified in the UGP PEIS. Further, in response to SDGFP's priority in working to avoid fragmenting intact grasslands, Philip Wind shifted all turbine locations to avoid unbroken grasslands. Philip Wind also consulted the SDGFP's South Dakota Environmental Review Tool (SDGFP 2025), specifically the Conservation Planning layers of the Greater Prairie-Chicken Habitat Prioritization and the Sharp-tailed Grouse Habitat Prioritization layers and the Conservation Planning–Lands & Waters–Undisturbed Lands layer, to inform revising the Project boundary, and revised Project impacts planned within the Project boundary. Figure A-9 in **Appendix A** includes the Project boundaries over the years as data was collected, feedback acted upon which resulted in revisions to the Project boundary, and refinements in the layout. Tens of thousands of acres of lands were removed from the Project Area and thousands of additional acres were deliberately pursued due to the land having fewer environmental constraints. As an additional example, with the goal of minimizing risk of impact to whooping cranes, and their potential stopover habitat, Philip Wind removed 47,278 acres of the 71,000 acres of the Project Area from consideration to site turbines by avoiding siting turbines within 1,000 feet of wetlands with a score of 4–11 in The Watershed Institute (TWI) Wetland Suitability Model (TWI 2012), and 0.5 mile of wetlands with a TWI score of 12–14. The various citing constraints and resources avoided are detailed in Figure A-4 of **Appendix A.**

Over the years, Philip Wind has taken feedback from SDGFP, USFWS, WAPA stakeholders, Tribal representatives, community stakeholders, landowners, and the available energy resource into consideration in establishing the Project boundary and the Project Layout within the boundary. Philip Wind believes the Project Layout presented in this Application best minimizes impacts to humans and the environment, while complying with all applicable requirements.

Applicable state siting requirements for wind energy facilities are provided in **Table 5.2-1**. The setbacks described below are measured from the outer wall of the turbine. Final design of the

Project will ensure that all turbine locations comply with the state setback requirements. Haakon County is unzoned and has no siting requirements for wind facilities.

Table 5.2-1. State Siting Requirements	
Type	**Requirement**
Setbacks*	Turbines shall be set back at least 500 feet or 1.1 times the height of the tower, whichever is greater, from any surrounding property line, unless the owner of the wind turbine tower has a written agreement with an adjacent landowner allowing the placement of the tower closer to the property line.

* Per SDCL 43-13-24.

The buildable area for turbines, after incorporating the siting requirements in **Table 5.2-1** as well as additional siting constraints, is visually depicted on the turbine siting constraints map provided in Figure A-4 in **Appendix A** and described in Table 1-1 in **Appendix C** (Table 1-1 from the EA).

5.3 Lack of Reliance on Eminent Domain

Philip Wind has entered into long-term, voluntary lease and easement agreements with private landowners within the Project Area. These lease and easement agreements provide for the placement of all Project Facilities and an operating period of 30 years. All Project Facilities will be sited on private land or within public ROW. Philip Wind has not requested, nor will it seek to utilize, eminent domain powers to acquire easements for the Project. As a result, selection of an alternative site would not further reduce reliance on eminent domain powers.

6. Environmental Information (ARSD 20:10:22:13)

> ***ARSD 20:10:22:13. Environmental information.*** *The applicant shall provide a description of the existing environment at the time of the submission of the application, estimates of changes in the existing environment which are anticipated to result from construction and operation of the proposed facility, and identification of irreversible changes which are anticipated to remain beyond the operating lifetime of the facility. The environmental effects shall be calculated to reveal and assess demonstrated or suspected hazards to the health and welfare of human, plant and animal communities which may be cumulative or synergistic consequences of siting the proposed facility in combination with any operating energy conversion facilities, existing or under construction. The applicant shall provide a list of other major industrial facilities under regulation which may have an adverse effect on the environment as a result of their construction or operation in the transmission site, wind energy site, or siting area.*

Sections 7 through 15 provide descriptions of the existing environment at the time of Application submittal and the potential changes to the existing environment that are anticipated to result from the construction and operation of the Project. These sections also identify the impact avoidance, minimization, and mitigation measures that will be implemented for the Project. The long-term impacts of the Project will not result in irretrievable changes to land use, because the land will be restored to its preconstruction condition to the extent practicable

following decommissioning of the Project (**Section 18**; **Appendix E**). As discussed in **Section 1.2**, the Project has been the subject of multi-year agency coordination and has undergone WAPA's environmental review process in accordance with NEPA, resulting in the issuance of an EA and a FONSI. As applicable, information from the EA and FONSI are incorporated into the following sections of the Application.

There are no other operating wind energy facilities that are in proximity to the Project Area. The closest wind energy facility is the Willow Creek Wind Energy Project, which is almost 100 miles away (Commission 2024; Hoen et al. 2018).

The Project will result in the operation of up to 87 wind turbines and associated access roads, collection lines, and other Project Facilities in Haakon County. Based on the information gathered by Philip Wind, the Project will not have a significant impact on the community or environment. The Project has been sited in accordance with applicable state requirements to avoid and minimize impacts on the community and the environment. These requirements impose restrictions on each project related to setbacks, lighting, and other factors that may impact the local environment.

Table 6-1 estimates both the construction-related (temporary) and operational (long-term) ground disturbance impacts expected by Project Facility type. For the purpose of analyzing environmental impacts in this Application, all 91 proposed turbine locations shown in Figure A-2 in **Appendix A** are included. Because the impact calculations include all proposed 91 turbine locations, the impact calculations likely overestimate the actual Project impacts. Temporary and long-term impacts for upgrades to existing roads will depend on final engineering and conditions in the Haakon County RUA.

Table 6-1. Summary of Project Ground Disturbance Impacts

Project Facility[a]	**Construction Impacts (Temporary)**		**Operational Impacts (Long-Term)**	
	Dimensions	**Total Acreage**	**Dimensions**	**Total Acreage**
Turbines	225-foot radius	296	55-foot radius	14
Electrical Collection and SCADA Systems[b]	Up to 109 miles	411	5 × 5 feet per junction box	<1
Collector Substation	600 × 600 feet	8	600 × 600 feet	8
Gen-Tie Line[c]	150 feet wide	82	14-inch radius per pole	<1
O&M Facility	N/A	0	470 × 470 feet	5
Access Roads[d]	40 feet wide	122	16 feet wide	84
MET Towers[e]	150-foot radius	4	35 × 35 feet	<1
ADLS Towers[f]	150-foot radius	4	35 × 35 feet	<1
Crane Paths[g]	75 feet wide	237	N/A	0
Temporary Laydown Yards	1 approximately 810 × 810 feet 2 approximately 660 × 660 feet	35	N/A	0
Total[h]		**1,199**		**115**

[a] Ground disturbance impact calculations are estimated based on all 91 proposed turbine locations and associated facilities.

[b] Temporary ground disturbance dimensions refer to the width of a single collector circuit. When collector circuits are installed in parallel, temporary ground disturbance impacts will be adjusted to account for each collector circuit being spaced approximately 15 feet apart. Temporary ground disturbance impacts are estimated based on 109 miles of underground collector circuits installed using a trenching methodology. Use of directional boring in select locations will reduce temporary ground disturbance impacts. Long-term ground disturbance impacts are estimated based on 50 aboveground junction boxes.

[c] Temporary ground disturbance impacts are estimated based on impact to a 200-foot width for the length of the Gen-Tie Line ROW.

[d] Ground disturbance impact calculations are estimated based on the type of Project Facility connected to the access road. Total access road length across the entire Project is estimated to be approximately 44 miles. Temporary ground disturbance impacts due to turn radii during component delivery are included.

[e] Ground disturbance impact calculations are estimated based on installation of three MET towers.

[f] Ground disturbance impact calculations are estimated based on installation of three ADLS towers.

[g] Ground disturbance impacts are estimated based on 46 miles of crane paths.

[h] Total impacts may be overestimated due to overlap of impact footprints.

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

ARSD 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 or wind energy site or through which the transmission facility will pass;
(2) A topographic map of the plant, wind energy, or transmission site;
(3) A written summary of the geological features of the plant, wind energy, 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 plant, wind energy, or transmission site;
(5) A description of the soil type at the plant, wind energy, or transmission site;
(6) An analysis of potential erosion or sedimentation which may result from site clearing, construction, or operating activities and measures which will be taken for their control;
(7) Information on areas of seismic risks, subsidence potential and slope instability for the plant, wind energy, 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.

7.1 Geological Resources

7.1.1 Existing Geological Resources

This section describes the regional landforms, surficial geology, bedrock geology, economic deposits, seismic risk, and subsidence potential within the Project Area.

7.1.1.1 Regional Landforms/Physiography

The Project Area is located within the Northwestern Great Plains Level III ecoregion of the Western Central Semiarid Prairies Level II ecoregion of the Great Plains Level I ecoregion. The Northwestern Great Plains region is typically characterized by semiarid rolling plains of shale, siltstone, and sandstone interrupted intermittently by buttes and badlands (U.S. Environmental Protection Agency [EPA] 2024). These features formed due to erosion of softer underlying bedrock through actions of wind and water along tributaries to the Cheyenne and Bad Rivers. The Project Area has a variable drainage pattern but typically drains northward to West Plum Creek to the northeast and Bridger Creek to the northwest. The depth to bedrock in the Project Area ranges from 50 centimeters (cm) to greater than 200 cm (Natural Resources Conservation Service [NRCS] 2023).

Rangeland is common in this ecoregion with pockets of native prairies still persisting in areas of steep or broken topography. Topographic relief within the Project Area is moderate with site elevations ranging from approximately 2,270 to 2,806 feet above mean sea level.

7.1.1.2 Surficial Geology

The Project Area mainly consists of Pierre Shale (46,586 acres) and Fox Hills Sandstone (15,824 acres) (**Table 7.1.1.2-1**; Figure A-5 in **Appendix A**). Locally, Fox Hills Sandstone contains mostly sandy sequences with some thin zones of coal-bearing beds and gradates rapidly into the underlying Pierre Shale (Waage 1968).

Table 7.1.1.2-1. Geological Units in the Project Area

Geological Unit*	Period	Description	Area (acres)	% of Proposed Project Area
Alluvium	Quaternary	Clay, boulder-sized clasts with locally abundant organic material. Thickness is up to 75 feet (23 m).	1,734	3%
Eolian deposits	Quaternary	Silt to medium-grained sand. Deposited as sand sheets; barchan, linear and dome-like dunes; and as veneer on uplands. Includes the Sand Hills Formation. Thickness up to 300 feet (91 m).	4,174	6%
Fox Hills Sandstone	Cretaceous	Blueish-green to green, white to dark-gray, and yellow to tan, carbonaceous and iron-stained, cross-bedded, very fine- to coarse-grained, glauconitic sandstone and siltstone. Interbedded with gray and green to brown shale and silty shale. Thickness 25–400 feet (8–122 m).	15,824	23%

Table 7.1.1.2-1. Geological Units in the Project Area				
Geological Unit*	**Period**	**Description**	**Area (acres)**	**% of Proposed Project Area**
Pierre Shale	Cretaceous	Blue-gray to dark-gray, fissile to blocky shale with persistent beds of bentonite, black organic shale, and light brown chalky shale. Contains minor sandstone, conglomerate, and abundant carbonate and ferruginous concretions. Thickness up to 2,700 feet (823 m).	46,586	68%
Total			**68,318**	**100%**

Source: Martin et al. (2004).

* In descending stratigraphic order (youngest to oldest).

7.1.1.3 Bedrock Geology

Bedrock geology in the Project Area mainly consists of Pierre Shale, a blue-gray to dark-gray Upper Cretaceous shale composed of beds of bentonite, black organic shale, and light brown chalky shale. Pierre Shale also contains minor sandstone, conglomerate, and abundant carbonate and ferruginous concretions, with a thickness of up to 2,700 feet (Martin et al. 2004). Fox Hills Sandstone is also prevalent across the Project Area (see **Table 7.1.1.2-1**). Another Upper Cretaceous shale, the Fox Hills Sandstone is a bluish-green to green, white to dark-gray, and yellow to tan shale cross-bedded with very fine- to coarse-grained, glauconitic sand- and siltstone (Martin et al. 2004). The Fox Hills Sandstone is also interbedded with gray and green to brown shale and silty shale (see **Table 7.1.1.2-1**). Other geological units present in the Project Area make up < 10% when combined and include Quaternary alluvial and eolian deposits (see **Table 7.1.1.2-1**). Bedrock outcrops may exist at the surface in places but are likely to be weathered and eroding into unlithified soils.

7.1.1.4 Mineral Resources/Economic Deposits

Commercially viable mineral deposits in Haakon County are limited to sand and gravel. Combined information from the SDDANR Minerals and Mining Program and a review of U.S. Geological Survey (USGS) USMIN Mineral Deposit Database data on prospect- and mine-related features on USGS topographic maps indicates no sand/gravel pit sites are present within the Project Area (SDDANR 2024a; USGS 2006). The closest gravel pit to the Project Area is approximately 14 miles south (USGS 2023a).

A review of the online information from the SDDANR Oil and Gas Initiative Program verifies that the Project Area is not within a known oil or gas field as most of the current and historic oil and gas development occurs further west in the state. Of note, there are two oil wells within the Project Area that are now plugged and abandoned. The nearest identified oil and gas fields are the Faith field and Lantry field, located approximately 45 miles northwest and northeast of the

Project Area respectively (SDDANR 2024b). No other active or historical economic mineral deposits exist within the vicinity of the Project.

7.1.1.5 Seismic Risk

The risk of seismic activity near the Project Area is extremely low. According to the USGS 2014 Seismic Hazard Map for the United States, a 2% chance exists for an earthquake to occur within the Project Area in the next 50 years (i.e., a recurrence interval of 2,500 years) that would result in a peak ground acceleration (PGA) of between 4% and 6% of gravity (0.04–0.06 gram). The USGS also estimates a 10% chance exists for an earthquake to occur within the Project Area in the next 50 years (i.e., a recurrence interval of 475 years) that would result in a PGA of between 0.02 and 0.03 gram (Petersen et al. 2015). For reference, a PGA of 0.1 gram is generally considered the minimum threshold for damage to older structures or structures not made to resist earthquakes and a PGA below 0.01 gram is considered unfelt. According to the short-term induced seismicity 1-year models, the chance of potentially minor damage ground shaking in 2018 in the Project Area is less than 1% (USGS 2018). According to the South Dakota Geological Survey (SDGS), no earthquakes have been recorded in Haakon County from 1872 to 2022, though earthquakes were recorded in adjacent counties (i.e., Pennington, Jackson, Jones, and Stanley) (SDGS 2023). There are no active faults or earthquakes recorded in Haakon County, South Dakota (SDGS 2023; USGS 2023b).

7.1.1.6 Subsidence Potential

The potential for subsidence and slope instability is considered negligible because the bedrock underlying the Project Area is not known to develop karst topography or contain layers susceptible to dissolution by water. There are no reclaimed or underground mining operations in the Project Area (USGS 2023a). Landslide incidence is low, but susceptibility is high, which can result in slumping especially along steep slopes, in channel cuts, or during excavations (Radbruch-Hall et al. 1982).

7.1.2 Geological Resources Impacts/Mitigation

Construction and operation of the Project is unlikely to impact geological resources and BMPs related to geology would include planning the placement of turbines and access roads to minimize geological risk. The geologic conditions within the Project Area are appropriate for the construction of the Project. Excavation, bearing, and groundwater conditions associated with the underlying unconsolidated materials, Pierre Shale, Fox Hills Sandstone, and other sedimentary bedrock in the Project Area are anticipated to be conducive to construction and operation of the Project Facilities. Geotechnical borings will be completed, and soil samples will be tested to determine the engineering characteristics of the site subgrade soils and develop Project Facility-specific design and construction parameters. As discussed in **Section 18**, the Project will be decommissioned after the end of the operational life of the Project. After decommissioning is complete, portions of underground Project Facilities will be abandoned in place; however, these remaining facilities will not result in irreversible changes to the underlying geological conditions of the Project Area.

Due to the limited developed or potential economic mineral resources within the Project Area, the construction and operation of the Project poses no impact to economic mineral resources. Therefore, no mitigation is required for impacts to mineral resources. Additionally, geologic hazards, such as seismicity, are expected to be extremely low to negligible in the Project Area. Due to the limited probability of significant seismically induced ground movements, the Project faces minimal risk of earthquake-related impacts. Therefore, no additional mitigation beyond adhering to prevailing industry specifications will be necessary.

7.2 Soil Resources

7.2.1 Existing Soil Resources

7.2.1.1 Soil Types

The soils within the Project Area generally consist of clay to silty clay textures derived from weathering of underlying shale and siltstone bedrock (National Cooperative Soil Survey 2023). These soils are moderately susceptible to rill erosion and can lose on average 5 tons of soil through water and wind erosion without affecting crop productivity (NRCS 2023). Other soil properties include a low resistance and medium susceptibility to compaction and are moderately well drained (NRCS 2023). The depth to bedrock in the Project Area ranges from 50 cm to greater than 200 cm (NRCS 2023).

Table 7.2.1.1-1 lists the soil types comprising over 1% of the Project Area and their characteristics.

Table 7.2.1.1-1. Soil Types Within the Project Area							
Soil Type	**Soil Taxonomy**	**Soil Texture**	**Parent Material**	**Natural Drainage Class**	**Depth to Restrictive Feature (inches)**	**Acres in Project Area**	**Percent of Project Area**
Ottumwa silty clay, 3 to 6 percent slopes	Fine, smectitic, mesic Vertic Haplustolls	Silty clay	Clayey alluvium and/or clayey residuum weathered from shale	Well drained	More than 80 inches	24,394	35.7%
Ottumwa-Lakoma silty clays, 6 to 9 percent slopes	Fine, smectitic, mesic Vertic Haplustolls	Silty clay	Slope alluvium	Well drained	45 to 62 inches	6,650	9.7%
Savo silt loam, 2 to 6 percent slopes	Fine, smectitic, mesic Aridic Argiustolls	Silt loam	Silty alluvium	Well drained	More than 80 inches	4,092	6.0%
Ottumwa-Lakoma complex, 3 to 6 percent slopes	Fine, smectitic, mesic Vertic Haplustolls	Silty clay	Alluvium	Well drained	45 to 62 inches	4,029	5.9%
Kirley-Ottumwa complex, 2 to 6 percent slopes	Fine, smectitic, mesic Vertic Argiustolls	Silty clay	Clayey alluvium	Well drained	More than 80 inches	3,834	5.6%
Ottumwa-Capa complex, 0 to 3 percent slopes	Fine, smectitic, mesic Vertic Haplustolls		Clayey alluvium and/or clayey residuum weathered from shale	Well drained	More than 80 inches	3,801	5.6%
Lakoma silty clay, 6 to 15 percent slopes	Fine, smectitic, mesic Vertic Calciustepts	Silty clay	Clayey residuum weathered from calcareous shale	Well drained	25 to 33 inches	2,907	4.3%

Table 7.2.1.1-1. Soil Types Within the Project Area							
Soil Type	**Soil Taxonomy**	**Soil Texture**	**Parent Material**	**Natural Drainage Class**	**Depth to Restrictive Feature (inches)**	**Acres in Project Area**	**Percent of Project Area**
Ottumwa-Razor silty clays, 6 to 9 percent slopes	Fine, smectitic, mesic Vertic Haplustolls	Silty clay	Clayey alluvium and/or clayey residuum weathered from shale	Well drained	More than 80 inches	2,506	3.7%
Razor-Midway complex, 6 to 15 percent slopes	Fine, smectitic, mesic Ustertic Haplocambids	Silty clay	Clayey residuum weathered from calcareous shale	Well drained	25 to 33 inches	2,469	3.6%
Ottumwa silty clay, 0 to 3 percent slopes	Fine, smectitic, mesic Vertic Haplustolls	Silty clay	Slope alluvium	Well drained	45 to 62 inches	1,700	2.5%
Pierre clay, 6 to 15 percent slopes	Fine, smectitic, mesic Torrertic Haplustepts	Clay	Clayey residuum weathered from shale	Well drained	20 to 40 inches	1,181	1.7%
Capa-Wendte, channeled, complex	Very fine, smectitic, mesic Leptic Vertic Natrustolls		Clayey alluvium derived from clayey shale	Moderately well drained	More than 80 inches	885	1.3%
Lohmiller-Arvada complex	Fine, smectitic, calcareous, mesic Torrertic Ustifluvents	Silty clay	Clayey alluvium derived from shale	Well drained	More than 80 inches	879	1.3%
Lakoma silty clay, 6 to 9 percent slopes	Fine, smectitic, mesic Vertic Calciustepts	Silty clay	Residuum weathered from shale	Well drained	25 to 33 inches	735	1.1%

Table 7.2.1.1-1. Soil Types Within the Project Area							
Soil Type	**Soil Taxonomy**	**Soil Texture**	**Parent Material**	**Natural Drainage Class**	**Depth to Restrictive Feature (inches)**	**Acres in Project Area**	**Percent of Project Area**
Ottumwa-Razor-Savo complex, 6 to 15 percent slopes	Fine, smectitic, mesic Vertic Haplustolls	Silty clay	Clayey alluvium and/or clayey residuum weathered from shale	Well drained	More than 80 inches	734	1.1%
Wendte-Herdcamp silty clays, channeled	Fine, smectitic, calcareous, mesic Vertic Ustifluvents	Silty clay	Clayey alluvium	Moderately well drained	More than 80 inches	718	1.1%
Kirley-Mosher complex, 2 to 6 percent slopes	Fine, smectitic, mesic Vertic Argiustolls	Clay loam	Clayey alluvium	Well drained	More than 80 inches	661	1.0%

7.2.1.2 Drainage Class

The drainage class identifies the natural drainage condition of the soil. It refers to the frequency and duration of wet periods and provides a guide to the limitations and potentials of the soil for field crops, forestry, range, wildlife, and recreational uses. The class roughly indicates the degree, frequency, and duration of wetness, which are factors in rating soils for various uses (NRCS 2023). Approximately 97.6% of the Project Area is classified as well drained and the remaining 2.4% is classified as moderately well drained.

7.2.1.3 Erosion Potential and Slopes

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation and the Revised Universal Soil Loss Equation to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter, and on soil structure and saturated hydraulic conductivity (Ksat). Factor K values range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water. The soils in the Project Area have a moderate susceptibility to erosion and have K Factors ranging from 0.21 to 0.42, with the majority between 0.32 and 0.39.

A Wind Erodibility Group consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated or disturbed areas. The soils assigned to group 1 are the most susceptible to wind erosion and those assigned to group 8 are the least susceptible. The soils in the Project Area have low to moderate susceptibility to wind erosion and have Wind Erodibility Group designations between 4 and 6. Slopes in the Project Area range from 0 to 40%, with most slopes between 3 and 7%.

7.2.1.4 Prime Farmland

NRCS farmland classifications include “prime farmland” (land that has the best combination of physical and chemical characteristics for the production of crops), “farmland of statewide importance” (land other than prime farmland that has a good combination of physical and chemical characteristics for the production of crops), and “not prime farmland” (land that does not meet qualifications for prime farmland), among other classifications. Prime farmland and farmland of statewide importance are subject to protection under the Farmland Protection Policy Act (Public Law 97-98; 7 United States Code 4201-4209). The Project Area is classified as approximately 51% farmland of statewide importance, approximately 42% as not prime farmland, and approximately 7% as prime farmland if irrigated (**Table 7.2.1.4-1;** Figure A-6 in **Appendix A**) (NRCS 2023).

Table 7.2.1.4-1. Summary of Farmland Types Affected by the Project			
Farmland Type	**Acres in Project Area (% of Project Area)**	**Acres of Construction Impacts (Temporary)**	**Acres of Operational Impacts (Long-Term)**
Prime Farmland if Irrigated	4,662 (7%)	24	4
Farmland of Statewide Importance	34,821 (51%)	850	90
Not Prime Farmland	28,835 (42%)	325	21

Source: NRCS (2023).

7.2.2 Soil Resources Impacts/Mitigation

Primary impacts to soil resources include ground-disturbing activities (e.g., grading, trenching, and excavating). Clearing vegetation removes protective cover and exposes soil to the effects of wind and precipitation, which may increase the potential for soil erosion and movement of sediments into sensitive environmental areas. Grading and equipment traffic may compact soil, reducing porosity and percolation rates, which could result in increased runoff potential. Contamination from release of fuels, lubricants and coolants from construction equipment could also impact soils. These impacts, if they occur to farmland of statewide importance or prime farmland, may reduce the quality, quantity, or productivity of the soils. The majority of these impacts are temporary and related to construction activities; however, there will be long-term operational impacts associated with aboveground facilities. Following completion of construction, all temporary construction workspaces will be cleaned up and restored to preconstruction conditions pursuant to the lease and easement agreements.

The Project would temporarily disturb 1,199 acres of soils, of which 850 acres would be farmland of statewide importance, 24 acres of prime farmland if irrigated, and 325 acres of not prime farmland. The Project would impact 115 acres of soils long-term, of which 90 acres would be farmland of statewide importance, 4 acres would be prime farmland if irrigated, and 21 acres would be not prime farmland (see **Table 7.2.1.4-1**).

As discussed in **Section 18**, the Project will be decommissioned after the end of the operational life of the Project. After decommissioning of the Project is complete, no irreversible changes to soil resources will remain beyond the operating life of the Project. During decommissioning, impacts to soils would be similar to those during construction. Temporary impacts would occur while land is used for deconstruction and removal of infrastructure.

Philip Wind has designed the Project Layout to minimize construction cut and fill requirements, and limit construction in areas with steep slopes, while maintaining optimal turbine locations. Wind turbines are typically located at higher elevations to maximize wind exposure, minimize wind obstructions, and avoid steep slopes for foundation installation. The access road locations generally avoid steep slopes as well. Similar siting efforts apply to the location of the underground collector circuits to avoid crossing steep ravines.

Construction of the Project will require coverage under the SDDANR General Permit for Storm Water Discharges Associated with Construction Activities (SDR10000). To maintain compliance

with provisions of this General Permit, Philip Wind will prepare a SWPPP to identify potential sources of stormwater pollution from the Project site and specify BMPs to control erosion and sedimentation and minimize negative impacts caused by stormwater discharges from the Project. The SWPPP will be prepared prior to construction of the Project and will be implemented from the initiation of construction and used through site restoration efforts. During Project operation, stormwater volume, stormwater flow, and erosion and sediment impacts to surface water and groundwater resources are not anticipated to change from preconstruction conditions.

Geotechnical borings will be completed and soil samples will be tested to determine the engineering characteristics of the site subgrade soils and develop Project Facility-specific design and construction parameters. Adjustments to Project Facilities will be made for unsuitable soils as needed.

8. Effect on Hydrology (ARSD 20:10:22:14, 20:10:22:15)

ARSD 20:10:22:15. Hydrology. *The applicant shall provide information concerning the hydrology in the area of the proposed plant, wind energy, 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, wind energy, 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 off-site 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; and

(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.[3]

8.1 Groundwater Resources

8.1.1 Existing Groundwater Resources

In South Dakota, water-producing bedrock units are deep and therefore expensive to drill and install wells in, may have undesirable water quality, or may not yield an adequate quantity of water where it is needed (Iles 2008). Often the water depth and water quality prevent the average consumer from utilizing water from these sources. Historically, rural water supplies of Haakon County were widely distributed and obtained from shallow pumped, deep pumped, and deep flowing wells. Almost all the wells in Haakon County were shallow pumped wells, of which 98% were less than 100 feet in depth (Searight and Meleen 1940).

The Project Area is located over the regional Northern Great Plains aquifer system (USGS 1996). Permeable rocks of this aquifer system have been grouped into five major aquifers: lower Tertiary, upper Cretaceous, lower Cretaceous, upper Paleozoic, and lower Paleozoic. Within this aquifer system, water movement occurs from recharge areas at high elevations, down the dip of

[3] The Project does not involve discharge of heated water or deep well injection for effluent disposal.

the aquifers, and then upward to discharge into shallower aquifers or discharge to the land surface. Recharge to this aquifer system is primarily from precipitation or snowmelt. Local recharge includes seepage of excess irrigation water. Discharge from this aquifer system is primarily from upward leakage of water into shallower aquifers where the hydraulic head in a shallower aquifer is less than that of a deeper aquifer.

8.1.2 Groundwater Resources Impacts/Mitigation

Construction of the Project is not anticipated to have long-term impacts on groundwater resources. The construction of Project Facilities may require dewatering of excavated areas due to perched or shallow groundwater, particularly for turbine foundations or collector circuit trenches. Any dewatering will be temporary and minimized to the extent practicable. Watered groundwater will be properly handled to allow sediments to settle out and be removed before the water is discharged, reducing soil erosion and sedimentation of surface waters. Dewatering will be conducted in accordance with the General Permit for Temporary Discharge Activities and the Temporary Permit to Use Public Waters from the SDDANR. More generally, construction will require coverage under the General Permit Authorizing Stormwater Discharges Associated with Construction Activities (SDR10000). As discussed in **Section 7.2.2**, Philip Wind will prepare a SWPPP to control sources of stormwater pollution during construction and reduce impacts to waterways from runoff. Routine operation and maintenance activities are not expected to affect groundwater resources.

The unlikely accidental release of construction-related chemicals, fuels, or hydraulic fluid into groundwater would have the potential to have an adverse effect on groundwater quality, most notably near shallow water wells. The impacts of spills are mainly linked to fuel storage, equipment refueling, and maintenance activities. Storage of petroleum products in quantities exceeding 100 gallons will be in elevated tanks; such tanks larger than 1,100 gallons will have secondary containment, as necessary.

Water usage at the O&M Facility will be similar to a household volume and any impacts to local groundwater supplies will be negligible.

8.2 Surface Water Resources

8.2.1 Existing Surface Water Resources

8.2.1.1 Hydrology

The USGS, in cooperation with various federal and state agencies, has mapped the hydrologic boundaries of water resources, in order of descending scale, into regions, subregions, basins, sub-basins, watersheds, and sub-watersheds. The Project Area lies within two sub-basins: the Cheyenne sub-basin and the Bad sub-basin (USGS 2023c).

Named streams present in the Project Area include Buzzard Creek, West Plum Creek, Grindstone Creek, Medicine Creek, North Fork, South Fork, Bridger Creek, and Mexican Creek. Two named lakes include Kroetch Lake and Ferguson Dam (**Appendix F**). No Wild and Scenic Rivers are in the Project Area (National Wild and Scenic Rivers System 2023). Figure A-8 in **Appendix A** shows surface water features in the Project Area.

The largest lake in the Project Area is Kroetch Lake. This waterbody is classified by the South Dakota Surface Water Quality Standards and Uses Assigned to Lakes for the following beneficial uses: (4) Warmwater permanent fish life propagation waters; (7) Immersion recreation waters; (8) Limited contact recreation waters; and (9) Fish and wildlife propagation, recreation, and stock watering waters (SDDANR 2024c). Kroetch Lake does not appear to have an outlet. The other lake within the Project Area is Ferguson Dam which has an outlet on the north side and drains into the south fork of Bridger Creek.

Most of the Project Area is within the Lower Cheyenne sub-basin. Water flow in this portion of the Project Area runs northward through West Plum Creek, Bridger Creek, and multiple unnamed tributaries until it reaches the Cheyenne River, approximately 9 miles north of the Project Area. A smaller portion of the Project Area is within the Bad sub-basin. Water flow in this portion of the Project Area flows south through Buzzard Creek, Medicine Creek, Grindstone Creek, Mexican Creek, North Fork, and multiple unnamed tributaries until water reaches the Bad River, approximately 14 miles south of the Project Area.

8.2.1.2 National Park Service Nationwide Rivers Inventory

The National Park Service (2023) Nationwide Rivers Inventory (NRI) is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more “outstandingly remarkable” natural or cultural values judged to be of more than local or regional significance. There are no NRI-listed river segments in the Project Area. The closest NRI-listed river to the Project Area is the Cheyenne River located over 10 miles away from the Project Area.

8.2.1.3 Impaired Waters

The goal of the Clean Water Act (CWA) is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (33 United States Code 1251(a)). Under CWA Section 303(d), states, territories, and authorized Tribes, collectively referred to in the CWA as "states," are required to develop lists of impaired waters.

No impaired waters listed under CWA Section 303(d) are in the Project Area (EPA 2015). The nearest impaired waterbody (Waggoner Lake) is over 10 miles away from the Project Area and is impaired for Chlorophyll-a (SDDANR 2024c).

8.2.1.4 Floodplains

According to the Federal Emergency Management Agency (FEMA), a study to determine flood hazards has not been completed for Haakon County and no floodplains were identified within 10 miles of the Project Area (FEMA 2021). The preliminary hydrology study for the Project Area (see **Appendix F**) shows low water depths and velocities across the Project Area and concluded that the site is suitable for the planned development.

8.2.2 Surface Water Resources Impacts/Mitigation

8.2.2.1 Hydrology

Potential impacts to surface waters due to the Project include transport of sediment into waters during construction due to excavation and the exposure of soils. The Project is anticipated to result in approximately 31 additional acres of impervious surface. representing approximately <0.1% of the Project Area and will be dispersed throughout the Project Area. Because the Gen-Tie Line will span any wetlands or streams, no impacts to surface waters are anticipated from the Gen-Tie Line. All turbines will be sited to avoid wetlands and all impacts to surface waters from turbines will be negligible. However, if there are impacts to wetlands or streams, they will be permitted in compliance with the CWA. Increased sedimentation, reduction of available flood storage, and impacts to drainage patterns due to stormwater runoff from the Project during construction and operation will be minimized through implementation of BMPs. Philip Wind has committed to implementing BMPs derived from the UGP PEIS; these measures would reduce long-term erosion and runoff from disturbance areas, protecting water resources. As discussed in **Section 7.2.2**, a SWPPP will be developed and implemented for the Project that identifies potential sources of stormwater pollution from the Project site and specifies the structural and non-structural controls, or BMPs, that will used to minimize the negative impacts to receiving waters caused by stormwater discharges associated with the construction activities. The Project is not expected to cause significant changes to existing hydrology or stormwater runoff; likewise, the EA concluded that the Project's impacts to the hydrologic setting and water resources would be negligible.

8.2.2.2 National Park Service Nationwide Rivers Inventory

There are no NRI-listed rivers within the Project Area; therefore, construction and operation of the Project poses no impact to these resources.

8.2.2.3 Impaired Waters

There are no 303(d)-listed waterbodies within the Project Area; therefore, construction and operation of the Project will have no impact to these resources.

8.2.2.4 Water Quality

Excavation and exposure of soils during construction can cause an increase in stormwater runoff and sedimentation in receiving waters during storm events. Coverage under the General Permit for Storm Water Discharges Associated with Construction Activities, administered by the SDDANR, will be required for the Project. As discussed in **Section 7.2.2**, a SWPPP will be developed and implemented for the Project that identifies potential sources of stormwater pollution from the Project site and specifies the structural and non-structural controls, or BMPs, that will used to minimize the negative impacts to receiving waters caused by stormwater discharges associated with the construction activities. The BMPs may include silt fences, straw wattles, erosion control blankets, Project staging, and other methods to control erosion and sedimentation. The erosion and sediment controls that will be implemented during Project construction and operation are expected to avoid negative impacts to water quality.

8.2.2.5 Drainage Patterns

The dispersed nature of the Project Facilities will not provide enough of a concentration of increased impervious surfaces in any specific location to change larger drainage patterns. With the Project Facilities, where practicable, generally located at higher elevations, impacts to streams and drainageways are not anticipated.

The installation of the electrical collection system may impact drainageways, but these impacts would be temporary in nature, with existing contours and drainage patterns restored after trenching. Where crossings of streams and drainageways cannot be avoided by access roads, appropriately designed crossings (i.e., culverts, low-water crossings) will be constructed to maintain existing drainage as practicable.

8.2.2.6 Flood Storage Areas

According to FEMA, there has not been a study to determine flood hazards for Haakon County. However, Philip Wind conducted a hydrology study using a FLO-2D model that incorporated elevation, soils, land cover, and precipitation data for the Project Area. The study concluded that the Project Area has low flood depths and is suitable for a wind energy facility. Any impacts to defined water flow paths would be temporary in nature and would be stabilized per the SWPPP.

8.3 Current and Planned Water Uses

8.3.1 Current and Planned Water Use

The USGS National Water Use Information Program publishes water use data for the United States and for each state and county. In 2015, the most recent year of published data, 70.3% of water in Haakon County was used for livestock and the remaining water was used for domestic use and irrigation (**Table 8.3.1-1**). Overall, Haakon County uses 0.3% of all water in South Dakota (USGS 2015). Philip Wind is not aware of any planned water uses within the Project Area.

Table 8.3.1-1. Water Use by Category in Haakon County and South Dakota

Water Use Category	Haakon County (gallons/day)	South Dakota (gallons/day)
Public self-supplied surface water withdrawals	110,000	23,970,000
Public self-supplied groundwater withdrawals	0	47,980,000
Municipal deliveries for domestic use	80,000	43,740,000
Industrial	0	24,440,000
Thermoelectric	0	2,390,000
Mining	0	8,650,000

Table 8.3.1-1. Water Use by Category in Haakon County and South Dakota		
Water Use Category	**Haakon County (gallons/day)**	**South Dakota (gallons/day)**
Livestock	780,000	47,860,000
Aquaculture	0	28,460,000
Irrigation	140,000	210,680,000
Total	**1,110,000**	**416,597,000**

Source: USGS (2015)

8.3.2 Current or Planned Water Use Impacts/Avoidance

Water use at the O&M Facility will be similar to household volume and is anticipated to be less than 5 gallons per minute. Philip Wind has begun coordinating with the Water District to locate and map its network of distribution lines within the Project Area and has determined that a rural water supply connection is possible for the O&M Facility. Philip Wind does not plan on using surface or groundwater supplies or aquifers within the Project Area as a water source for the O&M Facility or for the Project more generally. Additionally, a private wastewater treatment system will be required. If required, this system would be developed to meet the requirements of the SDDANR. Use of water for operations will be negligible and will not create undue burden; therefore, no mitigation is proposed. The Project will not impact municipal or private water uses in the Project Area.

If dewatering is required for construction of turbine foundations, the dewatering would be temporary and of limited spatial extent. Additionally, dewatering would be conducted in accordance with the General Permit for Temporary Discharge Activities and the Temporary Permit to Use Public Waters from SDDANR. If water supply wells are located near potential construction dewatering locations, provisions would be made to ensure that an adequate supply of water is provided until construction dewatering activities have ceased. These impacts are expected to be minor and temporary. Surface water availability for communities, schools, agriculture, recreation, fish, or wildlife will not be impacted.

The Project will have no impact on surface water availability or use for communities, agriculture, recreation, fish, or wildlife. As discussed in **Section 9.2.2**, minimal long-term impacts to wetlands and streams are anticipated. Any impact to wetlands and streams will be appropriately permitted in compliance with the CWA. Following construction, temporary impacts to wetlands and streams would be restored to preconstruction conditions.

Post-construction groundwater levels would be anticipated to return to preconstruction conditions.

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

> ***ARSD 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, wind energy 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.

9.1 Vegetation

9.1.1 Existing Terrestrial Ecosystem

9.1.1.1 General Vegetation

The Project Area is located in the River Breaks, Subhumid Pierre Shale Plains, and Semiarid Pierre Shale Plains Level IV ecoregions of the Northwestern Great Plains Level III ecoregion, which encompasses the western edge of South Dakota (EPA 2024). The River Breaks ecoregion consists of steep slopes and heavy, sticky soils that limit cultivation and historically supported pockets of junipers (*Juniperus* spp.), deciduous trees, little bluestem (*Andropogon gerardii*), and buffalograss (*Bouteloua dactyloides*). The Subhumid Pierre Shale Plains and Semiarid Pierre Shale Plains ecoregions are characterized by heavy soils with limited trees and the historic vegetation consisted of western wheatgrass (*Pascopyrum smithii*) and needlegrass (*Nassella viridula*) plains. The predominant land use in these ecoregions is grazing.

Land cover in the Project Area was initially described using the National Land Cover Database (NLCD) (Multi-Resolution Land Characteristics Consortium [MRLC] 2019) (Figure A-7 in **Appendix A**). In 2022, biologists completed field surveys to verify and update the data provided by NLCD in the Project Area (**Table 9.1.1.1-1**). Most of the Project Area (52%) is grassland/herbaceous, followed by agricultural (45% of the Project Area). Wetland areas occur throughout the Project Area, and total less than 1% of the Project Area (**Appendix G**). **Section 9.2** provides a detailed discussion of wetlands and waterbodies in the Project Area. Remaining land cover types each comprise 3% or less of the Project Area.

Based on the USFWS Information for Planning and Consultation (IPaC) online review tool, no federally listed plant species are known to occur within the Project Area (USFWS 2024a).

Table 9.1.1.1-1. Field-verified Land Cover in the Project Area

NLCD Land Cover Type	Acres	% of Project Area
Herbaceous	35,491	52%
Agricultural	30,721	45%
Developed	878	1%
Water	616	< 1%
Wetlands	543	< 1%
Forest	54	< 1%
Shrubland	14	< 1%

Table 9.1.1.1-1. Field-verified Land Cover in the Project Area		
NLCD Land Cover Type	**Acres**	**% of Project Area**
Barren	4	< 1%
Total	**68,318**	**100%**

Source: MRLC (2019)
Note: Values may not sum precisely due to rounding.

9.1.1.2 Farmland

Approximately 24,673 acres of cultivated crops and 2,005 acres of pasture/hay are present in the Project Area. Together, these agricultural areas comprise approximately 39.0% of the entire Project Area. USDA (2024) indicates the most common crop in the Project Area is winter wheat (10.4% of the Project Area) followed by spring wheat (10.1% of the Project Area); specific types of crops likely vary annually. These areas likely provide suitable habitat for grassland and some prairie species (see **Section 9.3.1**).

Section 7.2.1.4 provides detailed information about prime farmland and farmland of statewide importance in the Project Area.

9.1.1.3 Grasslands

In 2022, a grassland habitat assessment was conducted in 2022 and around the Project Area (**Appendix H**). The objective of the grassland habitat assessment was to identify parcels of grassland and to identify sod types as unbroken or broken. Broken sod type is defined as disturbed or mechanically manipulated ground (Bauman et al. 2018) and is characterized by the presence of features indicating mechanized cultivation, such as rock clearing, abrupt field edges, straight line features (indicating plowing, disking, harvesting, or planting), or presence of any other features indicating human disturbance to the sod. Unbroken sod is characterized by the absence of these features indicating no human-caused breaking of the sod (Bauman 2021; Bauman et al. 2018). All grassland types (broken and unbroken) can provide habitat for grassland and prairie species (**Table 9.1.1.3-1**); however, undisturbed grasslands are more likely to support prairie obligate and sensitive species (see **Section 9.3.2**).

In total, 27,678 acres were identified as grasslands (see **Appendix H**). Of the grasslands identified, 12,192 acres were broken grassland, and 14,915 acres were unbroken grassland. The remaining 571 acres were not surveyed due to access issues (see **Table 9.1.1.3-1**). Philip Wind has sited turbine locations to avoid unbroken grasslands.

Table 9.1.1.3-1. Results of Grassland Assessment Completed in 2018 and 2022		
Grassland Characterization	**Acres of Grassland**	**% of Project Area**
Unbroken	14,915	21.9%
Broken	12,192	17.9%
Not surveyed; no access	571	0.8%
Total	**27,678**	**40.5%**

9.1.1.4 Noxious Weeds

Noxious weeds may be regulated by state (SDCL 38-22) and federal (7 Code of Federal Regulations 360) rules and regulations designed to stop the spread of plants that are detrimental to the environment, crops, livestock, and public health. According to the SDDANR, three species of noxious weeds occur and are regulated within Haakon County (SDDANR 2017a, 2017b) (**Table 9.1.1.4-1**).

Table 9.1.1.4-1. State and Local Noxious Weeds Occurring in Haakon County

State Noxious Weed		County Noxious Weeds	
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Canada thistle	*Cirsium arvense*	Common mullein	*Verbascum thapsus*
Hoary cress	*Lepidium draba*		

Sources: SDDANR (2017a, 2017b)

9.1.2 Vegetation Impacts/Mitigation

Construction of the Project will result in temporary and permanent impacts to existing vegetation within the Project Area. These impacts will primarily result in a loss of crop production and pasture/herbaceous area. Indirect impacts could include the spread of noxious weed species resulting from construction equipment introducing seeds into new areas, or erosion or sedimentation due to ground disturbance activities in the construction workspaces.

The Project will result in approximately 1,199 acres of temporary ground disturbance impact and approximately 115 acres of long-term ground disturbance impact to vegetation (predominantly cropland and grassland/pasture). Impacts that occur to cultivated lands are not considered ecologically significant, because these lands are frequently disturbed by tilling, planting, and harvesting activities associated with crop production.

Vegetation communities most sensitive to disturbance are native prairies, grasslands with native plant communities, wetlands, and natural woodlands. The Project has been sited to minimize impacts to these sensitive habitats. Where sensitive habitats cannot be avoided, additional micrositing efforts have attempted to reduce impacts to these sensitive habitats. No turbines will be sited in unbroken grasslands. Temporary impacts will be minimized through BMPs, such as revegetation and erosion control devices. These measures will reduce impacts to vegetative communities adjacent to Project Facilities. Noxious weeds will be controlled using mechanical mowing and selective herbicide applications, as necessary.

Philip Wind has implemented several BMPs during Project design and micrositing, and will implement additional BMPs during construction, intended to minimize impacts to vegetation in the Project Area. Specific BMPs include:

- Reduce impacts to native vegetation to the extent practicable through Project Layout and design.
    - Locate transmission lines in areas where Philip Wind has site control and to the extent possible in areas where previous disturbance has already occurred.

  - Use the existing road network where feasible and reasonable to reduce the need for new road construction.
  - Limit ground disturbance wherever practicable during construction in potentially unbroken grasslands and limit the areas where construction vehicles drive through the Project Area.
  - To the extent practicable, site Project Facilities to avoid crossing tree rows and woodlots. Some minor clearing of brush may be required. For the Gen-Tie Line, the ROW will be cleared prior to construction and will be maintained free of woody vegetation that would interfere with safe and reliable operation. Overall, tree clearing activities and vegetation removal for the Project will be minimized to the extent practicable.
- Use appropriate erosion, sediment, spill control, and equipment cleaning measures.
- Regrade exposed subgrade in areas where the native soil has been removed to the original ground contour and replace soil to generally follow the original soil profiles.
- Reseed disturbed areas with a regionally appropriate seed mixture at an appropriate application rate.
- Compensate for damage to crops that occur on cultivated lands during construction.
- Fire hazards from vehicles and human activities will be reduced (e.g., use of spark arrestors on power equipment, avoiding driving vehicles off roads, allowing smoking in designated areas only).

To the extent practicable, Project Facilities have been sited to minimize crossing tree rows and woodlots. Some minor clearing of brush may be required and up to 2 acres of forest will be cleared for the Gen-Tie Line. For the Gen-Tie Line, the ROW will be cleared prior to construction and will be maintained free of woody vegetation that would interfere with safe and reliable operation. It is not anticipated that any tree clearing will be required for the construction and operation of the wind turbines. Overall, tree clearing activities and vegetation removal for the Project will be minimized to the extent practicable.

9.2 Wetlands and Waterbodies

9.2.1 Existing Wetlands and Waterbodies

Wetlands are defined in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." The Manual identifies three wetland criteria that must be met for a wetland to be present: dominance of hydrophytic vegetation, hydric soils, and sufficient hydrology. Some wetlands, as well as other waterbodies, are considered waters of the United States under Section 404 of the CWA and are, therefore, regulated by the USACE with respect to discharge of fill material into the water features.

Mapped waterbodies, including ponds, lakes, streams, and rivers were determined through desktop analysis and field verification of the National Hydrography Dataset (NHD) (USGS 2023d); wetlands were determined from the National Wetlands Inventory (NWI) (USFWS 2023a). NWI maps are produced by the USFWS and provide reconnaissance-level information including the location, type, and size of these resources. NWI maps are produced by reviewing

high-altitude imagery, and interpretation is variable based on quality of aerial photographs, experience of the interpreter, and whether ground-truthing was conducted.

A site reconnaissance visit was conducted on October 13 and 14, 2022, and NWI and NHD features inconsistent with the desktop analysis were documented if observed while traveling publicly accessible roads. Based on the site visit, the desktop analysis overestimated water resources; several wetland polygons mapped by the NWI and NHD appeared absent when viewed from publicly accessible roads. NWI and NHD data can be found in **Tables 9.2.1-1** and **9.2.1-2**, Figure A-8 in **Appendix A**, and in the Water Resources Analysis Report provided in **Appendix G**.

Table 9.2.1-1. Field-Verified National Hydrography Dataset Features

Resource Type	Length (miles)
Stream/River Intermittent	331.2
Artificial Path	39.0
Lake/Pond	N/A
Stream/River Perennial	7.4
Swamp/Marsh	N/A
Total	**377.6**

Source: USGS (2023d)
Note: N/A = not applicable

Table 9.2.1-2. Field-Verified National Wetlands Inventory Features

Resource Type	Area (acres)
Freshwater Emergent Wetland	750.5
Riverine	681.6
Freshwater Pond	333.1
Freshwater Forested/Shrub Wetland	33.5
Total	**1,798.7**

Source: USFWS (2023a)

Wetland delineations were conducted in accordance with the USACE *Wetlands Delineation Manual* and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)* (Environmental Laboratory 1987; USACE 2010) methodologies from June 13 to 16, 2023, and June 19 to 22, 2023. Field wetland delineations focused on a survey area of approximately 2,068 acres, covering the wind turbines, access roads, O&M Facility, and associated buffers rather than the entire Project Area. The objective of the wetland delineations was to identify and map the extent of potential USACE-jurisdictional wetlands and waterways within the survey area. A certified wetland scientist identified probable locations of wetlands and other potential waters of the United States by reviewing desktop data and aerial photography. The pedestrian survey was completed to identify wetlands and water bodies and to record locations and boundaries via GPS.

Although the NWI and NHD features used in this section do not represent an official jurisdictional determination of waters of the United States, key infrastructure siting was informed by the results of the completed in-field wetland delineations. Additional delineation surveys will be conducted for the remaining infrastructure prior to construction. The completed and planned delineations will determine the location and extent of potential jurisdictional water features on-site, allowing for a more refined quantification of water resources to inform siting decisions.

9.2.2 Wetland and Waterbody Impacts/Mitigation

Impacts to wetlands, streams, and other water resources could occur by directly filling water resources during construction, or by otherwise negatively altering their quality. Philip Wind anticipates that the Project will avoid significant impacts to wetland areas and streams, and any impacts will be permitted in compliance with the CWA. To the extent practicable, Project Facilities have been sited in upland areas, avoiding low-lying wetlands and streams. Wetland areas and streams will generally be avoided when routing access roads and collector circuits. Collector circuits that cross delineated wetlands and streams will be constructed by directionally boring beneath water features to the extent practicable. Temporary impacts associated with crane paths will also be minimized. To further protect wetlands and streams, BMPs for sediment and erosion control will be implemented to ensure compliance with water quality standards listed in **Sections 8.1** and **8.2**. To limit the risk of contamination of wetlands and streams due to accidental spilling of fuels or other hazardous substances, construction equipment will be refueled in areas away from wetlands or drainage areas, and a spill kit would be available at the construction site.

9.3 Wildlife

To reduce the potential impacts of wind energy facilities on wildlife species and habitat, the USFWS has developed the WEG (USFWS 2012) and the *Eagle Conservation Plan Guidance* (ECPG) (USFWS 2013). These voluntary guidelines provide a structured, scientific approach for assessing wildlife risks at wind energy facilities, promoting communication between project proponents and federal and state agencies, and providing a practical approach to addressing wildlife conservation concerns at all stages of land-based wind energy development. SDGFP, in cooperation with the South Dakota Bat Working Group (SDBWG), has also developed siting guidelines for wind energy facilities to address potential impacts to natural resources (SDBWG and SDGFP n.d.). These guidelines are generally consistent with the WEG and also provide guidance for other non-wildlife resources (e.g., land use, noise, visual resources, soil erosion, and water quality).

In addition to the processes and commitments identified in **Section 1.2**, Philip Wind followed the processes outlined by the WEG, ECPG, and the SDGFP guidelines for developing, constructing, and operating wind energy projects. Philip Wind has been engaged in coordination with the USFWS and SDGFP to seek input on wildlife resources potentially occurring within the Project Area, to seek guidance on the appropriate studies, and to inform development of avoidance and minimization measures for the Project. Summaries of coordination meetings are provided in **Section 22.2**. As often occurs during development of a wind energy facility, Philip Wind has refined the Project Area since wildlife studies began. Therefore, the project areas used for studies often represent earlier iterations of what is now the Project Area. Because the ecological setting

and land cover are similar throughout the project areas studied, results of surveys are expected to be consistent with those expected for the Project Area (Figure A-9 in **Appendix A**).

9.3.1 Existing Wildlife

Numerous wildlife studies relating to raptors, including eagles; migratory birds; bats; and other special-status species, have been completed for the Project between 2017 and 2023 (**Table 9.3.1-1**). A Site Characterization Study was completed in 2017 and updated in 2023 to summarize the biological resources present and to identify potential sensitive species or habitats that could be located near the Project. The Site Characterization Study informed additional wildlife studies conducted by Philip Wind.

Table 9.3.1-1. Wildlife Studies Conducted for the Project

Study	Survey Period
Eagle use survey	August 2017–July 2018; August 2018–July 2019
Eagle nest aerial survey	April 2018
Eagle nest ground survey	June 2018
Eagle utilization distribution monitoring	May–June 2022
Prairie grouse lek survey	July 2018; April–May 2022; March–May 2023
Whooping crane habitat assessment	August 2018; February 2023
Bat acoustic survey	April–November 2018
Avian use survey	August–November 2017; March–August 2018; January 2022–March 2023; April 2023–August 2024
Prairie dog colony status and mapping	January–October 2022
Northern long-eared bat habitat assessment	May–October 2022
Raptor nest survey	January–June 2022; February–June 2023

Wildlife species observed and/or expected to occur within the Project Area are generally common species associated with croplands and grasslands in the Northwestern Great Plains Level III ecoregion. A list of representative wildlife species that are likely to be found in the Project Area is provided in **Table 9.3.1-2** (Wiken et al. 2011).

Table 9.3.1-2. Representative Wildlife Species for the Northwestern Great Plains Level III Ecoregion

Common Name	Scientific Name
Mammals	
Bobcat	*Lynx rufus*

Table 9.3.1-2. Representative Wildlife Species for the Northwestern Great Plains Level III Ecoregion	
Common Name	**Scientific Name**
Cougar	*Puma concolor*
Jackrabbit	*Lepus* spp.
Prairie dog	*Cynomys* spp.
Pronghorn	*Antilocapra americana*
White-tailed deer	*Odocoileus virginianus*
Birds	
Ferruginous hawk	*Buteo regalis*
Golden eagle	*Aquila chrysaetos*
Northern pintail	*Anas acuta*
Sage thrasher	*Oreoscoptes montanus*
Western meadowlark	*Sturnella neglecta*
Reptiles and Amphibians	
Prairie rattlesnake	*Crotalus viridis*

Source: Wiken et al. (2011)

9.3.1.1 Prairie Dogs

Prairie dog colonies provide habitat and a food source for several protected species of wildlife. Philip Wind completed a prairie dog colony status and mapping study from January to October 2022 and a 2-mile buffer to inform turbine siting (see **Appendix J**). Six historical colonies were surveyed. Three were still active and three were absent. An additional five colonies were observed. Three were inactive based on evidence of unused burrows; two were active based on the presence of fresh burrows, tracks, fecal droppings, and prairie dogs. One potential prairie dog colony was identified during the desktop digitization effort but was determined in the field to be nonexistent.

9.3.1.2 Prairie Grouse

Prairie grouse are widely distributed from the Great Plains to Alaska and are a fairly common resident in South Dakota west of the Missouri River and on the Missouri and Prairie coteaus east of the Missouri River (Runia et al. 2021). Prairie grouse inhabit open grasslands mixed with shrubs and wooded draws. Grassland with a diversity of plant types, including grass, shrubs, and forbs, provide the best nesting habitat, whereas broods depend on areas with abundant forbs and insects and a mix of cover types for protection. Prairie grouse are listed by the SDGFP as a Species of Greatest Conservation Need (SGCN), which are species that require conservation attention and are identified in the South Dakota Wildlife Action Plan (SDGFP 2014).

Grouse lek surveys, including surveys for both sharp-tailed grouse and greater prairie-chicken, were conducted during three aerial flights between April 4 and May 11, 2022. No ground-based surveys were conducted during the 2022 surveys. A lek is an assembly area where animals (such as prairie grouse) display courtship behavior and can vary in number and location on an annual basis. These surveys followed guidance from the SDGFP *Prairie Grouse Management Plan for South Dakota 2017–2021* (SDGFP 2017). There were 31 new and historical leks observed during the surveys.

Philip Wind conducted additional prairie grouse lek surveys in 2023, revisiting the 2022 active lek locations via one aerial survey, and conducted three ground surveys based on a methodology designed in coordination with the SDGFP. The ground surveys were conducted between March 27 and May 6, 2023, within the period when prairie grouse are active at leks. The aerial survey was conducted within the same timeframe to cover areas not accessible by the ground survey. There were 69 new and historical leks observed during the 2023 surveys (see **Appendix K**). Mitigation, minimization, and avoidance measures for prairie grouse are discussed in **Section 9.3.4**.

9.3.1.3 Migratory Birds

The Migratory Bird Treaty Act is the basis for migratory bird conservation and protection in the United States. The Bald and Golden Eagle Protection Act (BGEPA) provides protection for bald (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) (USFWS 2024b).

The Project Area is in the Central Flyway, used by migrating waterfowl, songbirds, shorebirds, and raptors. The Project Area encompasses a mosaic of land cover types, including herbaceous, agricultural, wetlands, and open water areas, that may provide suitable foraging and stopover habitat for migrating avian species.

There are no Important Bird Areas or other lands designated specifically as bird habitat in the Project Area (National Audubon Society 2023). The closest registered IBAs to the Project Area are the Fort Pierre National Grassland located approximately 56 miles east of the Project Area and the Pierre Missouri River Bottomlands located approximately 58 miles northwest of the Project Area (National Audubon Society 2024).

The USFWS lists 26 species as Birds of Conservation Concern (BCC) within the Badlands and Prairies Bird Conservation Region 17, in which the Project is located (USFWS 2021a). These species are protected under the Migratory Bird Treaty Act and are species that may become federally listed as threatened or endangered without conservation measures being enacted. Of these 26 species, 25 could potentially use or occur in appropriate habitats (e.g., wetlands, herbaceous areas, forested areas) within the Project Area during migration, nesting, or wintering. The mosaic of herbaceous areas, open water, wetlands, forested areas, and shrublands in the Project Area may attract nesting, foraging, and roosting birds, and grain fields may provide additional feeding opportunities.

9.3.1.3.1 Avian Surveys

The following studies were conducted to identify the avian species composition and temporal and spatial activity within and surrounding the Project Area.

9.3.1.3.1.1 Point Count Surveys

Avian point count surveys were conducted to catalog observed bird species and estimate bird use at numerous locations (Figure A-9 in **Appendix A**) in fall 2017 and spring and summer of 2018 (Tetra Tech 2017, 2018a). Surveys were completed for large and small bird species at 13 point count locations biweekly for a total of 10 months. Survey points were selected to obtain representative coverage of habitat types within the area encompassing all proposed turbine locations.

9.3.1.3.1.2 Results

During fall 2017 surveys, each point count location was surveyed six times, resulting in the documentation of 761 birds representing 27 species. Passerines composed the majority of use (63.5%) with raptors composing 4.9% of use. One bald eagle and one golden eagle were recorded. No federally or state-protected threatened or endangered species were recorded during surveys (Tetra Tech 2017).

During spring and summer 2018 surveys, each point count location was surveyed 10 times, resulting in the documentation of 2,645 birds representing 59 species. Passerines composed the majority of use (75.6%) with raptors composing 1.3% of use. One bald eagle and two golden eagles were recorded. No federally or state-protected threatened or endangered species were recorded during surveys (Tetra Tech 2018a).

9.3.1.3.2 Large Bird Use Surveys

Additionally, Philip Wind conducted monthly large bird use surveys from January 2022 to March 2023 for a total duration of 15 months (see **Appendix L**). These surveys were conducted to assess species composition, identify the temporal and spatial use of large birds; document observed threatened, endangered, and other species of concern; and document eagle observations. Large birds are defined as waterbirds, waterfowl, shorebirds, gulls/terns, diurnal raptors (i.e., kites, accipiters, buteos, eagles, falcons, northern harrier [*Circus hudsonius*], osprey [*Pandion haliaetus*]), owls, vultures, upland game birds, doves/pigeons, nightjar, and large corvids. Initially, 38 point count locations were surveyed, with an additional 12 point count locations added, totaling 50 point count locations. A biologist documented all large birds observed over 60 minutes at each point count location per month.

Using the same methods described for the surveys conducted from January 2022 to March 2023, Philip Wind completed large bird use surveys from April 2023 to August 2024. A staggered survey approach was used, with surveys occurring at the initial 2022 to 2023 survey's 38 points ending in December 2023, followed by the 2022 to 2023 survey's additional seven points ending in April 2024, and finally the 2022 to 2023 survey's last five points ending in August 2024 (see **Appendix L**).

9.3.1.3.2.1 Results

January 2022 to March 2023 surveys resulted in 5,448 large bird observations of 51 identified species. Waterfowl made up the highest use group (42.9% of observed species) of the large birds recorded during the survey year, with most of them being goose species. There were 285

observations identified as raptors with 11 species documented. There were 24 bald eagle observations, 50 golden eagle observations, and most of the rest were identified as northern harrier. Overall observations and eagle observations were most common in the winter months. No federally or state-listed threatened or endangered species were recorded (Fields et al. 2023).

April 2023 to August 2024 surveys resulted in 4,755 large bird observations of 52 identified species. Waterfowl made up 42.3% of the large birds recorded during the survey year, with most of them being goose species. There were 455 observations identified as raptors with 12 species documented. There were 18 bald eagle observations, 15 golden eagle observations, and most of the rest were identified as Swainson's hawk (*Buteo swainsoni*). Overall observations were most common in spring and eagle observations were most common in fall. No federally or state-listed threatened or endangered species were recorded (see **Appendix L**) (Wilson et al. 2024).

9.3.1.4 Raptors

9.3.1.4.1 Raptor Species with Potential to Occur in the Project Area

Based on raptor distribution maps, one vulture species, seven owl species, and 17 diurnal raptor species could occur in or near the Project Area during the summer, winter, or migration (**Table 9.3.1.4.1-1**). Migration covers both the spring and fall seasons and is representative of the timeframe as opposed to the activity. Of these 25 species, 14 have the potential to breed in the Project Area. This is based on presence of potentially suitable nesting habitat in the Project Area and the individual breeding ranges of the species (NatureServe 2024; South Dakota Birds and Birding 2024).

The following raptor species were identified during fall 2017 avian use surveys: American kestrel (*Falco sparverius*), bald eagle, golden eagle, northern harrier, prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus*), turkey vulture (*Cathartes aura*), and unidentified hawk (Tetra Tech 2017). During spring and summer 2018 point count surveys, all raptor species observed in the fall were observed except for prairie falcon. Great horned owl (*Bubo virginianus*), merlin (*Falco columbarius*), and short-eared owl (*Asio flammeus*) were also observed in spring and summer 2018 (Tetra Tech 2018a).

Eagle use surveys were conducted in 2017, 2018, and 2019 to document bald eagle and golden eagle activity in rotor swept zone. The eagle use consisted of monthly ground surveys for eagles from August 2017 to July 2018 and August 2018 to July 2019. Surveys followed the ECPG (USFWS 2013). During each survey, a biologist continuously scanned the surrounding landscape for eagle activity using an unlimited viewshed within an 800-m radius circular plot and documented all eagle activity (Tetra Tech 2018b, 2019a).

During eagle use surveys conducted from 2017-2018, 27 golden eagles were observed. Of these, 13 golden eagles were observed within the survey window and within the 800-m radius. Of these, 11 were observed at or below 200 m. Eight bald eagles were observed. Of these, four bald eagles were observed during the survey window, within the 800-m radius, and at or below 200 m.

During eagle use surveys conducted from 2018 to 2019, six golden eagles were observed. All six golden eagles were observed within the survey window, within the 800-m radius, and at or below

200 m minutes. Ten bald eagles were observed during the survey window within the 800-m radius; nine of these were observed at or below 200 m.

During the 2022 to 2023 large bird avian use surveys, the following raptor species were observed: American kestrel, bald eagle, golden eagle, ferruginous hawk, merlin, northern harrier, peregrine falcon, prairie falcon, red-tailed hawk, rough-legged hawk, Swainson's hawk, great horned owl, short-eared owl, and turkey vulture (Fields et al. 2023). During the 2023 to 2024 large bird avian use surveys, the following raptor species were observed: American kestrel, bald eagle, Cooper's hawk, golden eagle, ferruginous hawk, merlin, northern harrier, prairie falcon, red-tailed hawk, rough-legged hawk, sharp-shinned hawk, Swainson's hawk, great horned owl, and turkey vulture (Wilson et al. 2024).

Table 9.3.1.4.1-1. Raptor Species Potentially Occurring in the Project Area

Common Name	Scientific Name	Year-round	Summer	Winter	Migration
Diurnal Raptors					
American goshawk*	*Accipiter atricapillus*			X	X
American kestrel	*Falco sparverius*	X			
Bald eagle	*Haliaeetus leucocephalus*	X			
Broad-winged hawk	*Buteo platypterus*				X
Cooper's hawk	*Accipiter cooperii*				X
Ferruginous hawk	*Buteo regalis*	X			X
Golden eagle	*Aquila chrysaetos*	X		X	X
Gyrfalcon*	*Falco rusticolus*			X	
Merlin	*Falco columbarius*	X			X
Northern harrier	*Circus cyaneus*	X			
Osprey	*Pandion haliaetus*				X
Peregrine falcon	*Falco peregrinus*				X
Prairie falcon	*Falco mexicanus*			X	X
Red-tailed hawk	*Buteo jamaicensis*	X			
Rough-legged hawk	*Buteo lagopus*			X	
Sharp-shinned hawk	*Accipiter striatus*				X
Swainson's hawk	*Buteo swainsoni*		X		X
Owls					
Barn owl	*Tyto alba*	X			
Burrowing owl	*Athene cunicularia*		X		

Table 9.3.1.4.1-1. Raptor Species Potentially Occurring in the Project Area					
Common Name	**Scientific Name**	**Year-round**	**Summer**	**Winter**	**Migration**
Eastern screech-owl	*Megascops asio*	X			
Great horned owl	*Bubo virginianus*	X			
Long-eared owl	*Asio otus*	X			
Short-eared owl	*Asio flammeus*	X			
Snowy owl*	*Bubo scandiacus*			X	
Vultures					
Turkey vulture	*Cathartes aura*		X		

*Species are considered rare or accidental (South Dakota Birds and Birding 2024).

9.3.1.4.2 Potential for Raptor Migration

Several factors influence the migratory pathways of raptors, the most significant of which is geography. Two geographical features often used by raptors during migration are ridgelines and the shorelines of large bodies of water. Updrafts formed as the wind hits the ridges, and thermals created over land and not water, make for energy-efficient travel over long distances. For this reason, raptors sometimes follow corridors or pathways, such as prominent ridges with defined edges, during migration (Liguori 2005).

The Project is located on flat to gently rolling land and lacks defined topographical ridges often used by migrating raptors. However, migrating raptors could rest or forage in the Project Area. Fields and field edges, roads, buildings, wetlands, and riparian areas within the Project Area provide potential foraging habitat for raptors where prey species may be concentrated. Prairie dog colonies present in the Project Area provide a potential prey resource for raptors (see **Section 9.3.1.1**).

9.3.1.4.3 Potential Raptor Nesting Habitat

Studies conducted indicate that the current mosaic of land cover types and land use present in the Project Area could provide nesting habitat for raptors, including the red-tailed hawk and great horned owl (see **Appendices M** and **N**). Breeding species could nest in small woodlots, isolated trees (including ornamentals), herbaceous areas, or wet meadows in the Project Area. Nesting within agricultural areas could occur in human-made structures, such as abandoned buildings, power poles, and other infrastructure.

9.3.1.4.4 Raptor and Eagle Nest Surveys

Raptor and eagle nest surveys were conducted to identify the location and occupancy status of potential raptor and eagle nests within and surrounding the Project Area. Raptor nest surveys were conducted in 2022 and 2023 (see Figure A-9 in **Appendix A**).

Raptor nest surveys were conducted in accordance with guidance provided in the WEG, the ECPG, the USFWS *Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests* (81 *Federal Register* [FR] 91494–91554 [December 16, 2016]), the USFWS *Updated Eagle Nest Survey Protocol* (USFWS 2020b), and the USFWS *Region 6 Recommended Protocol for Conducting Pre-construction Eagle Nest Surveys at Wind Energy Projects* (USFWS 2021b). The 2022 nest surveys included three ground-based and two aerial raptor nest surveys and a weekly eagle nest monitoring study. Two additional ground-based and two aerial raptor nest surveys were completed in 2023. The aerial surveys were conducted from a helicopter flown approximately 150 to 200 feet above the ground flying meandering transects spaced approximately 0.5 mile apart (Pagel et al. 2010; USFWS 2013). Biologists determined the status of nests by evaluating the behavior of adults on or near the nest, and the presence of eggs, young, whitewash, or fresh building materials. The ground-based surveys were conducted by biologists driving along public roads during daylight hours and visually identifying large stick nest structures in suitable nesting habitats. The status of nests was determined using the same criteria listed above (see **Appendix M**).

9.3.1.4.4.1 Results

During 2022, aerial nest surveys were conducted on February 24, March 19, and April 19, and ground-based surveys were completed on January 13, April 8, and June 15, 2022. One bald eagle nest and one golden eagle nest were documented during the surveys; both nests were classified as occupied active. An eagle nest monitoring study of the bald eagle nest determined that the nest had failed, as no eagle observations were made in the nest. The golden eagle nest was initially found active and occupied by a ferruginous hawk during the first aerial survey but was later observed to be occupied inactive by a golden eagle during subsequent ground-based and aerial surveys. Six non-eagle raptor nests were also observed: three unidentified inactive raptor nests were present, and three occupied red-tailed hawk nests were present.

During 2023, aerial nest surveys were conducted on March 1 and May 3; ground-based surveys were completed on February 2 and June 1 (see **Appendix M**). Two bald eagle nests and one golden eagle nest were observed. Of these, one of the bald eagle nests and the golden eagle nest were previously documented in 2022. In 2023, the previously documented bald eagle nest was first determined to be occupied inactive by a bald eagle, then was found occupied active later in the season with a great horned owl. Similarly, the golden eagle nest was first determined to be occupied inactive by a golden eagle, then occupied inactive later in the season by a red-tailed hawk during the 2023 survey. The second bald eagle nest identified during surveys in 2023 was approximately 816 feet east of the other bald eagle nest; this nest had not been observed during previous surveys (see **Appendix M**) and was determined to be occupied inactive in 2023. No federally or state-listed threatened or endangered species were documented during the 2023 survey efforts.

9.3.1.5 Bats

9.3.1.5.1 Bat Species with Potential to Occur in the Project Area

Fourteen bat species potentially have ranges overlapping the Project Area (SDBWG 2004; SDGFP 2014, 2024). The range of the federally listed endangered and state-listed threatened

northern long-eared bat (*Myotis septentrionalis*) (NLEB) potentially overlaps the Project Area. The little brown bat (*Myotis lucifugus*) is under review for federal listing and the tricolored bat *(Perimyotis subflavus*) is federally proposed for listing as endangered. Several species are considered SGCN. Species occurring in South Dakota and potentially occurring in the Project Area are listed in **Table 9.3.1.5.1-1**.

Table 9.3.1.5.1-1. Bat Species with Known or Potential Occurrence in the Project Area

Common Name	Scientific Name	Status (federal; state)	Habitat	Potential Presence in Project Area
Big brown bat	*Eptesicus fuscus*	-	Year-round resident in South Dakota. Primary habitat is forested areas but can be found in various habitats; roost sites occur in tree cavities, under bark, in human-made structures, rock crevices, mines, and caves; maternity colonies/roosts occur in tree cavities, buildings, barns, and bridges. Species hibernates in caves, mines, and buildings.	Likely
Eastern red bat	*Lasiurus borealis*	SGCN	Summer resident in South Dakota. Habitat includes deciduous and coniferous trees; roost sites include trees; foraging areas include cottonwood floodplains, urban areas, and deciduous forest areas.	Likely
Evening bat	*Nycticeius humeralis*	-	Migratory in South Dakota. Primary habitat is highly forested areas; roost sites include tree cavities, behind tree bark, tree foliage, rock crevices, and human-made structures; maternity colonies/roosts occur in buildings, behind loose bark, and tree cavities. The species forages in open areas and around trees.	Unlikely

Table 9.3.1.5.1-1. Bat Species with Known or Potential Occurrence in the Project Area				
Common Name	**Scientific Name**	**Status (federal; state)**	**Habitat**	**Potential Presence in Project Area**
Fringed myotis	*Myotis thysanodes*	-	Year-round resident in South Dakota. Habitats vary but include desert shrub and pines; roost sites include caves, mines, and abandoned buildings. The species hibernates in mines and caves.	Unlikely
Fringed-tailed myotis (Black Hills fringed myotis)	*Myotis thysanodes pahasapensis*	SGCN	Year-round resident in South Dakota. Habitats vary and include desert scrub, fir-pine, and oak and pinyon woodlands; roost sites include caves, mines, and buildings. The species hibernates in mines and caves.	Unlikely
Little brown myotis	*Myotis lucifugus*	SGCN	Year-round resident in South Dakota. Species use a wide range of habitats and roost sites include human-made structures. Species hibernates in caves, tunnels, abandoned mines; maternity colonies/roosts occur in human-made structures; foraging occurs over water and in woodlands near water.	Likely
Long-eared myotis (Western long-eared myotis)	*Myotis evotis*	-	Year-round resident in South Dakota. Habitats include coniferous forest and arid badlands; roost sites include trees, abandoned buildings, mines, caves, sinkholes, and cliff fissures. The species hibernates in caves, mines; maternity colonies/roosts occur in buildings and on the ground in rock crevices and fallen	Unlikely

Table 9.3.1.5.1-1. Bat Species with Known or Potential Occurrence in the Project Area				
Common Name	**Scientific Name**	**Status (federal; state)**	**Habitat**	**Potential Presence in Project Area**
			logs. Species forages over tree canopy, ponds, and streams.	
Long-legged myotis	*Myotis volans*	-	Year-round resident in South Dakota. Habitat includes coniferous-juniper forest at moderate elevations, lowlands, and riparian areas. Roost sites include trees, caves, mines, and rock crevices. The species hibernates in abandoned mines and caves; maternity colonies/roosts occur in tree cavities.	Unlikely
Northern hoary bat	*Lasiurus cinereus*	SGCN	Summer resident in South Dakota. Habitat includes forested areas and areas near water; roost sites occur in trees; foraging occurs over water and above tree canopies.	Likely
Northern long-eared bat	*Myotis septentrionalis*	FE; SGCN	Year-round resident in South Dakota. Habitats include dense forests and areas near water; roost sites include buildings, under tree bark, caves, and mines. The species hibernates in caves and mines and maternity colonies/roosts occur in buildings. Foraging occurs over forested hillsides.	Unlikely
Silver-haired bat	*Lasionycteris noctivagans*	SGCN	Summer resident in South Dakota. Habitats include forested areas, old growth forests, and wooded areas along streams; roost sites occur under bark, in snags, and in tree cavities;	Unlikely

Table 9.3.1.5.1-1. Bat Species with Known or Potential Occurrence in the Project Area				
Common Name	**Scientific Name**	**Status (federal; state)**	**Habitat**	**Potential Presence in Project Area**
			maternity colonies/roosts occur in trees, snags, and cavities; foraging occurs near water sources.	
Townsend's big-eared bat	*Corynorhinus townsendii*	SGCN	Year-round resident in South Dakota. Habitats include arid desert scrub and pine forests; roost sites are located underground and in areas with little human intervention. The species hibernates in areas with little human intervention in caves, and mines; maternity colonies occur in underground structures; and foraging occurs along forest edges or in tree canopies.	Unlikely
Tricolored bat	*Perimyotis subflavus*	PE	Found in forested habitats primarily within deciduous hardwoods. Hibernates in caves, abandoned mines, and occasionally road-associated culverts.	Unlikely
Western small-footed myotis	*Myotis ciliolabrum*	-	Year-round resident in South Dakota. Habitats include arid areas with cliffs, talus fields, prairies with clay buttes and steep banks along rivers, and cottonwood-willow floodplains. Roost sites are located in rock crevices and near water sources and the species hibernates in caves and mines. Foraging occurs above ground over cliffs or clay buttes.	Unlikely

Sources: SDGFP (2014, 2024)

Note: FE = federally listed endangered; PE = federally proposed endangered; SGCN = South Dakota Species of Greatest Conservation Need.

According to the NLCD, the Project Area contains limited (54 acres) deciduous forest (MRLC 2019) potentially suitable for summer tree roosting bats. These areas are present primarily as scattered, wooded patches throughout the Project Area. The USGS's 2020 karst map of the conterminous United States shows no karst in Haakon County (USGS 2020). It is not anticipated that bats that use subterranean areas (e.g., caves) utilize the Project Area during winter due to the lack of known hibernacula or cave habitats. Species that may overwinter in buildings (e.g., big brown bat, fringed myotis) may utilize the Project Area during winter.

To characterize use of the Project Area by bats, an acoustic bat survey was completed as described in the following section.

9.3.1.5.2 Acoustic Bat Surveys

In 2018, a passive acoustic study designed in accordance with the recommendations outlined in the WEG was conducted to determine bat species presence and their activity level to assess bat species' risk from April to November (Tetra Tech 2019b). This study, conducted in 2018, used four bat detectors, three of which were ground-based with a single microphone, and one of which was outfitted with a high and a low microphone mounted on a MET tower and used the Wildlife Acoustics Song Meter SM3BAT Monitoring Systems to record bat activity in full spectrum format.

9.3.1.5.2.1 Results

892 detector-nights (cumulative number of nights surveyed by all microphones) were sampled over the course of 211 calendar nights resulting in 14,262 recorded bat calls identified to the species level or frequency group with an overall activity rate of 16.0 bat passes per detector night. Bat passes identified at the species level included seven species and three groups (**Table 9.3.1.5.2.1-1)**. The recorded bat species, ordered by frequence of detection, included big brown bats (32%), hoary bats (18%), little brown bats (17%), silver-haired bats (12%), western small-footed bats (12%), eastern red bats (4%), long-legged myotis (4%), and unidentified high frequency bats, unidentified low frequency bats, and unidentified myotis species (accounting for less than 1% each). Migratory tree bats accounted for over 34% of all bat activity and demonstrated spikes of activity in early June and early August. Myotis species and big brown bats (33% and 32% respectively) accounted for the remaining activity and demonstrated consistent activity throughout the survey period with the highest levels of activity in mid-summer (Tetra Tech 2019b).

Table 9.3.1.5.2.1-1. Acoustic Detections of Bats in the Project Area

Common Name	Scientific Name	Percentage of Detections
Big brown bat	*Eptesicus fuscus*	32%
Eastern red bat	*Lasiurus borealis*	4%
Hoary bat	*Lasiurus cinereus*	18%

Table 9.3.1.5.2.1-1. Acoustic Detections of Bats in the Project Area		
Common Name	**Scientific Name**	**Percentage of Detections**
Little brown myotis	*Myotis lucifugus*	17%
Long-legged bat	*Myotis volans*	4%
Silver-haired bat	*Lasionycteris noctivagans*	12%
Western small-footed myotis	*Myotis ciliolabrum*	12%
Unidentified high frequency bats	N/A	<1%
Unidentified low frequency bats	N/A	<1%
Unidentified *Myotis* spp.	N/A	<1%

9.3.1.5.3 Northern Long-Eared Bat Habitat Assessment

A summer foraging and roosting habitat assessment specific to NLEB was completed in 2022 (see **Appendix O**). The assessment, and the NLEB, is further discussed in **Section 9.3.2.1.1**.

9.3.2 Sensitive Wildlife Species

The following sections describe sensitive wildlife species and their potential presence in the Project Area. For the purposes of this Application, the term sensitive species encompasses federally and state-listed species, species that are proposed for listing, and candidates for listing under the ESA.

9.3.2.1 Federally Listed Species

The USFWS IPaC report identified two federally listed endangered species, two federally listed threatened species, and one candidate species that may occur in the Project Area at certain times of the year (USFWS 2024a). These species are the NLEB, piping plover (*Charadrius melodus*; threatened), rufa red knot (*Calidris canutus rufa*; threatened*)*, whooping crane (*Grus americana*; endangered), and monarch butterfly (*Danaus plexippus*; candidate; discussed in **Section 9.3.2.2.2**).

9.3.2.1.1 Northern Long-Eared Bat

The NLEB is protected under the ESA and is federally listed as endangered. The NLEB hibernates in caves or abandoned mines during the winter. During the summer, the NLEB may roost beneath loose bark of live, dead, or dying trees. Additionally, the NLEB may roost in barns, in sheds, under bridges, or in other buildings that have little human disturbance. Female NLEBs typically roost as a maternity colony, while male NLEBs tend to roost singly or in small groups. Roosting and foraging habitat includes forests, wooded fence rows, and riparian areas. The primary causes of decline in NLEB populations are the rapid spread of white-nose syndrome, caused by the fungus *Pseudogymnoascus destructans*, across the eastern United States and the Midwest, habitat degradation, and human disturbance of hibernacula (caves or abandoned mines) during hibernation (USFWS 2022).

The NLEB range in South Dakota tends to follow larger streams and rivers, which could provide habitat for NLEBs, and encompasses only discrete areas of land in west-central South Dakota. A portion of the Project Area intersects the current NLEB range. Two North American Bat Monitoring Program detectors have documented NLEBs in South Dakota, one in Custer County in 2020 (Custer County is approximately 44.9 miles southwest of the Project Area) and one in Lawrence County in the Black Hills National Forest in 2022 (Black Hills National Forest is approximately 66.7 miles west of the Project Area) (USGS 2023e). The Project Area is approximately 68 miles from the nearest known hibernaculum in Black Hills, South Dakota.

A NLEB summer foraging and roosting habitat assessment (see **Appendix O**) was completed for the study area (see Figure A-9 in **Appendix A**) following guidance from the USFWS's *Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines* (USFWS 2022), and field validated on September 13, 2022. Suitable summer foraging and roosting habitat was defined as patches of trees 10 acres or greater and included a 1,000-foot buffer (hereafter, connected habitat buffer) as recommended by USFWS guidance. The evaluation consisted of an initial desktop review, followed by a field reconnaissance visit to ground-truth results of the desktop review. As a result of this habitat assessment, 65 acres of potential summer habitat and 1,508 acres of connected habitat were identified in the study area; most of this habitat is outside the Project Area.

None of the 14,262 bat calls recorded during acoustic bat surveys (see **Section 9.3.1.5.2**) were classified as NLEB (see **Table 9.3.1.5.2.1-1**). Due to the lack of documented NLEBs in the area, and limited amount of potentially suitable summer habitat in the Project Area, it is unlikely that NLEBs are present in the Project Area.

9.3.2.1.2 Rufa Red Knot

The rufa red knot was federally listed as threatened on January 12, 2015 (79 FR 73705 [December 11, 2014]). The red knot population is threatened by habitat loss in migration and wintering areas, reduction of quality and quantity of food resources, asynchronies in timing throughout its breeding and migration range, and high predation on the breeding grounds every 3 to 4 years. The rufa red knot is one of three subspecies occurring in North America, and has one of the longest migration distances known, traveling between its breeding grounds in the central Canadian Arctic to wintering areas that are primarily in South America (79 FR 73705 [December 11, 2014]).

During the breeding season, the rufa red knot is typically found along sandy beaches and shorelines, or on large mudflats (Cornell Lab of Ornithology 2024). Outside of the breeding season, red knots are usually found along intertidal, marine beaches (Harrington 2001). During migration, some red knots can be found flying over inland areas, but these cases are rare (Sibley 2003). Suitable habitat is lacking within the Project Area, though it is possible that a rufa red knot could fly over the Project Area during migration.

The nearest reported rufa red knot observation, detected in 2002, was approximately 74 miles east of the Project Area (eBird 2023). A second observation was recorded approximately 76 miles east of the Project Area and included nine individuals in May 2016 (eBird 2023). As identified in the PBA CEFs, the nearest suitable habitat is 30 miles from the Project Area.

It is unlikely for the rufa red knot to occur in the Project Area or within a 2.5-mile buffer surrounding the Project Area (Piorkowski et al. 2023). No rufa red knots were observed during the site reconnaissance visit conducted on September 13, 2022, or during the avian use studies conducted in 2017, 2018, 2022, 2023, and 2024. Due to the lack of rufa red knot observations, and lack of potentially suitable habitat in the Project Area, the species is unlikely to occur.

9.3.2.1.3 Piping Plover

The piping plover was federally listed as threatened in 1985 (50 FR 50726 [December 11, 1985]), with the Northern Great Plains and Atlantic Coast populations listed as threatened and the Great Lakes population listed as endangered. The piping plover breeds only in three geographic regions of North America: the Atlantic Coast, the Northern Great Plains, and the Great Lakes (USFWS 2023b). In South Dakota, the piping plover nests mainly along Lake Oahe and below Fort Randall and Gavin's Point Dams, and rarely on alkaline wetlands in northeastern South Dakota and along lakeshores in western South Dakota (SDGFP 2019).

The nearest reported piping plover observation was made in 2014, approximately 20 miles southwest from the Project Area (eBird 2023). Most reported observations of piping plover occur around Pierre, South Dakota, approximately 60 miles east of the Project Area within designated critical habitat for the species that is approximately 30 miles northeast of the Project Area. No alkali lakes were observed in the Project Area; however, in dry years, piping plover could occur within dried-up wetlands. During a site reconnaissance visit conducted on September 13, 2022, and the avian use studies during 2017, 2018, 2022, 2023, and 2024, no piping plovers were observed.

Due to the lack of piping plover observations in the Project Area, and the lack of potentially suitable habitat, piping plovers are unlikely to occur.

9.3.2.1.4 Whooping Crane

The whooping crane (*Grus americana*) was federally listed as endangered in 1967 (32 FR 4001 [March 11, 1967]) in the United States by the USFWS and in 1978 in Canada by the Committee on the Status of Endangered Wildlife in Canada (USFWS 2023c).

The whooping crane has one natural wild population of approximately 543 individuals (Butler et al. 2022). Members of this population nest in and adjacent to Wood Buffalo National Park in the Northwest Territories and Alberta, Canada, and winter mainly in and adjacent to Aransas National Wildlife Refuge along the central Texas coast (Government of Canada 2015; USFWS 2023c). Whooping cranes spend the largest amount of time during migration feeding in harvested grain fields (USFWS 2023c). Studies indicate whooping cranes use a variety of habitats during migration and generally roost in small palustrine (marshy) wetlands ≤ 1 kilometer (km) from suitable feeding areas (Howe 1987, 1989).

The Project Area is in the range of the wild whooping crane population range (USFWS 2023c) and in the portion of the USGS whooping crane migration corridor that encompasses 95% of confirmed whooping crane sightings (Pearse et al. 2018a, 2018b). The nearest known whooping crane observation occurred in fall 2015, approximately 5.4 miles west of the Project Area (USFWS 2023c). Two observations of whooping cranes have occurred 5.5 miles west and 8.8

miles east of the Project Area along with two individuals < 0.5 mile south and 5.5 miles southeast of the Project Area confirmed by telemetry locations (Pearse et al. 2020).

Philip Wind conducted a whooping crane habitat assessment in February 2023 using methods defined in **Appendix P**. The objective of the assessment was to identify potentially suitable whooping crane stopover habitat through the use of three methods: The TWI Wetland Suitability Model (TWI 2012), the Predicted Habitat Use Model, and the Decile Model (Niemuth et al. 2018).

The TWI model identifies suitable habitat by filtering out wetland areas in a study area due to proximity to anthropogenic features and visual obstructions and then scoring the remaining wetlands based on their water regime, distance to food, size, type, density. These data are then used to generate a numeric value for each wetland, and wetlands with scores of 12 or higher are considered "potentially suitable habitat" for whooping cranes. Results of the TWI Suitability Model indicate the Project Area contains 415 acres of wetlands identified as potentially suitable habitat.

The Predicted Habitat Use Model was developed specifically for North and South Dakota and considers 12 variables that have been validated using GPS data to predict the use of habitat by whooping cranes (Niemuth et al. 2018). The Predicted Habitat Use Model indicates that habitat within the Project Area has a 0.38% chance of use by the species during migration (see **Appendix P**).

The Decile Model calculates high use areas by deciles (or 1/10th parts) and defines suitable wetland stopover habitat as wetlands in the five highest use deciles (Niemuth et al. 2018). The Decile Model showed that 348 acres, including 5 acres of NWI wetlands, are considered a whooping crane high use decile (see **Appendix P**).

Based on the overall paucity of recent whooping crane observations in the Project Area, low quantities of suitable wetland stopover habitat relative to the Project Area, and the very low likelihood of use by whooping cranes, the species is considered unlikely to occur in the Project Area.

Even so, Philip Wind has taken significant steps to avoid siting wind turbines within suitable habitat for whooping cranes. All turbines have been sited to avoid unbroken grasslands and buffer zones around wetlands have been created based on TWI scores:

- No turbines are sited within 1,000 feet of wetlands with TWI scores of 4–11.
- No turbines are sited within 0.5 mile of wetlands with TWI scores of 12–14.

Of the approximately 68,000 acres within the current Project boundary, 47,278 acres have been eliminated from consideration for hosting a wind turbine to avoid siting close to suitable whooping crane habitat.

9.3.2.2 Proposed and Candidate Species

The federally proposed endangered tricolored bat and federally proposed threatened regal fritillary (*Argynnis [Speyeria] idalia occidentalis*) were not included in the IPaC report.

However, Philip Wind has considered these species and included discussion of them in this Application.

9.3.2.2.1 Tricolored Bat

The tricolored bat is federally proposed as endangered. As such, it is not currently afforded protections under the ESA. This species hibernates in caves or abandoned mines during the winter. During the summer, the tricolored bat may roost within leaf clusters of live, dead, or dying trees. Additionally, the tricolored bat may roost in barns, under bridges, culverts, buildings with little human disturbance, or in Spanish moss or lichen at the southern and northern parts of their range, respectively. Female tricolored bats typically roost as a maternity colony, while male tricolored bats tend to roost singly or in small groups. Roosting and foraging habitat includes forests, wooded fence rows, and riparian areas. The tricolored bat primarily occupies forest interiors. This species does occur in highly fragmented, agriculturally dominated landscapes, but generally forages over waterways and forest edges.

South Dakota is on the western edge of the species' range, with the nearest occurrence of the species more than 60 miles to the west of the Project Area in Pennington County, South Dakota (Geluso et al. 2005). The tricolored bat occurs in South Dakota but is considered rare, with records being in the western portion of the state.

Tricolored bat habitat includes forested areas where this species roosts, forages, or travels. Tricolored bat habitat within or near the Project Area is assumed to be the same as NLEB habitat. As stated in **Section 9.3.2.1.1**, 65 acres of potential summer habitat and 1,508 acres of connected habitat were identified in the NLEB habitat assessment study area; most of this habitat is outside the Project Area.

None of the 14,262 bat calls recording during acoustic bat surveys (see **Section 9.3.1.5.2**) were classified as tricolored bat (see **Table 9.3.1.5.2.1-1**). Due to the lack of documented tricolored bats in the area, and the limited amount of potentially suitable habitat in the Project Area, it is unlikely that tricolored bats are present in the Project Area.

9.3.2.2.2 Monarch and Regal Fritillary Butterflies

The monarch butterfly is federally proposed as threated. As such, it is not currently afforded protections under the ESA.

The monarch butterfly is a migrating insect whose range extends throughout most of the continental United States. This butterfly can live in a variety of habitats, including prairies, savannas, ROWs, and field edges with abundant flowering plants. Although the monarch can live in many different habitats, their larval stage requires a diet of milkweed (primarily *Asclepias* spp.) species. Because of this reliance on milkweed, habitats with milkweed may be more likely to have monarch butterflies present. The summer range of the monarch butterfly extends into Canada, which is the northern edge of the milkweed range, and the species migrates to overwinter in Mexico or the California coast (USFWS 2023d).

No monarch butterflies were observed during the site reconnaissance visit (Piorkowski et al. 2023). The site reconnaissance visit was conducted on September 13 and October 13 to 14, 2022,

when monarch butterfly adults are in flight and would be expected to be readily observed if present in the area (Bird Watching HQ 2023).

The USFWS proposed listing the regal fritillary under the ESA in August 2024. The western population species range overlaps the Project Area and is proposed as threatened. As such, it is not currently afforded protections under the ESA. The species requires an abundance of violets (*Viola* spp.) and nectar sources, warm season bunchgrasses, and native tallgrass or mixed grasses indigenous of the region. Suitable grasslands are sufficiently large (ideally more than 2,471 acres), contiguous, and maintained by periodic disturbance. Regal fritillary larvae feed exclusively on the leaves of violets, and adults feed on a variety of nectar sources. Adult males are generally present earlier in summer than females, beginning about May 15, but females are generally present later into the fall, until about October 31. Eggs are typically laid in prairie landscapes August 15 to October 31, and individuals overwinter as larvae, before pupating approximately May 1 to July 31 (USFWS 2023e).

According to the USFWS (2023e), there are historical records of the regal fritillary occurring in Haakon County, South Dakota, but there are no current records. The Project Area is in the Northwestern Great Plains Regal Fritillary Species Status Assessment Analytical Unit. This Analytical Unit has a high resiliency and habitat condition score for regal fritillaries, and even under the most extreme future scenario modeled by the USFWS was still ranked as having medium resiliency (USFWS 2023e).

The Project Area contains potentially suitable habitat for the monarch butterfly and regal fritillary in the form of herbaceous areas, ROWs, fallow fields, and grasslands with potential to contain milkweed and/or violet species. Therefore, both butterfly species have potential to occur in the Project Area.

9.3.2.3 State-listed Species

Based on a desktop review of the SDGFP distribution lists, three state-listed terrestrial species may occur in the Project Area (**Table 9.3.2.3-1**) (SDGFP 2025). Aquatic species are discussed in **Sections 10.1.2** and **10.2.2**. These three species are the peregrine falcon (*Falco peregrinus*) (state-listed threatened), whooping crane (federally and state-listed endangered, discussed in **Section 9.3.2.1.4**), and swift fox (*Vulpes velox*) (state-listed threatened). Philip Wind submitted a Natural Heritage Database request to the SDGFP for the Project. Based on the information received from the SDGFP on February 22, 2023, evidence of only one state-listed species, the swift fox, has been documented within 5 miles of the Project.

9.3.2.3.1 Peregrine Falcon

The state-listed endangered peregrine falcon is a widespread raptor that feeds primarily on birds and small mammals, lizards, fishes, and insects. The species prefers open grasslands with cliffs and rock outcroppings available for nesting that are near a concentrated prey base. The species is believed to have been historically widespread throughout South Dakota, and peregrine falcons could use the open grasslands in the Project Area for foraging (SDGFP 2024). The 2022 to 2023 large bird surveys included one peregrine falcon observation in the spring, fall, and winter (Fields et al. 2023).

9.3.2.3.2 Whooping Crane

See **Section 9.3.2.1.4** for discussion on the whooping crane.

9.3.2.3.3 Swift Fox

The swift fox is an omnivore that historically occurred in appropriate habitat throughout South Dakota (SDGFP 2024). The species prefers heavily grazed shortgrass or mixed-grass prairies usually associated with prairie dog or ground squirrel colonies. A swift fox den site was documented approximately 3.6 miles south of the Project boundary in 2010 (Morey, scoping letter, 2023). No swift fox dens or individuals were observed during any of the site visits; therefore, it is unlikely to occur within the Project Area.

9.3.3 Wildlife Impacts/Mitigation

During Project construction, the temporary loss, alteration, or fragmentation may result in potential displacement of wildlife to proximate suitable habitat. Additionally, individuals of wildlife may avoid work areas due to increased traffic and noise. Avoidance may include nest or burrow abandonment or loss of eggs or young, which has the potential to result in a decrease in reproductive success for certain individuals. Common wildlife species likely to inhabit the Project Area are likely adapted to a mosaic of land cover types and anthropogenic uses (e.g., farming practices), and wildlife individuals are expected to reinhabit suitable areas in and adjacent to the Project Area once Project construction activities cease.

During Project construction and O&M, injury and mortality of individual wildlife may result from crushing by, or collisions with vehicles or equipment. During Project O&M, injury or mortality of individuals may also result from collisions with turbines or the Gen-Tie Line. Philip Wind will implement BMPs contained in the UGP PEIS and additional avoidance, minimization, and mitigation measures (see **Section 9.3.4**) to minimize the likelihood of such events occurring.

Philip Wind has committed to implementing BMPs derived from the UGP PEIS in addition to the Applicant's additional voluntary environmental protection measures. Philip Wind has also committed to BMPs and species-specific conservation measures identified in the PBA CEFs. The PBA CEFs were completed for the following federally listed species that may occur in the proposed Project Area: NLEB, piping plover, whooping crane, and rufa red knot.

Overall, the Project's impacts to wildlife resources are consistent with the analysis in the UGP PEIS and would not result in impacts greater than those described therein.

9.3.3.1 Prairie Grouse

In consideration of its 2022 and 2023 lek survey results, Philip Wind committed to remove at least four turbines that had been preliminarily sited proximate to leks or suitable prairie grouse habitat. Given the small amount of long-term disturbance to potential prairie grouse habitat and the Project's commitment to further minimize impacts by following the BMPs and mitigation measures in **Section 9.3.4**, these impacts would be consistent with the analysis and findings in the UGP PEIS and the Project would not result in new or more severe significant impacts than described in the UGP PEIS.

9.3.3.2 Migratory Birds and Raptors

Impacts to migratory bird and raptor species may be direct (e.g., turbine strike mortality) or indirect (e.g., habitat loss or alteration). The Applicant has completed small and large bird use surveys and raptor and eagle use and nest surveys to assess baseline conditions and inform Project siting and design (**Sections 9.3.1.3** and **9.3.1.4.4**). Philip Wind plans to conduct post-construction mortality monitoring, which is described in detail in the Project Bird and Bat Conservation Strategy (BBCS) (**Appendix Q**). It is anticipated that some avian mortality could occur due to the presence of the Project; however, the impacts are anticipated to be within the average range of mortality based on documented events at other facilities within similar environments.

9.3.3.3 Bats

Impacts to bats can be direct (e.g., turbine strike mortality) or indirect (e.g., habitat loss or degradation). Philip Wind has completed a habitat suitability assessment and an acoustic survey for bats to assess baseline conditions and inform Project siting and design (**Sections 9.3.1.5.2** and **9.3.2.1.1**). Philip Wind plans to conduct post-construction mortality monitoring, which is described in detail in the Project BBCS (see **Appendix Q**). With the avoidance and minimization measures listed in **Section 9.3.4** and because special-status bat species are not likely to be present within the Project Area, impacts to bat species are expected to be minimal.

9.3.3.4 Federally Listed Species

During Project construction and O&M, Philip Wind has committed to implementing BMPs derived from the UGP PEIS, as well as additional avoidance, minimization, and mitigation measures described in **Section 9.3.4**. Philip Wind has also committed to BMPs and species-specific conservation measures identified in the PBA CEFs. The PBA CEFs were completed for the NLEB, rufa red knot, piping plover, and whooping crane. The Project complies with Section 7 of the ESA per the PBA CEFs for these species.

The following impact summaries consider threatened, endangered, and special-status species-specific BMPs identified in **Section 9.3.4** and measures outlined in the PBA Project CEFs. Additional BMPs and mitigation measures outlined for vegetation (see **Section 9.1.2**) and water resources (see **Sections 9.2.2** and **10.2**) are also applicable. BMPs and mitigation measures presented for wildlife (see **Section 9.3.4**) are considered generally protective for threatened, endangered, and special-status species and their habitats.

9.3.3.4.1 Northern Long-Eared Bat

As described in **Section 9.3.2.1.1**, summer roosting habitat is present within the Project Area; however, it is in small quantities and hibernacula are lacking in the Project Area and distance to such features makes the likelihood of NLEBs being present very low.

Because NLEBs are not likely to be present within the Project Area and Philip Wind will implement the minimization measures and practices described in **Section 9.3.4** to avoid and minimize potential impacts to bats, no impacts to the NLEB are expected to occur.

9.3.3.4.2 Rufa Red Knot

No suitable rufa red knot habitat is present and there are no recorded occurrences of rufa red knot in the Project Area during the numerous site visits, it is unlikely that rufa red knot would occur in the Project Area. No impacts to rufa red knot are anticipated.

9.3.3.4.3 Piping Plover

No suitable piping plover habitat is present and there are no recorded occurrences of piping plover in the Project Area, so it is unlikely that piping plover would occur in the Project Area. No impacts to piping plover are anticipated.

9.3.3.4.4 Whooping Crane

Based on the three-method approach discussed in **Section 9.3.2.1.4**, Philip Wind determined that the Project Area contains 415 acres of potentially suitable habitat, of which 5 acres are considered suitable wetland stopover habitat, with a 0.38% chance that whooping cranes will use that habitat over any given year (see **Appendix P**). In addition to the avoidance and minimization measures described in **Section 9.3.4**, Philip Wind developed and will implement a whooping crane monitoring and contingency plan (**Appendix R**) to minimize potential impacts to whooping cranes during Project construction and O&M. In the EA, WAPA determined that the Project may affect but is not likely to adversely affect the whooping crane (WAPA 2023).

9.3.3.5 Proposed and Candidate Species

9.3.3.5.1 Tricolored Bat

As described in **Section 9.3.2.2.1**, tricolored bats are unlikely to be present in the Project Area. Measures described in **Section 9.3.3.4.1** will also serve to avoid and minimize impacts to this species should they be present in the Project Area. Because tricolored bats are unlikely to be present within the Project Area and Philip Wind will implement measures to avoid and minimize potential impacts to bats, no impacts to the species are expected to occur.

9.3.3.5.2 Monarch and Regal Fritillary Butterflies

There may be suitable habitat for both butterfly species within the Project Area and both the monarch and regal fritillary may occur in the Project Area; however, these species are not currently protected and there is little evidence to suggest that butterfly mortality is a concern at commissioned wind energy facilities (Grealey and Stephenson 2007). Because most potential habitat in the Project Area has been impacted by grassland conversion, minor impacts may occur due to loss of habitat for these species. These impacts would be largely avoided through siting and minimization measures listed in **Section 9.3.4**.

9.3.3.6 State-listed Species

9.3.3.6.1 Peregrine Falcon

The Project Area contains suitable foraging habitat for peregrine falcons. However, there is limited breeding habitat and a lack of recorded sightings in the Project Area; therefore, impacts to the species are unlikely.

9.3.3.6.2 Whooping Crane

See **Section 9.3.3.4.4** for the discussion on impacts to whooping cranes.

9.3.3.6.3 Swift Fox

The Project Area contains suitable habitat as well as the presence of prey (prairie dogs); however, there are no recordings of swift fox in the Project Area and the nearest recording was a den observation 3.5 miles outside of the Project Area recorded over 10 years ago. Therefore, impacts to the species from the Project are unlikely.

9.3.4 Avoidance, Minimization, and Mitigation Measures

As discussed in **Section 1.2** and elsewhere in this Application, Project Facilities have been sited to avoid or minimize impacts to federally listed and other special-status wildlife species. Philip Wind will continue to implement applicable avoidance and minimization measures. Philip Wind will construct and operate the Project in accordance with federal and state requirements.

Philip Wind prepared a BBCS (see **Appendix Q**) in accordance with the USFWS WEG (USFWS 2012) that will be implemented to minimize impacts to avian and bat species during construction and operation of the Project. As stated in the BBCS, the following impact minimization and avoidance measures will be implemented for the Project.

Design minimization and avoidance measures:

- To the extent commercially reasonable, maximize power generation per turbine to reduce the number of turbines needed to achieve maximum energy production.
- Locate transmission lines in areas where Philip Wind has site control and to the extent possible in areas where previous disturbance has occurred, thereby minimizing impacts to trees and associated birds and bats.
- Where applicable, the Project's aboveground power lines shall be designed and constructed to minimize avian electrocution and collision risks, referencing guidelines outlined in the APLIC *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012).
- Use the existing road network where feasible and reasonable to reduce the need for new road construction.
- Avoid siting Project components in wetlands and waterbodies to the extent practicable.

- Avoid siting turbines within 1,000 feet of wetlands with TWI score of 4–11 and within 0.5 mile of wetlands scores with a TWI score of 12–14 in consideration of potential whooping crane habitat.
- Minimize disturbance to broken grasslands.
- Avoid siting turbines on native (unbroken) sod grasslands.
- Avoid all SDGFP modeled Tier 1 and Tier 2 sharp-tailed grouse and greater prairie-chicken habitat for siting turbines.
- Avoid siting turbines on unbroken grasslands within 1 mile of known active sharp-tailed grouse and greater prairie-chicken leks.
- Avoid siting turbines within 0.5 mile of NLEB summer roosting and foraging habitats.
- Avoid siting turbines within 500 m of known active prairie dog colonies.
- Site turbines and other aboveground wind facility infrastructure away from prairie grouse leks to the extent feasible.
- Avoid siting turbine within 2 miles of currently known bald eagle nests.
- Follow USFWS Region 6 raptor nest (non-eagle) setback buffers from preconstruction data as follows: 800 m for red-tailed hawk and 400 m for great horned owl.
- Turn off unnecessary lighting at night to limit the attraction of migratory birds. Follow lighting guidelines, where applicable, from the WEG. This includes using lights with timed shutoff, downward-directed lighting to minimize horizontal or skyward illumination, and avoidance of steady-burning, high-intensity lights. Extinguish all internal turbine nacelle and tower lighting when unoccupied.
- Light the wind turbines and met towers in accordance with the FAA requirements.
- Prepare a BBCS in accordance with the WEG that will be implemented to minimize impacts to avian and bat species during construction and operation of the Project.

Construction minimization and avoidance measures:

- Avoid tree removal from April 15 through October 31 to reduce potential impacts to roosts and other tree roosting habitats for the NLEB and other bat species.
- Minimize tree clearing as much as feasible to minimize potential impacts to bat roosting habitat. The Project has been sited to avoid tree clearing to the extent feasible and reasonable.
- Establish wind turbine buffer zones around occupied raptor nests and occupied bat roosts.
- Conduct construction monitoring and contingencies during whooping crane migration seasons and stop construction activities within 2 miles of observed whooping cranes until the crane leaves following the whooping crane monitoring and contingency plan.
- Construction activities within 0.5 mile of known active leks in unbroken grasslands during displaying and nesting season (March 15–May 15) will be avoided from 3 hours after sunrise to 1 hour before sunset.
- Install avian flight diverters on any new or upgraded overhead collector, distribution, and transmission lines within 1 mile (1.6 km) of suitable stopover habitat to minimize potential collision impacts to whooping cranes and other avian species. Devices will be installed on the overhead top statis wire (as appropriate) to increase wire visibility (APLIC 2012).
- To the extent feasible, the area required for Project construction and operation will be minimized. Philip Wind will restore all areas of temporary disturbance to their previous condition, including the use of applicable seed mixes.

- Following Project construction, roads not needed for site operations will be restored to preexisting conditions.
- Limit vehicle speeds to 25 miles per hour (mph) to avoid wildlife collisions and construction vehicles will be restricted to pre-designated access routes.
- Cover all trash in containers, and work sites will be cleared regularly of any garbage and debris related to food.
- Pets shall not be allowed in the Project Area near Project Facilities.

Operation minimization and avoidance measures:

- Vehicle speeds will be limited to 25 mph to avoid wildlife collisions.
- Fire hazards from vehicles and human activities will be reduced (e.g., use of spark arrestors on power equipment, avoiding driving vehicles off roads, allowing smoking in designated areas only).
- Pest and weed control measures will be implemented as specified by county, state, and federal requirements.
- Turbines will be feathered below the cut-in speed (3.0 m/s) during the bat active season (April 1–October 31).
- Curtailment of turbines from 30 minutes before sunset to 30 minutes after sunrise from August 16 to October 31 will increase to 5.0 m/s.
- A mitigation offset for potentially impacted whooping crane stopover habitat (5 acres) will be implemented by a third party prior to an interconnect.
- Conduct operational monitoring during whooping crane migration seasons following Project's monitoring and contingency plan; operations staff will be trained to identify whooping cranes, and if any are noted in the Project Area, turbines will be shut down within 2 miles of the crane until it leaves.
- Conduct 1 year of post-construction monitoring that achieves a g-value of 0.2 minimum and uses Evidence of Absence to analyze fatality estimates for NLEB.
- All of Philip Wind's employees and contractors working on-site will receive worker awareness training for identifying and responding to encounters with sensitive biological resources, including avian and bat species. The training will:
    - Be conducted by Philip Wind or their designee;
    - Instruct employees, contractors, and site visitors to avoid harassment and disturbance of birds and bats, especially during reproductive (e.g., courtship and nesting) seasons;
    - Provide information to contractors and employees on the Project detailing information on potential state and federal special-status animal and plant species that might be discovered on the Project site; and
    - Include an overview of the distribution, general behavior, and ecology of golden and bald eagles. Employees will be informed that they are not authorized to approach, handle, or otherwise move any eagles that might be encountered during construction or operation, whether alive, injured, or deceased. Operations personnel will be instructed to report any finding of an injured or deceased eagle to the Philip Wind environmental lead within 24 hours of observation, which will then be reported within 2 business days to USFWS.

Monitoring and adaptive management will be implemented as described in greater detail in Sections 5 and 6 of the BBCS (see **Appendix Q**) to ensure the effectiveness of the avoidance and minimization strategies incorporated into the Project.

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

> ***ARSD 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, wind energy 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.*

10.1 Existing Aquatic Ecosystem

10.1.1 Surface Waters and Wetland Resources

Surface waters are described in **Section 8.2**. The Project Area is located over the regional Northern Great Plains aquifer system (USGS 1996) and in the following watersheds: Ash Creek (hydrologic unit code [HUC] 012011204), Bridger Creek (HUC 1012011205), Buzzard Creek-Bad River (HUC 1014010208), Grindstone Creek-Bad River (HUC 1014010206), Harding Creek-Cheyenne River (HUC 1012011206), North Fork Bad River (HUC 1014010204), and West Plum Creek (HUC 1012011208) (USGS 2023c). Approximately 1,800 acres of NWI wetlands occur within the Project Area (approximately 2.6% of the Project Area). The wetlands in the Project Area consist of freshwater emergent wetlands, riverine, freshwater ponds, and freshwater forested/shrub wetland (USFWS 2023a). Aquatic biota present within the waterways of the Project Area are diverse and representative of the area.

10.1.2 Federal and State Special-Status Aquatic Species

No federally listed or state-listed threatened or endangered aquatic species were identified that have potential to occur within the Project Area.

10.2 Aquatic Ecosystem Impacts/Mitigation

10.2.1 Surface Waters and Wetland Resources

As described in **Section 9.2.2**, impacts to wetlands and waterways are expected to be minimal. The primary potential for impact to aquatic ecosystems would be from increased sedimentation or increased total suspended solids due to soil erosion from the Project during construction. In general, surficial soils on flat areas are less prone to erosion than soils in sloped areas. Construction on or adjacent to steep slope areas can render soils unstable, accelerate natural erosion processes, and cause slope failure.

Project Area slope ranges from 0 to 40%, with the majority of slope at 4.5%. Care will be taken to avoid or limit excavation in steep slope areas. Wind turbines are typically located at higher

elevations to maximize wind exposure, minimize wind obstructions, and avoid steep slopes for foundation installation. The access road locations generally avoid steep slopes as well. Similar efforts apply to the location of the underground collector circuits to avoid crossing steep ravines, however, limited trenching in steep slopes may be required, although it will be limited to the extent practicable by siting and directional boring of these areas. The Gen-Tie Line will span any wetlands or waterways in its route. During construction, BMPs will be implemented to help avoid impacts to drainageways and streams from sediment runoff from exposed soils during precipitation events. Because erosion and sediment control BMPs will be implemented for construction and operation of the Project, no impacts to aquatic ecosystems are expected.

10.2.2 Federal and State Special-Status Aquatic Species

The Project will not impact any federally or state-listed aquatic species. Therefore, no avoidance, minimization, or mitigation measures are proposed.

11. Land Use (ARSD 20:10:22:18)

ARSD 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 plant, wind energy, or 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 non-renewable resources;

(g) Other major industries;

(h) Rural residences and farmsteads, family farms, and ranches;

(i) Residential;

(j) Public, commercial, and institutional use;

(k) Municipal water supply and water sources for organized rural water systems; and

(l) Noise sensitive land uses;

(2) Identification of the number of persons and homes which will be displaced by the location of the proposed facility;

(3) An analysis of the compatibility of the proposed facility with present land use of the surrounding area, with special attention paid to the effects on rural life and the business of farming; and

(4) A general analysis of the effects of the proposed facility and associated facilities on land uses and the planned measures to ameliorate adverse impacts.

11.1 Land Use

11.1.1 Existing Land Use

Land cover in the Project Area consists predominantly of herbaceous and planted/cultivated land. Approximately 27,107 acres (40.5%) of the Project Area were identified as grassland, with 12,192 acres (17.9% of the Project Area) categorized as broken grassland and 14,915 acres

(21.9% of the Project Area) categorized as unbroken grassland (see **Appendix H**). In addition, approximately 571 acres of desktop-delineated grassland were not assessed in the field due to access issues. Remaining land cover in the Project Area consists of developed land, open water, wetlands, forest, shrubland, and barren area (MRLC 2019) (see **Table 9.1.1.1-1**).

Thirteen receptors (including habitable residences and a cemetery) are scattered throughout the Project Area, and an additional four receptors are outside of the Project Area that are within 1.25 miles of a potential turbine location (**Table 11.1.1-1**). All receptors, were originally identified using satellite imagery, followed by a field verification conducted by Philip Wind in March 2023. A second field verification was conducted in November 2024 to ensure accuracy and completeness. During this field verification process, Philip Wind noted that several structures visible on imagery are either no longer standing, or do not appear to be habitable. These locations are noted below as "Abandoned" in **Table 11.1.1-1** and were not considered in shadow flicker or sound reports. For each structure identified as "abandoned," Philip Wind requested and received documentation from the applicable landowner confirming that the structure is, in fact, abandoned.

Table 11.1.1-1. Receptors in the Project Area or within 1.25 Miles of a Turbine

Receptor ID	Coordinates	Category	Within Project Area?	Within 1.25 miles of Turbine?	Participating Landowner?
R-001	101.61359 W, 44.299207 N	Habitable Residence	Yes	No	No
R-002	101.670323 W, 44.242722 N	Habitable Residence	Yes	No	Yes
R-003	101.698051 W, 44.298705 N	Habitable Residence	Yes	Yes	Yes
R-004	101.728577 W, 44.283515 N	Habitable Residence	Yes	Yes	Yes
R-005	101.748579 W, 44.295882 N	Habitable Residence	Yes	Yes	No
R-006	101.749764 W, 44.331462 N	Habitable Residence	Yes	No	Yes
R-007	101.755049 W, 44.284734 N	Habitable Residence	Yes	Yes	No
R-008	101.827001 W, 44.287416 N	Habitable Residence	Yes	Yes	Yes
R-009	101.856769 W, 44.285142 N	Cemetery	Yes	No	No
R-010	101.866645 W, 44.270602 N	Habitable Residence	Yes	Yes	Yes

Table 11.1.1-1. Receptors in the Project Area or within 1.25 Miles of a Turbine					
Receptor ID	**Coordinates**	**Category**	**Within Project Area?**	**Within 1.25 miles of Turbine?**	**Participating Landowner?**
R-011	101.866952 W, 44.271095 N	Habitable Residence	Yes	Yes	Yes
R-012	101.868717 W, 44.309875 N	Habitable Residence	Yes	No	No
R-013	101.889485 W, 44.309134 N	Habitable Residence	Yes	No	No
R-018	101.685693 W, 44.31443 N	Habitable Residence	No	Yes	No
R-020	101.756251 W, 44.400694 N	Habitable Residence	No	Yes	No
R-022	101.804289 W, 44.401938 N	Habitable Residence	No	Yes	No
NR-001	101.668086 W, 44.257301 N	Abandoned	Yes	No	Yes
NR-002	101.688701 W, 44.283423 N	Abandoned	Yes	Yes	Yes
NR-003	101.802213 W, 44.283303 N	Abandoned	Yes	Yes	Yes
NR-004	101.840536 W, 44.268272 N	Abandoned	Yes	Yes	Yes
NR-005	101.855268 W, 44.32943 N	Abandoned	Yes	No	Yes

Project Area land use based on the classification system specified in ARSD 20:10:22:18(1) is shown in Figure A-10 in **Appendix A**. The following land use classifications occur in the Project Area:

- Land used primarily for row and nonrow crops in rotation
- Pasturelands and rangelands
- Haylands
- Potentially unbroken grasslands
- Rural residences and farmsteads, family farms, and ranches
- Residential
- Noise sensitive land uses

The following land use classifications do not occur in the Project Area:

- Irrigated lands
- Existing and potential extractive non-renewable resources
- Other major industries
- Public, commercial, and institutional use
- Municipal water supply and water sources for organized rural water systems

In Haakon County in 2022, approximately 33% of the land in farms was cropland, with corn and soybeans being the two most common crops. Total cropland in Haakon County increased by 13% from 323,940 acres in 2017 to 377,031 in 2022. Specific acreages of different crops within the Project Area, which change from year to year, are not available. In Haakon County in 2022, approximately 65% of the land in farms was pastureland. Pastureland decreased 6% from 821,946 acres in 2017 to 750,191 acres in 2022 (USDA 2024).

11.1.2 Land Use Impacts/Mitigation

Construction of the Project will result in conversion of a small portion of the land within the Project Area. **Table 6-1** provides a summary of the temporary and long-term ground disturbance impacts associated with the Project. Approximately 1,199 acres of temporary ground disturbance is expected to result from Project construction, of which 771 acres is agriculture. Damage to crops that occur on cultivated lands during construction will be compensated for by Philip Wind. Approximately 115 acres will be impacted long-term for the operational life of the Project (approximately 0.2% of the Project Area) to host aboveground Project Facilities. Only 68 acres of agriculture will be impacted long-term for the operation life of the Project (approximately 0.1% of the Project Area, 0.02% of agriculture land within Haakon County). Following completion of construction, all temporary construction workspaces will be restored to preconstruction conditions, which primarily consist of cultivated croplands and pastureland/grassland, pursuant to the lease and easement agreements. Because Philip Wind coordinated turbine siting with landowners and will implement BMPs to minimize impacts from ground disturbance, any impacts to land use would be less than significant.

As discussed in **Section 18**, the Project will be decommissioned after the end of its operational life. After Project decommissioning is complete, no irreversible changes to land use will remain.

Twelve residences are within the Project Area. No displacement of residences or businesses will occur as a result of the Project.

11.2 Public Lands and Facilities

Public lands and facilities within the Project Area are shown in Figure A-10 in **Appendix A**.

11.2.1 Existing Public Lands and Conservation Easements

11.2.1.1 Federal Lands

One BLM inholding approximately 1,457 acres in size, lies within the Project Area near center of the western boundary and approximately 18.2 miles northwest of the town of Philip (see Figure A-10 in **Appendix A**); however, Philip Wind verified no infrastructure would be sited on

the BLM inholding in the Project Area. Philip Wind held a meeting with BLM on March 18, 2024, to provide updates regarding layout and transportation of Project components adjacent to the BLM inholding. Philip Wind confirmed with BLM the width of the existing road ROW maintained by the county would be sufficient for the Project and no encroachment onto the BLM inholding would be anticipated to occur.

Philip Wind confirmed with USFWS that there are no USFWS wildlife refuges, USFWS conservation easements, or USFWS wetland management district properties in the Project Area. Additionally, there are no USDA Agricultural Conservation Easement Program lands within the Project Area.

11.2.1.2 State Lands

There are no SDGFP properties in the Project Area. Three State of South Dakota School and Public Land parcels are outside of and directly adjacent to the Project Area boundary (see Figure A-1 in **Appendix A**).

11.2.1.3 Public Facilities

There are no places of worship or other public spaces or publicly accessible facilities in the Project Area. The closest public facilities to the Project Area are in the town of Philip, approximately 15 miles southeast, including a hospital, police department, fire station, ambulance services, schools, places of worship, parks, and recreational facilities.

There are no municipal or commercial airports in the Project Area. The closest airport is the Philip Municipal Airport, which is approximately 14 miles south of the Project Area. Two additional municipal airports (the Wall and Kadoka airports) are located approximately 26 and 29 miles from the Project Area, respectively. Commercial airports within 100 miles of the Project Area consist of Rapid City Regional Airport and Pierre Regional Airport, located 86 miles to the west and 92 miles to the east, respectively. Google Earth (2022) aerial imagery shows the Ferguson Landing Strip on private land located near the intersection of 213th Avenue and 215th Street (also known as Hilland Road). However, this landing strip is no longer operational.

One cemetery is located in the Project Area (see Figure A-10 in **Appendix A**). All Project Facilities would avoid the cemetery.

11.2.2 Public Lands and Facilities Impacts/Mitigation

No impacts to public lands, public facilities, or publicly accessible facilities are anticipated. No public facilities are in the Project Area, apart from public roads. Philip Wind has entered into an RUA with Haakon County regarding use of County roads for the Project. The nearest airport is approximately 14 miles from the Project Area; therefore, no impacts to airports are anticipated. Philip Wind would follow FAA regulations for marking structures and would implement the necessary safety lighting.

11.3 Sound

A noise analysis for the Project is provided in **Appendix S**.

11.3.1 Existing Sound Levels and Regulatory Framework

The Project Area is located in rural Haakon County and consists of cropland, pastureland, grasslands, and scattered rural residences. This area is a windy region; therefore, wind is a natural contributor to noise in the area. Other contributing factors to noise in the Project Area include farming activities and occasional vehicular traffic. Currently, there are no noise-related federal, county, or local regulations that apply to the Project. Ambient sound measurements have not been recorded for the Project Area.

11.3.1.1 Acoustical Terminology

The term "sound level" is often used to describe two different sound characteristics: sound power and sound pressure. Every source that produces sound has a sound power level. The sound power level is the acoustical energy emitted by a sound source and is a quantity that is not affected by the surrounding environment. The acoustical energy produced by a source propagates through the air as pressure fluctuations. These pressure fluctuations are what human ears hear and microphones measure.

The human ear is sensitive primarily to the level (loudness) of a noise (sound), but also to its pitch (frequency). The human ear can detect an incredibly large range of sound pressure changes, from approximately 20 micropascals (the "threshold of human hearing") to approximately 20 pascals (the "threshold of pain"). The frequency of a sound is the rate at which it fluctuates in time, expressed in Hertz (Hz), or cycles per second.

The compressive decibel scale is used to make the expression of loudness of a sound more manageable for discussion. Sound is quantified using the decibel, which can be weighted and expressed in different ways. The most common weighting scale used in environmental noise analysis and regulation is the dBA. This weighting mechanism emulates the human ear's varying sensitivity to the frequency of sound. The human ear is much less sensitive to low frequencies, most sensitive to approximately 1,000 Hz, and less sensitive to high frequencies. The A-weighted level represents the sum of the energy across the entire "audible frequency spectrum" (20–20,000 Hz), weighted by frequency as the human ear does. This incorporates the frequencies where wind turbines produce most of their sound (250–1,250 Hz). This is a common range for other sources as well, including transportation, industrial, and agricultural equipment. For reference, the A-weighted sound pressure level and subjective loudness associated with some common sound sources are listed in **Table 11.3.1.1-1**.

Table 11.3.1.1-1. Typical Sound Pressure Levels Associated with Common Sound Sources

Sound Pressure Level (dBA)	Subjective Evaluation	Environment	
		Outdoor	Indoor
140	Deafening	Jet aircraft at 75 feet	--

Table 11.3.1.1-1. Typical Sound Pressure Levels Associated with Common Sound Sources			
Sound Pressure Level (dBA)	**Subjective Evaluation**	**Environment**	
		Outdoor	**Indoor**
130	Threshold of pain	Jet aircraft during takeoff at 300 feet	--
120	Threshold of feeling	Elevated train	Hard rock band
110	--	Jet flyover at 1,000 feet	Inside propeller plane
100	Very loud	Power mower, motorcycle at 25 feet, auto horn at 10 feet, crowd noise at football game	--
90	--	Propeller plane flyover at 1,000 feet, noisy urban street	Full symphony or band, food blender, noisy factory
80	Moderately loud	Diesel truck (40 mph) at 50 feet	Inside automobile at high speed, garbage disposal
70	Loud	B-757 cabin during flight	Close conversation, vacuum cleaner
60	Moderate	Air-conditioner condenser at 15 feet, near highway traffic	General office
50	Quiet	--	Private office
40	--	Farm field with light breeze, birdcalls	Soft stereo music in residence
30	Very quiet	Quiet residential neighborhood	Bedroom, average residence (without TV or stereo)
20	--	Rustling leaves	Quiet theater, whisper
10	Just audible	--	Human breathing
0	Threshold of hearing	--	--

Source: Adapted from Egan (1988) and Ramsey and Sleeper (1994).

Turbines do not emit much high frequency noise, and that which is emitted is attenuated by the atmosphere before it reaches even the closest residences. Sounds in the environment vary with time, and the two sound level metrics that are commonly reported in community noise monitoring are:

- L_{90}, which is the sound level in dBA exceeded 90% of the time during a measurement period. The L_{90} is close to the lowest sound level observed. It is essentially the same as the "residual"

sound level, which is the sound level observed when there are no obvious nearby intermittent noise sources.

- L_{eq}, the equivalent level, is the level of a hypothetical steady sound that would have the same energy (i.e., the same time-averaged mean square sound pressure) as the actual fluctuating sound observed during a time interval. The equivalent level is the most commonly used metric for predicting, regulating, and measuring wind turbine noise. The equivalent level is designated L_{eq} and is commonly A-weighted. The equivalent level represents the energy average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with time-averaged mean square sound pressure values, the L_{eq} is mostly determined by occasional loud noises.

11.3.1.2 Noise Regulations

Noise impacts are not currently regulated in applicable local, state or federal law, but the Project has been designed such that anticipated sound levels will be consistent with recent Commission sound requirements for other wind projects. Sound levels consistent with recent Commission sound requirements approved for the South Deuel Wind Project include a noise level for non-participating residences not to exceed 45 L_{eq} dBA where the noise level is measured at the perimeter of existing non-participating residences (Commission 2025:Permit Condition 27).

11.3.2 Noise Analysis

A noise analysis of all three turbine models under consideration was completed for the Project and is provided in **Appendix S**. The noise analysis assessed the potential impact of the Project and confirmed the levels will not exceed 45 dBA.

11.3.3 Sound Impacts/Mitigation

The following is information on the anticipated sound levels from construction and operation of the Project.

11.3.3.1 Construction and Decommissioning

Potential sound associated with the construction and decommissioning of the Project includes site clearing, grading, foundation work, and turbine installation. All reasonable efforts will be made to minimize the impact of sound resulting from construction activities. Sounds generated by construction activities are typically exempt from state and local noise oversight if they occur within weekday, daytime periods. While most heavy construction work is anticipated to occur during daylight hours, some construction operations may be conducted outside of normal working hours. In these cases, the necessary construction efforts generally require activities that must be completed in their entirety once initiated (i.e., pouring concrete). All construction- and decommissioning-related sound producing activities will be undertaken to comply with applicable state and county regulatory obligations and ordinances. To minimize the impact of construction sound, the Project will limit any necessary nighttime work near residences to quiet activities such as finishing, and will maintain equipment to manufacturers' specifications, and minimize backing up on-site of delivery trucks. The list of construction equipment that may be used on the Project, the typical duration a particular piece of equipment is used in any 1-hour

period (Usage Factor), and the resulting hourly equivalent sound level ($L_{eq\ (1\text{-}hour)}$) for the piece of equipment are provided in **Table 11.3.3.1-1**.

Table 11.3.3.1-1. Sound Source Characteristics of Construction Equipment

Equipment	Usage Factor (%)	$L_{eq(1\text{-}hour)}$ Sound Level at 50 feet (dBA)
Backhoe	40	78
Bucket Truck	20	75
Cable Layer	50	67
Chain Saw	20	84
Concrete Truck	20	81
Crawler Crane	16	81
Dozer	40	82
Drill Rig	20	79
Dump Truck	40	77
Excavator	40	81
Feller Buncher	40	85
Forklift	40	65
Grapple Loader	40	79
Horizontal Drill	25	82
Log Truck	40	74
Moto Grader	40	85
Roller	40	80
RT Crane	16	81
Seed Drill	50	80
Skid Steer	40	79
Track Hoe	40	78
Tractor Trailer	40	74
Trencher	50	80
Truck Crane	16	81

11.3.3.2 Operation

The sound commonly associated with a wind turbine is described as a rhythmic “whoosh” caused by aerodynamic processes. This sound is created as air flow interacts with the surface of rotor blades. The rhythmic fluctuations of the overall sound levels are less perceivable the farther one

gets from the turbine. Additionally, multiple turbines operating at the same time will create the whooshing sound at different times. These non-synchronized sounds will blend to create a more constant sound to an observer at most distances from the turbines. Another phenomenon that reduces perceivable noise from turbines is the wind itself. Higher wind speed produces noise that tends to mask (or drown out) the sounds created by wind turbines.

11.3.3.3 Acoustical Model Inputs

Noise levels from the Project were predicted using the modeling method set forth in International Organization for Standardization Standard 9613-2:2024: Attenuation of Sound During Propagation Outdoors. The method was implemented using the SoundPLAN v9.0 acoustical modeling program. Figure 4-1 in **Appendix S** shows a representative three-dimensional view of the SoundPLAN model of the Project.

In the SoundPLAN model, each turbine was represented as an acoustical point source located at its hub height, which is 98 m above the ground for both the V163-4.5 and GE 3.8-154 turbine models, and 108 m above the ground for the N163-4.5 units. Transformers were modeled at a height of 3 m above the ground. The ground elevation for each turbine location was determined using Digital Elevation Model data from the USGS National Elevation Dataset. Noise levels from the full, normal, and continuous operation of the Project were predicted at each non-participating and participating residence located within 1.25 miles of any Project noise source. The main power transformers (two 140 MVA units) in the Collector Substation were assumed to be operating at their maximum rating, including operations of cooling fans. For the analysis, all 91 proposed turbine locations were included in the model. All turbine models at all proposed turbine locations can be constructed to limit the sound to 45-dBA limit at all non-participating residences.

11.3.3.4 Acoustical Modeling Results

The maximum predicted L_{eq} sound pressure levels at each receiver (the logarithmic addition of sound levels from each frequency from every turbine) are provided in **Appendix S**. The results show a maximum sound level of 44 dBA at non-participating residences. The maximum sound level at participating residences is 48 dBA when modeled with the loudest turbine model under consideration, the Vestas 163-4.5 with standard blades. These values represent only the noise emitted by the Project and do not include any extraneous noises (traffic, etc.) that could be present during physical noise measurements.

11.3.3.4.1 Transmission Facility

Construction of the Gen-Tie Line will result in sound levels similar to those of the construction of the wind energy facility. Generally, noise levels during the operation and maintenance of the Gen-Tie Line will be minimal. Transmission conductors can create a noise called corona under certain conditions. Corona noise has a buzzing or crackling sound and is due to corona discharges, defined as the small amount of electricity ionizing the moist air near the conductors. The level of noise depends on conductor conditions, voltage level, and weather conditions. Several other factors, including conductor voltage, shape and diameter, and surface irregularities such as scratches, nicks, dust, or water drops can affect a conductor’s electrical surface gradient

and, therefore, its corona noise emission levels. Measures such as carefully handling the conductor during construction to avoid nicking or scraping or otherwise damaging the surface and using hardware with no sharp edges or points are typically adequate to control corona. The way conductors are arranged on the support poles also affects corona noise production. No additional mitigation measures are required since there will be minimal noise impact from the operation of the Gen-Tie Line.

11.4 Visual Resources

11.4.1 Existing Visual Resources

Rangeland, cropland, large open vistas, and gently rolling topography visually dominate the Project Area landscape. Vegetation in and near the Project Area is predominantly cropland and grassland/pasture. Existing structures in the Project Area consist of occupied residences dispersed throughout as well as scattered farm buildings.

Visual impacts to the landscape attributable to the Project would depend on the extent to which the existing landscape is already altered from its natural condition, the number of viewers (i.e., residents, travelers, visiting recreational users, etc.) within visual range of the area, and the degree of public or agency concern for the landscape. Agriculture is the dominant land use with large, geometric agricultural plots occupying most of the Project Area. Thirteen receptors are scattered throughout the Project Area, and an additional four receptors are outside of the Project Area but within 1.25 miles of a potential turbine location (see **Table 11.1.1-1**). South Dakota Highway 73 is the only major transportation corridor intersecting the Project Area from north to south; South Dakota Highway 34 directly abuts the northern edge of the Project Area. In addition to these major roadways, a number of rural roads bisect the Project Area. The current landscape also includes numerous lakes and reservoirs, a cemetery, roadside ditches, and existing transmission lines.

The nearest designated scenic resources to the Project Area are the southwest corner of the Native American Scenic Byway located 35 miles to the northeast, Minuteman Missile National Historic Site located 25 miles south, Badlands Loop Scenic Byway beginning 25 miles to the southwest, and Badlands National Park located 35 miles southwest.

11.4.2 Visual Impacts/Mitigation

Visual impacts can be defined as the human response to the creation of visual contrasts that result from the introduction of a new element into the viewed landscape. These visual contrasts interact with the viewer's perception, preferences, attitudes, sensitivity to visual change, and other factors that vary by individual viewer to cause the viewer to react negatively or positively to the changes in the viewed landscape.

Construction, operation, and decommissioning of the Project will introduce visual contrasts in the Project Area that will cause a variety of visual impacts. The types of visual contrasts of concern include the potential visibility of turbines, transmission structures and conductors, and associated facilities, such as access roads; marker lighting on wind turbines and transmission structures; security and other lighting; modifications to landforms and vegetation; vehicles associated with transport of workers and equipment for construction, O&M activities, and

facility decommissioning. A subset of potential visual impacts associated with turbines are blade movement, blade glinting,[4] and shadow flicker.[5] Shadow flicker is discussed further in **Section 11.5**.

The primary visual impacts associated with the Project will result from the introduction of numerous vertical lines of the turbines and transmission structures into the generally strongly horizontal landscape found in the Project Area. The visible structures will produce visual contrasts by virtue of their design attributes (form, color, and line). In addition, marker lighting could cause some visual impacts at night, though these impacts will be mitigated by the installation of an ADLS.

For nearby viewers, including the rural residences dispersed throughout the Project Area, the sizes and geometric lines of both the individual turbines themselves and the array of turbines could dominate views, and the large sweep of the moving rotors would tend to command visual attention. Structural details, such as surface textures, could become apparent, and the O&M Facility, Collector Substation, Gen-Tie Line, and other structures will be visible as well.

For some, the presence of the Project within the viewsheds of recreational areas, and conservation areas may diminish the natural quality of those areas and the experience of those using those areas, potentially perceived as an adverse impact. However, the Project's operation will not generate a substantial increase in traffic or a noticeable increase in day-to-day human activity. Therefore, the Project Area will still retain its rural ambiance and remote nature characteristic of the vicinity. Furthermore, the proposed land use will not involve any ongoing industrial use of non-renewable resources, nor will it release emissions into the environment.

The magnitude of the visual impacts associated with the Project will depend on certain factors, including:

- Distance of the Project Facilities from viewers;
- Duration of views (highway travelers vs. permanent residents);
- Weather and lighting conditions;
- The presence and arrangements of lights on the turbines and other structures; and
- Viewer attitudes toward renewable energy and wind power.

Turbines will be set back at least 1.1 times the turbine height from non-participating property lines. The towers will be painted a non-glare white, off-white, or gray to comply with FAA regulations and reduce potential glare and minimize visual impact. Additionally, Philip Wind would install up to three ADLS towers to comply with FAA requirements. ADLSs involve installation of radar units around the perimeter of the wind energy facility. When radar detects an aircraft, it would stop sending a signal and the wind turbine lighting would activate. Visual impacts would be increased for a short time when an aircraft is detected. ADLS towers would reduce long-term lighting impacts as ADLS towers would use innovative technologies to eliminate the need for continuously flashing lights. The Gen-Tie Line would be a new visual

[4] Reflection of sunlight from moving wind turbine blades when viewed from certain angles under certain lighting conditions.
[5] As wind turbine blades spin under certain sunny conditions, they may cast moving shadows on the ground or nearby objects, resulting in alternating light intensity (flickering) as each blade shadow crosses a given point.

feature in the landscape, but impacts would mirror those of the existing t-lines in the Project Area. Additionally, the Gen-Tie Line has been sited to minimize length, number of structures, and impacts.

As discussed in **Section 18**, the Project will be decommissioned after the end of the operational life of the Project. After decommissioning for the Project is complete, visual resources would return to pre-Project conditions and land impacted long-term would be restored to pre-Project land uses.

11.5 Shadow Flicker

A shadow flicker analysis for the Project is provided in **Appendix T**.

11.5.1 Shadow Flicker Overview

Shadow flicker occurs when rotating turbine blades pass in front of the sun to create recurring shadows on an object. Such shadows occur only under very specific conditions, depending upon sun position, wind speed and direction, time of day, and other similar factors. The intensity of shadow flicker varies significantly with distance, and as separation between a turbine and receptor increases, shadow flicker intensity correspondingly diminishes. Shadow flicker intensity for distances greater than 10 rotor diameters is generally low and considered imperceptible.

Shadow flicker impacts are not currently regulated in applicable state or federal law. Additionally, Haakon County has no published ordinances regarding shadow flicker limits. Regardless, Philip Wind has designed the Project to result in shadow flicker consistent with other wind projects approved by the Commission. Shadow flicker limits that have been approved for other wind projects by the Commission include shadow flicker at existing residences to be no more than 30 hours annually.

11.5.2 Shadow Flicker Impacts/Mitigation

Philip Wind has conducted and published a shadow flicker study (see **Appendix T**). Results of the study demonstrate that the wind energy facility could be operated with minimal disturbance to sensitive receptors (see **Appendix T**). Currently, Haakon County has no published shadow flicker regulations; however, in accordance with Commission historical requirements, shadow flicker will be limited to 30 hours per year unless a waiver is obtained.

The shadow flicker study surveyed an area out to 1.25 mile surrounding turbines to be conservative of the 0.9-mile area of perception. In total, 17 potential receptors were identified within the area surveyed (see **Appendix T**). Results from the shadow flicker study are based on the potential for 91 turbine locations. If all 91 turbine locations were constructed, one receptor owned by a participating landowner would receive an expected 33:35 annual hours of expected shadow flicker for one of the turbine models, and Philip Wind has obtained a shadow flicker waiver for this receptor. No other receptor would receive more than 30 hours per year for any turbine model under consideration.

11.6 Electromagnetic Interference

11.6.1 Microwave Paths

11.6.1.1 Existing Microwave Paths

Comsearch conducted a microwave study (**Appendix U**) to evaluate the Project's potential effects to Federal Communication Commission (FCC)-licensed microwave paths. The analysis consisted of a Fresnel x/y/z axis study. Fresnel and Consultation Zones were calculated for the identified microwave paths using Comsearch proprietary microwave data, which includes all non-government licensed, proposed, and applied paths from 0.9 to 23 GHz that are registered with the FCC. The Fresnel Zone shows the narrow area of signal swath calculated for the identified microwave paths in the Microwave Project Area (see Figure A-10 in **Appendix A**). The Consultation Zone represents the area directly in front of each microwave antenna. The Fresnel and Consultation Zones were calculated and can be found in Figure 3 in **Appendix U**.

11.6.1.2 Microwave Paths Impacts/Mitigation

Two unique FCC database point-to-point microwave paths were identified within the Project Area. Philip Wind designed the Project Layout to avoid impacts to both existing microwave paths. Because no impacts to microwave paths will occur, no mitigation is proposed.

11.6.2 AM and FM Radio

11.6.2.1 Existing AM and FM Radio

Comsearch completed an amplitude modulation (AM) and frequency modulation (FM) radio report (**Appendix V**) to evaluate the Project's potential effects upon FCC-licensed radio frequency facilities.

The exclusion distance for AM broadcast stations varies by antenna type and broadcast frequency for directional antennas; it would be the lesser of 10 wavelengths or 1.9 miles (3 km) for non-directional antennas. A search radius of 18.6 miles (30 km) found no AM station records. According to the AM and FM Radio Report, FM stations are generally not susceptible to interference caused by wind turbines, especially at the distances recorded for those near the Project Area. No FM stations are located within 18.6 miles (30 km) of the Microwave Project Area (see **Appendix V**).

11.6.2.2 AM and FM Radio Impacts/Mitigations

The nearest AM or FM stations are located approximately 18.6 miles from the Project Area. Therefore, no impacts to AM or FM stations are expected to occur, and no mitigation measures are proposed.

11.6.3 Communication Facilities

11.6.3.1 Existing Communication Facilities

Comsearch conducted a communication tower study (**Appendix W**) to evaluate the Project's potential effects to licensed communication facilities. Based on review of FCC Antenna Structure Registration, Universal Licensing System, national and regional tower owner databases, and the applicable local planning and zoning regulations, one communication antenna was identified within the Project Area, and one tower structure and eight communication antennas were identified within 1.2 miles (2 km) of the Microwave Project Area. The single tower structure contains five of nine total communication antennas; the remaining four communication antennas (one within the Microwave Project Area and three outside the Microwave Project Area) are located on a variety of other structure types (e.g. guyed towers, monopoles, silos, rooftops, or portable structures). The antennas are used for land mobile and microwave services in the area.

11.6.3.2 Communication Facilities Impacts/Mitigations

Philip Wind has sited Project turbines such that the rotors are outside of any communication beam paths to avoid disturbances to communication systems. Reasonable distance between land mobile antennas and turbines is based on FCC interference emissions from electrical devices according to their respective frequency bands.

The communication tower study suggests turbines be set back from communication towers at a distance equivalent to the maximum height of the turbine to avoid impacts in the unlikely event of a turbine tower failure. The Project meets and exceeds this standard, with the closest communication antenna being 0.67 mile away from a proposed turbine location. If, after construction, Philip Wind receives information related to communication systems interference potentially caused by Project operation where reception is currently good, Philip Wind will resolve such problems on a case-by-case basis.

11.6.4 Department of Defense Radar

11.6.4.1 Existing Department of Defense Radar

Aviation Systems, Inc., conducted an obstruction evaluation and airspace analysis to evaluate the potential effects upon Department of Defense (DoD) radar due to Project construction and operation (**Appendix X**). The analysis also used the DoD Pre-Screening Tool (PST) to evaluate potential impacts to air defense long-range radar.

The PST indicated that there are two radars near the Project Area: Ellsworth Airforce Base Airport Surveillance Radar (within 65 nautical miles of the Project) or the Gettysburg Air Route Surveillance Radar (within 105 nautical miles of the Project). However, the Project Area is not within either of these radar's line of sight; therefore, no mitigation is required.

Philip Wind received Determinations of No Hazard for a previous version of the Project Layout. Philip Wind submitted updated requests to the FAA on April 30, 2025, and those requests are

currently being processed. Philip Wind will provide an update in this docket with the FAA issues the Determinations of No Hazard.

11.6.4.2 Department of Defense Radar Impacts/Mitigation

The Project Area does not expect to impact DoD radars. As discussed in greater detail in **Section 15.4.2.2**, Philip Wind will obtain Determinations of No Hazard from the FAA for the Project turbines, as well as any applicable permits or approvals from the South Dakota Aeronautics Commission prior to construction.

11.6.5 Military Airspace

No military airspace or training routes overlap the Project Area (see **Appendix X**), and no impacts are anticipated.

11.6.6 NEXRAD and WSR-88D

Aviation Systems, Inc. used the DoD PST to evaluate the potential impact of obstructions to the Next-Generation Radar (NEXRAD) Weather Surveillance Doppler Radar Stations due to Project construction and operation (see **Appendix X**). The PST NEXRAD analysis evaluates potential impacts to DoD, FAA, and National Oceanic and Atmospheric Administration Weather Surveillance Radar model-88 Doppler sites. The Project is in a "No Impact Zone," and no impacts are anticipated.

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

> ***ARSD 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.*

The Project will be constructed on agricultural land in Haakon County. There are no local zoning ordinances in place that apply to the Project Area. Philip Wind has collaborated with Haakon County to enter into a RUA for the use, improvement, repair, and restoration of roads within the county, and will obtain required road crossing, approach, and utility permits required for the Project. **Sections 5.1.4** and **22.2.3** discuss coordination with Haakon County officials in detail.

13. Water Quality (ARSD 20:10:22:20)

> ***ARSD 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.*

Groundwater and surface water resources are discussed in **Section 8**. As discussed in **Section 8.2.2**, increased sedimentation, reduction of available flood storage, and impacts to drainage patterns due to stormwater runoff from the Project during construction and operation will be minimized through implementation of BMPs.

Construction of the Project will require coverage under the SDDANR General Permit for Storm Water Discharges Associated with Construction Activities. To maintain compliance with provisions of this General Permit, Philip Wind will prepare a SWPPP to identify potential sources of stormwater pollution from the Project site and specify BMPs to control erosion and sedimentation and minimize negative impacts caused by stormwater discharges from the Project. The BMPs may include silt fence, wattles, erosion control blankets, temporary stormwater sedimentation ponds, revegetation, and/or other features and methods designed to control stormwater runoff and mitigate erosion and sedimentation. Because erosion and sediment control will be in place for construction, operation and decommissioning of the Project, impacts to water quality are not expected to be significant.

14. Air Quality (ARSD 20:10:22:21)

> ***ARSD 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.*

The following sections discuss the existing air quality conditions within the Project Area and the potential air quality impacts from the Project.

14.1 Existing Air Quality

The entire state of South Dakota is in attainment for all NAAQS criteria pollutants (SDDANR 2025). The nearest ambient air quality monitoring site to the Project Area is the Badlands of South Dakota, which is located approximately 45 miles southwest of the Project. This site monitors particulate matter, sulfur dioxide, nitrogen dioxide, and ozone levels (SDDANR 2020). The primary emission sources that exist within the Project Area include agriculture-related equipment and vehicles traveling along State Highway 73.

14.2 Air Quality Impacts

Temporary construction activities may lead to fugitive dust emissions and short-term emissions from diesel trucks and construction equipment. Temporary impacts may result if a concrete batch plant is required. However, any air quality effects resulting from construction will be short-term and limited to the duration of construction activities, without exceeding NAAQS for particulate matter or significantly increasing greenhouse gas emissions.

While operational, the wind turbines and Gen-Tie Line are expected to have no direct air emissions because no fossil fuels will be combusted. Wind power is recognized as a low-carbon energy source, as electricity generation from wind turbines produces zero carbon emissions. Consequently, the development of clean wind energy avoids significant carbon dioxide (CO_2) pollution, with estimates suggesting that wind energy generation in 2022 avoided approximately 336 million metric tons of CO_2 emissions, equivalent to the emissions from approximately 73 million cars (American Clean Power 2024). Wind power also significantly reduces the amount of sulfur dioxide and nitrogen oxides in the air, pollutants associated with smog formation and asthma exacerbation.

Operation of the Gen-Tie Line is expected to have negligible impacts on air quality. Studies examining ozone production under transmission lines have generally been unable to detect any significant increases attributable to a transmission facility (Sebo et al. 1976; Valuntaite et al. 2009). Existing calculations concerning ozone production and concentration typically assume conditions of high humidity or rain, with no reduction in the amount of ozone due to oxidation or air movement. These calculations therefore overestimate the amount of ozone produced and concentrated at ground level.

During O&M activities, negligible amounts of dust, vehicle exhaust emissions, and combustion-related emissions from diesel emergency generators may occur, without causing exceedances of air quality standards or negative impacts on climate change. The operation of the Project could produce minute amounts of ozone and nitrogen oxides emissions as a result of atmospheric interactions with the energized conductors. These minor emissions during operation will have a negligible impact on ambient air quality. The use of sulfur hexafluoride-filled circuit breakers will be used in the Collector Substation; leaks are rare, and air quality impacts from maintenance and inspection activities are anticipated to be negligible.

Decommissioning activities would have similar impacts to air quality as construction activities, but would be on a smaller scale and for a shorter duration. Potential emissions impacting ambient air quality would be temporary and minor.

14.3 Mitigation Measures for Air Quality

A general air quality permit from SDDANR may be required if the Project elects to utilize a concrete batch plant. Any such permit would be obtained by the construction contractor or concrete batch plant operator.

BMPs will be implemented during construction to suppress fugitive dust emissions, and regular inspections and preventative maintenance will be conducted on equipment during operations to minimize leaks. BMPs will include:

- Using surface access roads, on-site roads, and parking lots surfaced with aggregates or designed to maintain compacted soil conditions to mitigate dust generation;
- Strategically staging construction activities to limit the area of disturbed soils exposed at any given time to the extent practicable; and

- Watering unpaved roads, disturbed areas (e.g. scraping, excavation, backfilling, grading and compacting), and loose materials generated during Project activities as needed to minimize fugitive dust generation.

15. Community Impact (ARSD 20:10:22:23)

ARSD 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.

15.1 Socioeconomic and Community Resources

15.1.1 Existing Socioeconomic and Community Resources

The Project Area is located in central South Dakota in Haakon County. In 2020, Haakon County had an estimated population of 1,872. Philip, with an estimated 2020 population of 885, is the largest city in Haakon County (U.S. Census Bureau 2020). Philip is located approximately 15 miles from the Project Area. The populations of the communities within 50 miles of the Project Area are provided in **Table 15.1.1-1**.

Table 15.1.1-1. Populations of Communities Within 50 Miles of Project Area

Community	County	2020 Population Estimate	Distance and Direction from Project Area
Philip	Haakon	885	15 miles southeast
Cottonwood	Jackson	6	17 miles south
Quinn	Pennington	44	19 miles southwest
Wall	Pennington	818	22 miles southwest
Midland	Haakon	179	25 miles southeast
Wasta	Pennington	75	27 miles west
Kadoka	Jackson	706	29 miles south
Belvedere	Jackson	57	33 miles southeast
Interior	Jackson	77	34 miles south
Faith	Meade	489	44 miles north
Dupree	Ziebach	434	46 miles north
Eagle Butte	Dewey	619	49 miles northeast

Source: U.S. Census Bureau (2020)

The median household income in 2023 in Haakon County was $59,231 (U.S Census Bureau 2023). In 2023, 8.2% of the population was below the poverty level. By comparison, the median household income for the state was higher ($71,810), and the poverty level was higher (11.8%) (U.S. Census Bureau 2023).

In Haakon County, the top industries in terms of employment in 2023 were: (1) education services, and health care and social assistance (25.1% of employment); (2) agriculture, forestry, fishing and hunting, and mining (25% of employment); (3) retail trade (13.9% of employment); and (4) other services, except public administration (7.4%) (U.S. Census Bureau 2023). The unemployment rate in Haakon County in 2023 was 1.3%, and the South Dakota unemployment for that same year was 1.7% (South Dakota Department of Labor and Regulation 2023).

15.1.2 Socioeconomic and Community Impacts

15.1.2.1 Economic Impacts

The Project is anticipated to provide positive short-term and long-term benefits to the local economy. Wind energy facilities have numerous benefits for local communities including direct payments to participating landowners, increased local government revenue from property taxes, and job opportunities during both the short-term construction phase and the long-term operational phase. The Project is expected to create approximately 200 temporary construction jobs for Haakon County. Employees hired during construction will include skilled labor, such as crane operators, specialized transport, structural engineers, mechanics, construction equipment operators, wind turbine operators, as well as unskilled laborers. During operations, the Project is expected to employ approximately 12 full-time employees. Employees hired during operation will include turbine technicians, facility manager(s), and administrative personnel as necessary.

In addition to the employees directly involved in the construction and maintenance of the Project, numerous other jobs are created through indirect supply chain purchases, services required, and the higher spending that is induced by employees and landowners. Local businesses, such as restaurants, grocery stores, hotels, and gas stations, will see increased business from construction-related workers. Local industrial businesses, including aggregate and cement suppliers, welding and industrial suppliers, hardware stores, automotive and heavy equipment repair, electrical contractors, and maintenance providers, will also likely benefit from construction of the Project.

Long-term beneficial impacts to the state and local tax base as a result of the operation of the Project will contribute to improving the local economy. In addition to the creation of jobs and personal income, the Project will pay capacity and production taxes which will benefit the state, Haakon County, school districts and the communities in the Project Area with wind turbines.

Over the 30-year operational life of the Project, Philip Wind is expected to generate:

- Approximately $50 million in total county property taxes for Haakon County, an average of over $1.7 million each year;
- Approximately $85 million for Haakon County landowners, an average of approximately $2.9 million each year;
- State and local sales tax for the state of South Dakota and Haakon County are currently estimated to be more than $10 million dollars.

The direct payment information in **Section 1.2** does not include any multiplying factor of additional income earned being kept in Haakon County or the local area, which is expected to multiply the total economic impact of the Project.

15.1.2.2 Population and Housing

Philip Wind anticipates that trained local labor will not be sufficient to fill the total number of jobs available. The largest city that would provide workers local to the Project would be Philip, South Dakota, followed by Kadoka or Midland, South Dakota. Workers within an 85-mile radius

will likely commute and therefore not require temporary housing in the Project Area. Workers outside an 85-mile radius will likely require temporary housing in or near the Project Area but Philip Wind expects existing community facilities and services to be generally adequate to support the workforce during construction. The Project does not anticipate long-term impacts on overall population and occupation distribution in Haakon County.

15.1.2.3 Property Value Impacts

The Project is not anticipated to impact property values. Prior analysis in South Dakota and other Midwestern states did not support any finding that proximity to a wind turbine had a negative impact on property values.

Similarly, the Commission has previously found that wind projects do not impact property values and declined to impose related conditions. For example, the Commission has previously concluded for the Dakota Range Wind Project that there is "no record evidence that property values will be adversely affected" (Commission 2018a). The Commission found similarly in the Crocker Wind Farm docket: "There was no credible showing that there will be quantifiable or qualitative effect on property value" (Commission 2018b).

The impact of transmission lines on property values has also been reviewed in the literature. In 2010, Jackson and Pitts prepared a literature review of empirical studies conducted between 1964 and 2009. Based on the studies reviewed, while having some inconsistencies in their detailed results, there were generally small (2–9% reduction in property value), or no effect on sales price due to the presence of electric transmission lines. Where an effect was detected, this effect generally dissipated with time and distance. While this study indicates that a small reduction in property value is possible, significant impacts to property values are not anticipated.

15.1.3 Mitigation Measures for Socioeconomic and Community Impacts

As noted above, the Project will positively impact the local community. As such, no mitigation measures are proposed.

15.2 Commercial, Industrial, and Agricultural Sectors

15.2.1 Existing Commercial, Industrial, Agricultural Sectors

The Project Area is predominantly agricultural, consisting of a mix of cropland and pastureland. No commercial or industrial land uses are located within the Project Area. In 2022, Haakon County's 291 farms (totaling 1,151,771 acres) produced $124.5 million in agricultural products. Of the agricultural products sold, 47% were from livestock sales and 53% were from agricultural sales. Cattle and calves were the top livestock inventory item, and wheat was the top agricultural product, in terms of acreage. Haakon County ranked 45th of the 66 South Dakota counties in total value of agricultural products sold (USDA 2024).

15.2.2 Impacts to Commercial, Industrial and Agricultural Sectors

Approximately 1,199 acres of temporary ground disturbance impact is expected during construction of the Project. Following completion of construction, all temporary construction

workspaces will be cleaned up and restored to preconstruction conditions pursuant to the lease and easement agreements. Damage to crops that occur on cultivated lands during construction will be compensated for by Philip Wind. Approximately 68 acres will be taken out of agricultural use for the operational life of the Project to host aboveground Project Facilities. Crops can be grown, and livestock can graze up to the turbines, transmission structures, and other aboveground Project Facilities. A detailed description of impacts to the agricultural sector is also further discussed in **Section 11.1.2**. Once the Project is operational, landowner incomes will be better diversified, allowing for a more stable income long-term.

15.2.3 Mitigation Measures for Commercial, Industrial and Agricultural Sectors

Following completion of construction, all temporary construction workspaces will be restored to preconstruction conditions, which primarily consist of cultivated croplands and pastureland/grassland, pursuant to the lease and easement agreements. Philip Wind minimized impacts to local agricultural operations by involving landowners in discussions to determine the least impactful infrastructure siting option. The Project will be decommissioned after the end of its operational life, after which, no irreversible changes to land use will remain.

No displacement of residences or businesses will occur as a result of the Project. The mitigation measures for impacts to agricultural lands are further described in **Sections 4.4.10** and **4.5.3**.

15.3 Community Facilities and Services

15.3.1 Existing Community Facilities and Services

Table 15.1.1-1 identifies communities within the vicinity of the Project Area which will have facilities and services such as hospitals, police, fire and ambulance services, schools, churches and parks, and recreational facilities. Electrical service in the Project Area is provided by West Central Electric. West River/Lyman-Jones Rural Water Systems Inc. rural water system supplies rural water to the Project Area and maintains a network of distribution lines within the Project Area.

15.3.2 Impacts to Community Facilities and Services

Given the short-term duration of the construction activities, the Project is not likely to increase the need for public services, including police and fire protection. No significant increase in the permanent population of local communities will be expected from the operation of the Project. Existing community facilities and services should be adequate to support the workforce during construction. In addition, the construction workforce will not create any measurable negative impact to the local government, utilities, or community services.

It is expected that the Project will have no significant impact on the security and safety of the local communities and the surrounding area during construction and operation. Additional risk for workers or public injury may exist during the construction phase, as it will for any large construction project. In response, work plans and specifications will be prepared to address worker and community safety during construction. The Project's construction contractor will identify and secure all active construction areas to prevent public access to potentially hazardous areas.

15.3.3 Mitigation Measures for Community Facilities and Services

During construction, the Project's construction contractor will work with local emergency response agencies to develop procedures for response to emergencies, natural hazards, hazardous materials incidents, manmade problems, and potential incidents concerning construction. The construction contractor will provide site maps, haul routes, schedules, contact numbers, training, and other requested Project information to local emergency response agencies. During operation, Philip Wind will communicate regularly with local first response agencies and coordinate training meetings in accordance with the Project's ERP. Should any aspect of the Project construction or operations present unfamiliar situations for first responders, Philip Wind will arrange for adequate professional training to address those concerns. Philip Wind will register each turbine and the O&M Facility with the rural identification/addressing (fire number) system and 911 systems.

15.4 Transportation

15.4.1 Existing Transportation

15.4.1.1 Ground Transportation

The existing roadway infrastructure within and near the Project Area generally follows section lines and is characterized by state and county roads. Primary access to the Project Area is via South Dakota Highway 73 and South Dakota Highway 34. The roads within the Project Area are summarized in **Table 15.4.1.1-1**.

Table 15.4.1.1-1. Project Area Roads

Road	Surface Type	Width
State Highway 73	Paved asphalt	24 feet
Secondary County roads	Gravel or crushed rock/bituminous	10 to 24 feet

Source: South Dakota Department of Transportation (2024)

Traffic counts in the Project Area were available for U.S. and State highways in 2023, and data were available for select county roads in the Project Area ranging from 2014 to 2023. In 2023, average daily traffic volume was between 251 to 500 trips along State Highway 73 in the Project Area (South Dakota Department of Transportation 2024).

15.4.1.2 Airports

There are no public airports located within the Project Area. The closest airports to the Project Area are the Philip Municipal Airport, located approximately 14 miles south of the Project Area, the Wall Municipal Airport, located approximately 26 miles southwest of the Project Area, the Kadoka Municipal Airport, located approximately 29 miles southeast of the Project Area, the Rapid City Regional Airport, located 86 miles west of the Project Area, and the Pierre Regional Airport, located 92 miles east of the Project Area. Google Earth (2022) aerial imagery shows the Ferguson Landing Strip on private land located near the intersection of 213th Avenue and 215th Street (also known as Hilland Road). However, this landing strip is no longer operational.

15.4.2 Impacts to Transportation

15.4.2.1 Ground Transportation

During construction, temporary impacts to public roads within the Project Area are anticipated. Construction vehicles, including light, medium, and heavy-duty construction vehicles, as well as private vehicles used by construction personnel, will travel to and from the work sites, thereby increasing the daily traffic on the roads. Some activities may require extended construction hours, and nighttime construction may be necessary to maintain the construction schedule. Most heavy equipment (cranes and earthmoving equipment) will remain at the site for the duration of construction activities. Some roads may require temporary expansion along specific routes as necessary to facilitate the movement of equipment. Shipment of construction materials, such as gravel, concrete, and water, are not expected to substantially affect local primary and secondary road networks. Construction activities will increase the amount of traffic using local roadways, but such use is not anticipated to result in significant adverse traffic impacts.

The Project will not result in long-term impacts to the area's ground transportation resources. Improvements to most gravel roads and temporary impacts to local roads will occur during construction of the Project. Philip Wind has obtained a RUA from Haakon County that governs the use, improvement, repair, and restoration of roads within the county, and will obtain any road crossing, approach, and utility permits required for the Project.

After construction is complete, traffic impacts during operation of the Project will be minimal. Project personnel will drive through the area in pickup trucks on a regular basis to monitor and maintain the Project Facilities, as needed. Heavy equipment may occasionally return to the site if large components need to be repaired or exchanged. A slight, temporary, increase in traffic will occur for occasional repair of Project Facilities, but traffic flow will not be impacted as a result.

15.4.2.2 Aviation

Aviation Systems, Inc., conducted an obstruction evaluation and airspace analysis (see **Appendix X**) for the Project in 2020. The purpose of this analysis was to identify obstacle clearance surfaces established by the FAA that could limit the placement of wind turbines. The Project's siting reflects the clearance restrictions identified in the analysis. As often occurs during the development of a wind energy facility, Philip Wind has made adjustments to the Project Area boundary since the analysis was procured. Although portions of the Project Area extend beyond the study area examined by Aviation Systems, Inc., in 2020, the information obtained was sufficient to be contemplated during the siting of the Project. As indicated by the analysis, air traffic is not anticipated to be impacted by the Project.

Federal aviation regulations require structures that exceed 200 feet above ground level to be submitted to the FAA for aeronautical study, to determine whether the structures may be a hazard to air navigation or the efficient utilization of navigable airspace by aircraft. Vertical limits for wind turbines depend on specific location and respective airspace classifications. After having obtained Determinations of No Hazard for a prior version of the Project Layout, Philip Wind submitted requests for Determinations of No Hazard to the FAA for the Project Layout presented in this Application on April 30, 2025. The Project will obtain Determinations of No

Hazard from the FAA and any required permits or approvals from the South Dakota Aeronautics Commission for each turbine prior to construction.

After receiving FAA Determinations of No Hazard and finalizing turbine locations, Philip Wind will work with the FAA to determine a lighting plan for the Project. The plan will comply with all South Dakota requirements for ADLS outlined in SDCL 49-41B-25.2 while meeting the requirements set forth in Chapter 14 of FAA Advisory Circular 70/7460-1L. Notification of construction will be provided to the FAA for each turbine location prior to construction (Form FAA 7460-2 Part 1), after reaching maximum turbine height (7460-2 Part 2), or both. Philip Wind will also complete any required notifications, permits, or approvals with the South Dakota Aeronautics Commission related to Project Facilities.

The installation of wind turbines, MET towers, and ADLS towers will create additional obstacles for crop-dusting aircraft. While the Gen-Tie Line will also be an obstacle for crop-dusting aircraft, the minimal crop-dusting activities within the Project Area are anticipated to result in minimal risk. Pilots operating in the vicinity of the Project are anticipated to become accustomed to the Gen-Tie Line's location and adjust their maneuvers accordingly.

15.4.3 Mitigation Measures for Transportation

15.4.3.1 Ground Transportation

As part of the RUA that has been obtained with Haakon County, prior to delivery of Project components, Philip Wind will coordinate with local road authorities to establish a traffic control plan to ensure the safe and efficient use of roads and to minimize and mitigate the overall impact of traffic. Trucks will not be allowed to stage or block public roads. If trucks cannot exit the roadway in a timely fashion, they will be directed to a designated staging area.

If roads require temporary expansion or improvements to facilitate the movement of Project equipment, local traffic will be directed safely through the work area or around on alternate routes, if needed. Some delays or detours may be necessary to enable the installation of road improvements, but the Project will have plans in place to enable the traffic to move safely. Delays and detours will be similar in nature to what can occur during peak farming operations or other road improvements. The construction site manager will be available on-site to address any concerns or challenges that occur during construction. Project personnel and contractors will be required to adhere to speed limits commensurate with road types, traffic volumes, vehicle types, and site-specific conditions to ensure safe and efficient traffic flow.

The cost estimate to repair roads to preconstruction conditions will be completed as part of final engineering and will depend on the plans for road upgrades as well as the equipment delivery plan. With respect to the Gen-Tie Line, pursuant to SDCL 49¬41B-38, Philip Wind will furnish an indemnity bond in the amount of $1 million to secure the restoration and repair of roads after construction.

15.4.3.2 Aviation

Wind turbines, MET towers, and ADLS towers will be visible from a distance and lighted according to FAA guidelines. MET towers and ADLS towers will be free-standing with no guy wires. Philip Wind will notify local airports about the Project and new towers in the area to reduce the risk to crop dusters. Philip Wind will also work with landowners to coordinate crop-dusting activities to further reduce risk to crop dusters.

15.5 Cultural Resources

15.5.1 Existing Cultural Resources

To assess the cultural resources within the Project Area, Philip Wind engaged BCA to conduct a cultural resources survey in 2018 within the original APE for the Project. BCA conducted a second cultural resources survey in 2023 for the updated APE (BCA 2024a). The APE is defined in 36 Code of Federal Regulations 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The direct APE encompasses approximately 1,641 acres and includes the locations where Project Facilities will be built, such as turbine pads, the O&M Facility, and the Collector Substation; corridors mapped over the center of the proposed collection lines, access roads, and t-lines; as well as areas of temporary disturbance such as laydown yards and staging areas. The indirect APE includes locations where Project Facilities might visually, or through other means, alter the characteristics and impact the integrity of a cultural resource and its eligibility for NRHP listing. In accordance with requests from SHPO, the indirect APE has been defined as a 1-mile buffer around the t-line and a 2-mile buffer around each turbine location (actual and alternative). The information in the Application is based on the results of these surveys.

Philp Wind first engaged BCA to complete a Cultural Resource Level I Records Review to identify both archaeological and historic resources previously recorded within the Project Area and within a 2-mile search radius (study area). Building upon the findings of the Records Review, Philip Wind engaged BCA to complete a Level III intensive archaeological resources survey for the direct APE (**Appendix Y - Confidential**) (BCA 2024a).

BCA conducted a reconnaissance architectural inventory within the indirect APE, which inherently includes the direct APE, in fall 2023 (**Appendix Z**) (BCA 2024b). The purpose of the architectural inventory was to photographically document architectural buildings and structures within the indirect APE and determine their eligibility for the NRHP. The assessment followed the guidance presented in the 1994 *Homesteading and Agricultural Development Context*, which states that "[a]n agricultural property is an interrelated set of buildings, structures, and archaeological features, all of which are part of a production system," and "[t]herefore, whenever possible, a building, structure or archaeological feature should be evaluated as part of a whole, rather than individually" (Brooks and Jacon 1994:31).

All work was conducted to professional standards and guidelines in accordance with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation

(48 FR 44716–44742 [September 29, 1983]), the Secretary's Standard for Identification (48 FR 44720–44723 [September 29, 1983]), and SDCL 1-19A-11. The work also complies with SHPO's *South Dakota Guidelines for Complying with Federal and State Preservation Laws* (SDSHS 2023a) and the *South Dakota Architectural Survey Manual* (SDSHS 2023b).

15.5.1.1 Previously Recorded Archaeological Sites

The Cultural Resource Level I Records search revealed 10 previously recorded archaeological resources within the Project Area and study area: eight sites and two isolated finds comprising Native American Tribal and historic Euro-American artifact scatters, foundations, a well, a dump, and a farmstead (**Table 15.5.1.1-1**). One Euro-American artifact scatter site is considered eligible for the NRHP. Three sites have been formally determined ineligible for the NRHP, two isolated finds have been recommended not eligible, and four artifact scatters are unevaluated. None of the previously recorded archaeological sites identified are located within the direct APE; Project Facilities will avoid all previously recorded archaeological sites.

Table 15.5.1.1-1. Previously Recorded Archaeological Sites Within the Study Area

Site	Site Type	Cultural Affiliation	NRHP Eligibility
39HK0051	School Foundation	Historical	Ineligible
39HK59	Euro-American Artifact Scatter; Euro-American Monument	Historical/ Architectural	Eligible
39HK0060	Foundation	Historical	Ineligible
39HK0136	Euro-American Isolated Find	Historical/ Architectural	Recommended Not Eligible; No SHPO Determination
39HK0137	Euro-American Isolated Find	Historical	Recommended Not Eligible; No SHPO Determination
39HK0139	Well/Cistern, Dump	Historical	Ineligible
39HK140	Farmstead, Euro-American Artifact Scatter	Historical/ Architectural	Unevaluated
39HK0165	Native American Artifact Scatter	Period Unknown	Unevaluated
39HK0166	Native American Artifact Scatter	Period Unknown	Unevaluated
39HK0168	Native American Artifact Scatter	Period Unknown	Unevaluated

Source: BCA (2024a)

15.5.1.2 Historic-Age Non-Archaeological Resources

The Cultural Resource Level I Records Review for architectural resources within the study area identified three previously recorded historic-age structures, comprising a barn, a fence, and a

series of destroyed buildings (**Table 15.5.1.2-1**). All three sites are determined ineligible for the NRHP. None of these architectural resources are located within the direct APE.

Table 15.5.1.2-1. Previously Recorded Architectural Resources Within the Study Area			
Site ID	**Resource Name**	**Resource Type**	**NRHP Eligibility**
HK00000016	Structure	Historical/ Architectural	Ineligible
HK00000054	Vehicle Fence	Historical	Ineligible
57132	Ranch House Foundation, Cellar, Well, & Windmill Footings (Destroyed)	Historical	Ineligible

Source: BCA (2023)

15.5.1.3 Level III Archaeological Survey

The Level III intensive archaeological resources survey was completed for a previous iteration of the direct APE in November 2018. No previously recorded cultural resources were revisited because none were present in the direct APE. No previously unrecorded cultural resources were identified during the 2018 survey. A second Level III intensive archaeological resource survey was conducted and completed in November 2023 for the updated direct APE (see **Appendix Y - Confidential**) (BCA 2024a). The survey identified a total of seven newly recorded cultural resources, consisting of three archaeological sites (39HK0182, 39HK0183, 39HK0184) and four precontact isolated finds (39HK0089, 39HK0095, 39HK0180, and 39HK0181). All of the sites and isolated finds lacked integrity and significance and were recommended not eligible for the NRHP. BCA's recommendations for archaeological sites within the direct APE are summarized in **Table 15.5.1.3-1**.

Table 15.5.1.3-1. Archaeological Site Recommendations within the Direct APE					
Site No.	**Site Type**	**Identified Component**	**Site Integrity**	**NRHP Recommendation**	**Recommendation**
39HK0182	Farmstead	Euro-American	Poor	Not eligible	No further work is recommended
39HK0183	Farmstead	Euro-American	Poor	Not eligible	No further work is recommended
39HK0184	Farmstead	Euro-American	Poor	Not eligible	No further work is recommended
39HK0089	Isolated find, tertiary quartzite flake	Unknown prehistoric	Poor	Not eligible	No further work is recommended
39HK0095	Isolated find, bifacially	Unknown prehistoric	Poor	Not eligible	No further work is recommended

Table 15.5.1.3-1. Archaeological Site Recommendations within the Direct APE					
Site No.	**Site Type**	**Identified Component**	**Site Integrity**	**NRHP Recommendation**	**Recommendation**
	worked petrified wood tool				
39HK0180	Isolated find, chalcedony flake	Unknown prehistoric	Poor	Not eligible	No further work is recommended
39HK0181	Isolated find, quartzite Plains side-notched projectile point	Unknown prehistoric	Poor	Not eligible	No further work is recommended

Source: BCA (2024a)

15.5.1.4 Historic Architectural Resources Reconnaissance Survey

The historic architectural resources reconnaissance survey was conducted in fall 2023. During the field survey effort, surveyors sought to document all buildings, structures, objects, districts, etc. constructed in or prior to 1978 (45 years of age or older) within the indirect APE. Each resource was evaluated for both state and national designation.

Upon completion of the reconnaissance fieldwork, each building and structure within the indirect APE was evaluated by an architectural historian to determine its age and NRHP eligibility based on its potential significance and integrity. A reconnaissance architectural inventory report was prepared detailing findings and recommendations for NRHP-eligible or unevaluated architectural resources within the indirect APE (see **Appendix Z**) (BCA 2024b).

In total, 83 locations that were or appeared to be architectural sites were investigated in accordance with SHPO reconnaissance survey requirements and photographed from the public ROW. Of these 83 locations, 14 had no remaining standing structures, 28 were entirely modern, two were not visible from the public ROW and were therefore not recorded or updated following guidance from SHPO, and 39 contained recordable, historic architectural structures. All of the architectural sites are located within the indirect APE; none of the architectural sites are within the direct APE. Of the 39 sites that possessed buildings and structures of historic age, five of these sites contained at least one building or structure that is recommended potentially eligible but unevaluated for the NRHP (see **Appendix Z**). In WAPA's Determination of Effect for the proposed undertaking, WAPA stated that they disagreed with BCA's NRHP eligibility recommendations for certain buildings within these five sites and determined that four structures within two of these sites should not be eligible for the NRHP (see **Appendix Z**). However, based on correspondence between WAPA and SHPO on July 11, 2024, SHPO agreed with and upheld

BCA's NRHP eligibility recommendations for all sites and structures and concurred that a total of 16 structures within these five sites should be considered unevaluated and four structures should be considered not eligible for listing in the NRHP (see **Appendix Z**).

15.5.2 Cultural Resource Impacts

For cultural resources identified during the surveys, recommendations regarding their NRHP eligibility were made as shown in **Tables 15.5.1.1-1, 15.5.1.2-1,** and **15.5.1.3-1**. No NRHP-listed or eligible architectural resources will be adversely affected by the Project because they are not located within the direct APE and the Project will not result in direct physical impacts. All sites or historic architectural resources determined to be NRHP-eligible or potentially eligible (unevaluated) are avoided by Project Facilities. Likewise, WAPA determined that the Project would have no adverse effects on historic properties; SHPO concurred with this determination. Thus, no impacts are anticipated.

15.5.3 Mitigation Measures for Cultural Resource Impacts

No mitigation measures are proposed because the Project Layout avoids impacts to cultural resources. An Unanticipated Discovery Plan is provided in **Appendix AA** outlining the procedures to follow to address any unanticipated discoveries of cultural resources during Project construction, including previously undiscovered archaeological sites and possible human remains.

If potential or confirmed human remains are identified during construction of the Project, all work will be halted at the immediate vicinity of the discovery and the construction manager will be notified who will then notify the Philip Wind Project manager. This location will be immediately secured, including a buffer zone of 50 feet (15 m) surrounding the discovery. Following notification of the construction manager and Philip Wind Project manager, Philip Wind will immediately notify local law enforcement, the county coroner, and the SDSHS. The coroner and local law enforcement will make the official ruling on the nature of the remains, being either forensic or archaeological. The subsequent treatment of the discovery, including custody of the remains, will follow guidelines set forth in SDCL 34-27, as follows.

- If the remains are believed to be human, Philip Wind will notify local law enforcement, the county coroner, and the SDSHS, pursuant to SDCL 34-27-25.
- If the human remains reported under SDCL 34-27-25 are not associated or suspected to be associated with a crime, the state archaeologist (or other representative of the SDSHS) shall be notified within 15 days. The state archaeologist shall then follow the procedure set out in SDCL 34-27-31.
- Pursuant to SDCL 34-27-31, the state archaeologist shall take no more than 1 year to identify human remains. If the remains are not associated with a Tribal group, the state archaeologist will arrange for their final disposition after consulting with the director of the SDSHS. If the state archaeologist finds there is a connection to a Tribal group, the archaeologist must notify the director and reach out to the group designated by the Office of Indian Affairs. If the Tribal group requests the return of the remains within 1 year, they must be returned; otherwise, the archaeologist will manage their final disposition after consultation.

15.5.4 Tribal Engagement

Cultural resources can also include properties of traditional religious and cultural significance (PTRCSs), which are of importance to Native American Tribes. Several federally recognized Native American Nations indicated to WAPA that they were interested in consulting on the Project, as identified in the initial Project scoping in 2018. Tribal Cultural Specialists from the Rosebud Sioux Tribe, the Standing Rock Sioux Tribe, the Cheyenne River Sioux Tribe, and the Santee Sioux Nation previously participated in the 2018 cultural resources survey, during which time no Tribal cultural resources or PTRCSs were identified. Interested Tribes were invited again to participate in the 2023 Level III pedestrian inventory to assist the archaeologists and review the updated direct APE for potential PTRCS. Four federally recognized Tribes, consisting of the Standing Rock Sioux Tribe, Rosebud Sioux Tribe, Cheyenne River Sioux Tribe, and Northern Cheyenne Tribe, participated in the 2023 survey effort. The results of the PTRCS inventory were included in the Level III cultural resources inventory report, which was provided to SHPO for review. SHPO issued concurrence in June 2024.

16. Employment Estimates (ARSD 20:10:22:24)

ARSD 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.*

As discussed in **Section 15.1.2.1**, the Project is expected to create approximately 200 temporary construction jobs. Employees may be from Haakon County or brought in from outside areas. Employees hired during construction will include skilled labor, such as crane operators, specialized transport, structural engineers, mechanics, construction equipment operators, wind turbine operators as well as unskilled laborers. During operations, the Project is expected to employ approximately 12 full-time employees. Employees hired during operation will include turbine technicians, facility manager(s), and administrative personnel as necessary.

It is likely that general skilled labor is available in Haakon County or the state at a scale necessary to serve the basic infrastructure and site development needs of the Project. Specialized labor will be required for certain components of Project construction, which may be imported from other areas of the state or from other states, as the relatively short duration of construction makes special training of local or regional labor impracticable.

The estimated number of jobs by classification and annual employment expenditures during construction are provided in **Table 16-1**.

Table 16-1. Anticipated Construction Jobs and Employment Expenditures

Job Classification	Number	Estimated Annual Salary
Crane operators	10	$90,000–$150,000
Civil workers	30	$75,000–$100,000
Construction managers	5	$100,000–$130,000
Collection workers	25	$70,000–$85,000
Tower erectors	43	$65,000–$85,000
Transmission workers	20	$60,000–$75,000
Substation workers	25	$70,000–$95,000
Foundation workers	20	$60,000–$85,000

Table 16-1. Anticipated Construction Jobs and Employment Expenditures		
Job Classification	**Number**	**Estimated Annual Salary**
Testing and inspections	13	$60,000–$85,000
Design engineers	10	$60,000–$85,000

The estimated number of jobs by classification and annual employment expenditures during operation are provided in **Table 16-2**. Annual estimated employment expenditures are anticipated to be the same for each of the first 10 years of commercial operation. Philip Wind estimates that employees will reside locally, likely within Haakon County, during operation of the Project.

Table 16-2. Anticipated Operation Jobs and Employment Expenditures		
Job Classification	**Number**	**Estimated Annual Salary**
Facility managers	1	$90,000–$135,000
Wind turbine technicians	5–10	$55,000–$90,000
Administrative personnel	1	$50,000–$65,000

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

> ***ARSD 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.*

Apart from the final micrositing flexibility requested in **Section 4.2**, Philip Wind does not currently have any plans for future additions or modifications to the Project.

18. Decommissioning of Wind Energy Facilities (ARSD 20:10:22:33.01)

> ***ARSD 20:10:22:33.01. Decommissioning of wind energy facilities -- Funding for removal of facilities.*** *The applicant shall provide a plan regarding the action to be taken upon the decommissioning and removal of the wind energy facilities. Estimates of monetary costs and the site condition after decommissioning shall be included in the plan. The commission may require a bond, guarantee, insurance, or other requirements to provide funding for the decommissioning and removal of a wind energy facility. The commission shall consider the size of the facility, the location of the facility, and the financial condition of the applicant when determining whether to require some type of funding. The same criteria shall be used to determine the amount of any required funding.*

Philip Wind prepared a Decommissioning Plan (see **Appendix E**) and estimated cost analysis for the Project. The detailed decommissioning cost estimate is provided in Appendix B of the Decommissioning Plan. The analysis assumed up to 87 turbines constructed (depending on the ultimate turbine model selected) (see **Table 4.2.1-1**) with salvage value but no resale value. Three potential turbine models were evaluated for the Decommissioning Plan. Overall, the estimated net decommissioning cost (in 2025 U.S. dollars) for the Project is up to $6,009,123,

depending on the turbine model selected. Methodology for the estimates is provided in **Appendix E**. Philip Wind understands that the Commission has required decommissioning financial assurance for wind projects and is prepared to comply with the requirements imposed in Docket EL24-023 here, as well.

Haakon County does not have any decommissioning requirements.

Philip Wind anticipates that the operational life of the Project will be approximately 30 years. At the end of commercial operation, Philip Wind will assess whether to decommission the Project or seek to extend the life of the Project. Subject to applicable regulatory approval, should Philip Wind decide to pursue continued operations, it will evaluate whether to continue with the existing equipment or to upgrade the facility with newer technologies.

19. Reliability and Safety (ARSD 20:10:22:33.02)

19.1 Wind Energy Facility Reliability and Safety

Reliability (availability) as related to wind energy is defined as the percentage of time that a turbine will be functioning at full capacity during appropriate wind conditions at a site with specified wind resource characterization for a specified period of time, such as the life of the facility (Hill et al. 2008). South Dakota has some of the nation's greatest wind resources and the site of this Project, in particular, boasts an abundance of wind resources.

Invenergy has over 20 years of operational experience and 1,200 highly skilled operations personnel. Invenergy Services currently operates 109 wind projects totaling over 17,000 MW in capacity and maintains a fleetwide wind turbine availability of approximately 97%, significantly exceeding industry benchmarks. Each member of the Invenergy Services team receives an average of 65 hours of safety training annually, totaling over 42,000 hours fleet wide. Invenergy approaches operations with an owner's mindset by maintaining projects in top working condition to ensure optimal performance. Invenergy's comprehensive service capabilities are supported by dedicated staff continuously monitoring and improving the performance of the fleet. Performance monitoring includes fault analysis, predictive analysis, and condition monitoring. Additional staff are dedicated to monitoring blades, gearboxes, generators, and oils/greases, and monitoring the fleets' centralized SCADA system. Invenergy's commitment to safety and excellence has earned the company the American Wind Energy Association Award for Achievement in Operations three times.

The Project is located in a rural setting in an area of low population density; construction and operation of the Project will have minimal impacts on the security and safety of the local population. Philip Wind will communicate regularly during construction and operation with local first response agencies and coordinate training meetings in accordance with the Project's ERP. The following safety measures will be taken to reduce the chance of physical and property damage, as well as personal injury, at the site:

- Turbines will be set back from non-participating property lines as described in **Section 5.2**;

- Security measures will be implemented during the construction and operation of the Project, including temporary and long-term operational fencing, warning signs, and locks on Project Facilities;
- Routine maintenance and inspections will be conducted;
- Safety training will be conducted, and standardized practices will be implemented for construction crews and on-site personnel;
- Turbine tower exteriors will be designed to be unclimbable;
- A professional engineer will certify that foundation and tower designs are within accepted professional standards for the localized soil and climate conditions;
- Before excavation begins, the construction contractor will coordinate with the South Dakota One-Call program to avoid impacts to existing underground infrastructure;
- Following construction, Philip Wind will register the appropriate underground facilities with the South Dakota One-Call program;
- Each turbine location and the O&M Facility will be registered with a rural address identifier (fire number) as outlined in the South Dakota Rural Addressing Procedural Handbook;
- The Project will be monitored to detect icing conditions on turbine blades by evaluating meteorological data, identifying deviations in turbine power curves, and visual inspections. If significant icing accumulation is identified, the affected turbine(s) will be shut down automatically either by the control system or manually by O&M personnel. Turbines will return to normal operation once icing is no longer a concern.

WAPA's UGP PEIS assessed occupational and physical hazards associated with construction and O&M of wind facilities, and the expected impacts of this Project would not constitute a new or more severe significant impact. The UGP PEIS evaluated common hazardous materials and waste products associated with construction and O&M of wind facilities. This Project would use and manage those resources under relevant regulations and Project permits, so no new or more severe significant impacts would occur. The UGP PEIS analyzed health and safety risks consistent with those anticipated for the Project; therefore, no new or more severe significant impacts to health and safety would be anticipated.

19.2 Transmission Facility Reliability and Safety

Transmission lines are designed to operate for decades and typically require only moderate maintenance. The transmission facility may remain in use or be repurposed after the operational life of the wind energy facility. The transmission facility will include very few mechanical elements, which results in high reliability. The infrastructure is built to withstand weather extremes and the circuits are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, over 99%.

The transmission facility will be designed and constructed in compliance with state, county, and utility standards regarding clearance to ground, clearance to utilities, clearance to buildings, strength of materials, and ROW widths. Temporary guard or clearance structures will be installed as needed over existing distribution or communication lines, roads, navigable waterways, or other obstructions after the necessary notifications are made or permits obtained.

The transmission facility will be equipped with protective devices, such as breakers and relays, for safety purposes. Breakers and relays will be located where the transmission facility connects to the Switchyard and will de-energize the line in the event of an emergency. In addition to protective devices, proper signage will be posted warning the public of the safety risks associated with energized equipment.

19.3 Electric and Magnetic Fields

Natural and manmade electric and magnetic fields (EMF) are present everywhere in our environment. Natural electric fields in the atmosphere range from background static levels of 10 to 120 volts per m to over several kilovolts per m produced by the build-up of electric charges in thunderstorms. The Earth itself has a magnetic field that ranges from approximately 300 to 700 milliGauss (mG). In addition to the presence of the Earth's steady state electric field, an average home experiences additional magnetic fields of 0.5 mG to 4 mG, which arise from the general wiring and appliances located in a typical home. Electric fields are present wherever there is an electric charge. A magnetic field arises when this charge is in motion, such as when electrons flow to generate an electric current.

Considerable research has been conducted to determine if exposure to magnetic fields, such as those from high-voltage power lines, causes biological responses and health effects. Toxicological and laboratory studies have not shown a biological mechanism between EMF and cancer or other adverse health effects. In 2007, the World Health Organization conducted a review of health implications from magnetic fields and concluded, "…virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level extremely low frequency magnetic fields and changes in biological function or disease status" (World Health Organization 2007).

The frequency of transmission line EMFs in the United States is 60 Hz and falls in the extremely low frequency range of the electromagnetic spectrum (any frequency below 300 Hz). For the lower frequencies associated with transmission lines, the two fields (electric and magnetic) are typically evaluated separately. The intensity of the electric field is related to the voltage of the line, while the intensity of the magnetic field is related to the current flow along the conductors. Both measurements rapidly decrease with distance from the source. Furthermore, EMF levels have been shown to be indistinguishable from background levels at distances <6.5 feet from the base of a turbine (McCallum et al. 2014).

The wind energy facility would produce the greatest EMFs near the Collector Substation, Gen-Tie Line, and Basin Electric transmission line. Given the National Institute of Environmental Health Sciences (2023) reports EMF levels from high-voltage transmission lines decreases by ≥ 95% at 200 feet, and given the nearest residence would be 9,232 feet from the Collector Substation, 233 feet from the Gen-Tie Line, and 2,310 feet from a Basin Electric t-line, it is expected EMFs produced would dissipate before reaching residences, causing no measurable effect above background levels.

Induced (stray) voltage issues are generally caused by improperly grounded and/or isolated electrical circuits found in older buildings, factories, or barns. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences and are

typically grounded properly. However, transmission lines can induce stray voltage on a distribution circuit that is parallel to and immediately under the transmission line. Appropriate measures, such as proper grounding, will be implemented to prevent stray voltage problems.

20. Information Concerning Wind Energy Facilities (ARSD 20:10:22:33.02)

ARSD 20:10:22:33.02. Information concerning wind energy facilities. *If a wind energy facility is proposed, the applicant shall provide the following information:*

(1) Configuration of the wind turbines, including the distance measured from ground level to the blade extended at its highest point, distance between the wind turbines, type of material, and color;

(2) The number of wind turbines, including the number of anticipated additions of wind turbines in each of the next five years;

(3) Any warning lighting requirements for the wind turbines;

(4) Setback distances from off-site buildings, rights-of-way of public roads, and property lines;

(5) Anticipated noise levels at the exterior of all occupied residences located within the affected area during construction and operation;

(6) Anticipated electromagnetic interference during operation of the facilities;

(7) The proposed wind energy site and major alternative site locations as depicted on overhead photographs and land use culture maps;

(8) Reliability and safety;

(9) Right-of-way or condemnation requirements;

(10) Necessary clearing activities;

(11) Configuration of towers and poles for any electric interconnection facilities, including material, overall height, and width;

(12) Conductor configuration and size, length of span between structures, and number of circuits per pole or tower for any electric interconnection facilities; and

(13) If any underground collection facilities are placed, the depth of burial, distance between access points, conductor configuration and size, and number of circuits.

Please refer to the Completeness Checklist in **Section 1.5.1** for ARSD requirement details. Requirements specific to ARSD 20:10:22:33.02 are addressed in various sections of the Application, as indicated in **Table 20-1**.

Table 20-1. Information Concerning Wind Energy Facilities	
Information Request	**Section**
(1) Configuration of the wind turbines	Sections 4.1 and 4.2
(2) Number of wind turbines	Section 4.2; Figure A-2 in Appendix A
(3) ADLS requirements for wind turbines	Sections 4.2.14 and 4.4.9
(4) Setback distances	Section 5.2
(5) Noise levels during construction and operation	Section 11.3; Appendix S
(6) Electromagnetic interference	Section 11.6; Appendices U and V
(7) Proposed site and major alternatives	Sections 4.1 and 5; Figures A-2 and A-9 in Appendix A
(8) Reliability and safety	Section 19.1
(9) Right-of-way or condemnation requirements	Sections 4.3 and 5.3
(10) Clearing activities	Sections 4.4.2 and 9.1.2
(11) Configuration of interconnection towers and poles	Sections 4.2.10 and 4.5
(12) Conductor and structure configurations	Sections 4.2.10 and 4.5; Figure A-3 in Appendix A
(13) Underground electric interconnection facilities	Sections 4.2.8 and 4.4.5

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

***ARSD 20:10:22:35. Information Concerning Transmission Facilities**. If a transmission facility is proposed, the applicant shall provide the following information:*

(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 size, and number of circuits.

Please refer to the Completeness Checklist in **Section 1.5.1** for ARSD requirement details. Requirements specific to ARSD 20:10:22:35 are addressed in various sections of the Application, as indicated in **Table 21-1**.

Table 21-1. Information Concerning Transmission Facilities	
Information Request	**Section**
(1) Configuration of towers and poles	Sections 4.2.10 and 4.5
(2) Conductor configuration and size, length of span, and number of circuits	Sections 4.2.10 and 4.5, Figure A-3 in Appendix A
(3) Proposed transmission site and major alternatives	Sections 5.1 and 5.2
(4) Reliability and safety	Section 19.2
(5) Right-of-way or condemnation requirements	Sections 4.3 and 5.3
(6) Necessary clearing activities	Section 4.5

22. Additional Information in Application (ARSD 10:22:36)

ARSD 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.*

22.1 Permits and Approvals

The Project must comply with federal, state, and local laws requiring permits or approvals. The potential permits or approvals that have been identified as being required for the construction and operation of the Project are provided in **Table 22.1-1**.

Table 22.1-1. Potentially Applicable Permits and Approvals			
Agency	**Permit/Approval**	**Notes**	**Status**
Federal			
Western Area Power Administration	National Environmental Policy Act (NEPA)	EA and FONSI for interconnection to WAPA transmission line.	Complete
Federal Aviation Administration	Notice of Proposed Construction or Alteration (Form 7460-1)	Required for any proposed construction over 200 feet above ground level.	Not started

Table 22.1-1. Potentially Applicable Permits and Approvals			
Agency	**Permit/Approval**	**Notes**	**Status**
	Notice of Actual Construction or Alteration (Form 7460-2, Part 1 and/or 2)	Supplemental notice in advance of or after commencing construction of turbines.	Not started
	Marking and Lighting Recommendations	Required for approval of light-mitigating technology.	Not started
U.S. Department of Commerce, National Telecommunications and Information Administration	NTIA Letter of Concurrence	No interference with federal communication systems anticipated.	Not started
U.S. Army Corps of Engineers	Clean Water Act Section 404 Permit	The Project is designed to avoid impacts to jurisdictional water resources to the extent practicable. The final Project footprint will be evaluated to determine the appropriate authorization for impacts, if any.	Not started
U.S. Fish and Wildlife Service	Endangered Species Act Section 7 consultation	Determination of effect on federally listed species.	Complete
U.S. Environmental Protection Agency	Spill Prevention, Control, and Countermeasure Plan	Required prior to storage of oil products greater than 10,000 gallons.	Not started
State			
South Dakota Public Utilities Commission	Energy Facility Permit	Required for wind energy facility.	In progress
South Dakota State Historic Preservation Office	SDCL 1-19A-11.1 Consultation	Determination of effect on archaeological and historical resources.	Complete
	Section 106 consultation	Determination of effect on archaeological and historical resources.	Complete
South Dakota Department of	Section 401 Water Quality Certification	The Project is designed to avoid impacts to water resources to the extent practicable. The final Project footprint will be	Not started

Table 22.1-1. Potentially Applicable Permits and Approvals			
Agency	**Permit/Approval**	**Notes**	**Status**
Agriculture and Natural Resources		evaluated to determine the appropriate authorization for impacts, if any.	
	National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activities	Required for land disturbance or construction activities that disturb 1 or more acres with a point source discharge to surface waters of the United States.	Not started
	General Permit for Temporary Discharges	Temporary permit for the use of public water for construction dewatering.	Not started
	Temporary Water Use Permit for Construction Activities	Temporary permits for the use of public water for construction, testing, or drilling purposes; issuance of a temporary permit is not a grant of water right.	Not started
	Water Rights Permit for Non-irrigation Use	Required if water will be appropriated for O&M Facility.	Not started
	Septic System Plan Approval	Review and approval required if O&M Facility septic system is not "conventional."	Not started
South Dakota Electrical Commission	Electrical Inspection	Required for O&M Facility.	Not started
South Dakota Game, Fish, and Parks	Coordination	Resource coordination.	Complete
South Dakota Department of Transportation	Aeronautical Hazard Permit	Permit lighting plan determined with FAA coordination.	Not started
	Utility Permit	Permit required for any utility crossing or use within state road ROW.	Not started
	Highway Access Permit	Permit required for any access roads abutting state roads.	Not started

Table 22.1-1. Potentially Applicable Permits and Approvals			
Agency	**Permit/Approval**	**Notes**	**Status**
	Oversize/Overweight Permit	Permit required for heavy equipment transport over state roads during construction.	Not started
Local			
Haakon County, South Dakota	Road Use, Repair, and Improvements Agreement	Permit required for the use, repair, and improvement of designated county roads during construction.	Complete
Haakon County, South Dakota	Utility Permit	Permit to allow collection crossings across County roads.	Not started

22.2 Agency Coordination

Throughout Project planning and development, Philip Wind has coordinated with various federal, state, and local agencies to provide Project updates and discuss potential concerns regarding the Project. A summary of the primary agency meetings completed to date is provided below. Philip Wind's Generator Interconnection Agreement with WAPA to connect to WAPA's existing Oahe to New Underwood 230-kV transmission line constituted a major federal action, and WAPA considered the potential environmental impacts of the Project under NEPA, including outreach to the public, federal, state, and local agencies, and non-governmental organizations. **Appendix I** is the Environmental Assessment WAPA completed for the Project; Section 5 of the Environmental Assessment summarizes the consultation and coordination conducted for the Project.

22.2.1 U.S. Fish and Wildlife Service and South Dakota Game, Fish, and Parks

Philip Wind maintains a commitment to work cooperatively to minimize adverse impacts to environmental resources. Through the planning stages of the Project, Philip and its consultants worked in coordination with federal and state agency personnel regarding necessary wildlife studies and siting considerations to ensure that all parties understand the scope of the Project and potential issues identified and addressed early in the planning process. Philip Wind will continue to work with the agencies to implement conservation measures intended to avoid, minimize, and/or mitigate potential impacts.

Prior to Invenergy's acquisition of Philip Wind, Philip Wind met with USFWS and SDGFP multiple times in 2018 to discuss the Project. After the acquisition, meetings with USFWS and SDGFP were conducted from 2022 through 2024. Key agency communications included Project overviews, data sharing, and the solicitation of feedback on study methodologies and siting considerations. In response to agency input, Philip Wind redesigned the Project to address concerns about birds, bats, and sensitive habitats, including shifting the Project Area and Project Facilities, and proposing additional environmental surveys.

Throughout 2022 and 2023, Philip Wind presented completed studies and demonstrated how data informed Project design, particularly regarding prairie grouse, whooping crane habitats, and grassland and wetland easements. UGP PEIS species-specific CEFs were developed in coordination with USFWS, SDGFP, and WAPA for the piping plover, rufa red knot, whooping crane, and NLEB. Ongoing coordination led to further refinements in survey protocols and turbine siting.

In 2024, Philip Wind continued to update agencies on Project progress and adaptive management strategies, particularly regarding the proposed listing of the tricolored bat. Philip Wind committed to applying NLEB avoidance and minimization measures to the tricolored bat and worked closely with the USFWS to ensure continued alignment with updated conservation measures in the final *Land-based Wind Energy Voluntary Operational Avoidance Guidance for the Northern Long-eared Bat* (USFWS 2024c) that was released in 2024. In 2025, the USFWS signed the updated CEF for the NLEB.

22.2.2 South Dakota State Historic Preservation Office

South Dakota SHPO was contacted during WAPA's EA scoping period that was held from January 19 to February 13, 2023. Additionally, cultural resources surveys were initiated in 2023 for the updated direct APE. In addition, an architectural survey was completed within the indirect APE to identify historic properties that could be visually impacted by the Project. The field surveys were concluded and consultation with SHPO as part of WAPA's National Historic Preservation Act Section 106 consultation were completed in July 2024 and SHPO concurred with the conclusions and recommendations presented in the report on July 11, 2024.

22.2.3 Haakon County

Philip Wind has consulted with Haakon County representatives through meetings, phone calls, and electronic communications. The Haakon County Conservation District and Haakon County Historical Society were contacted during the scoping period. The primary topics of these coordination efforts are summarized below.

- Introduction of Invenergy as the developer of the Project, along with Project summaries and status update presentations to Haakon County Board of County Commissioners and Haakon County Auditor
- Communications with County Commissioners, County Auditor, and County Highway Department on RUA

22.3 Public and Agency Comments

As discussed in **Section 5**, several potential Project sites in South Dakota were considered before the Project Area was selected. Philip Wind considered input from agencies and the public in siting the Project Area and in identifying potential turbine locations. Some of the adjustments made during Project siting and design, in response to comments, included:

- Avoidance of impacts to state and federal lands within or near Project Area, to the extent practicable;

- Micrositing Project Facilities in coordination with landowners; and
- Avoidance or minimization of impacts to unbroken grasslands, wetlands, and other habitats within or near the Project Area.

22.4 Applicant's Burden of Proof (49-41B-22)

As described in **Section 1.5**, Philip Wind has addressed the matters set forth in SDCL 49-41B and in ARSD 20:10:22, related to wind energy facilities and transmission facilities.

Philip Wind's burden of proof is set forth in SDCL 49-41B-22. Philip Wind has established that:

1. The facility complies with all applicable laws and rules;
2. The facility will not pose a threat of serious injury to the environment nor to the social and economic condition of inhabitants or expected inhabitants in the siting area;
3. The facility will not substantially impair the health, safety or welfare of the inhabitants; and
4. The facility will not unduly interfere with the orderly development of the region with due consideration having been given to the views of governing bodies of affected local units of government.

23. Testimony and Exhibits (ARSD 20:10:22:39)

Philip Wind is submitting testimony and exhibits in support of this Application. The individuals identified in **Table 23-1** are providing testimony in support of the Application. Philip Wind reserves the right to provide supplemental and/or rebuttal testimony, as needed, to further support this Application.

Table 23-1. Individuals Providing Testimony

Individual	Title	Company	Subject Matter
Alex Chandler	Director, Renewable Development	Invenergy	Project development
Brianna Gries	Senior Associate, Renewable Development	Invenergy	Project development
Michelle Phillips	Manager, Environmental Compliance and Strategy	Invenergy	Environmental and wildlife
Teddy Hines	Staff Engineer, Renewable Engineering	Invenergy	Engineering
Michael Hankard	President and Principal	Hankard Environmental, Inc.	Noise
JoAnne Blank	Senior Scientist and Project Manager	Stantec Consulting Services Inc.	Shadow flicker

23.1 Applicant Verification

Bristi Cure, being duly sworn, deposes and states that she is an Authorized Representative of Philip Wind and is authorized to sign this Application on behalf of Philip Wind Partners, LLC.

She further states that she does not have personal knowledge of all the facts recited in the Application and Exhibits and Attachments attached hereto, but the information has been gathered from employees and agents of the Owner / Applicant, and the information is verified by her as being true and correct on behalf of the Owner / Applicant.

Dated this 15th day of August 2025.

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