

**APPLICATION TO THE
PUBLIC UTILITIES COMMISSION OF THE
STATE OF SOUTH DAKOTA
FOR A FACILITY PERMIT TO CONSTRUCT A 300
MEGAWATT WIND FACILITY**

CROWNED RIDGE WIND FARM

Crowned Ridge Wind, LLC

JANUARY 30, 2019

Table 6.2 Sections Containing Project Features

County	Township Name	Township	Range	Sections
Codington	Waverly	118	51	1-3, 5, 8-12, 14-23
Codington	Rauville	118	52	13, 24-25
Codington	Leola	119	51	4-5, 7-9, 17-19, 25-26, 28-32, 35-36
Codington	Germantown	119	52	23, 25-26, 36
Grant	Troy	118	50	3-6, 8, 10,
Grant	Stockholm	119	50	3-6,9-10,13-16,23-29,32-34
Grant	Twin Brooks	120	50	17, 19-20, 28-30, 32-34
Grant	Mazeppa	120	51	24, 32-33

In addition, the following temporary features will be associated with the project: crane paths, one concrete batch plant, and one laydown area. These features are described below in more detail. The dimensions and estimated temporary and permanent impacts of these features can be found in Table 8.1.

6.1 Turbines

The Crowned Ridge Wind Farm turbine layout will consist of 130 three bladed, upwind, horizontal-axis wind turbines (Figure 3) which originate from the GE 2 MW-116 model series. The proposed Project will utilize 117 GE 2.3 MW turbines with 116-meter (381-feet) rotor diameter and 90-meter (295-feet) hub height (Figure 4a) as the Project's primary turbine technology, and 13 GE 2.3 MW turbines with 116-meter (381-feet) rotor diameter and an 80-meter (262-feet) hub height (Figure 4b) as the Project's secondary technology which will be utilized in select locations. The 20 alternate turbines have the same specifications as the primary turbine technology (GE 2.3MW with 116-meter (381-feet) rotor diameter and 90-meter (295-feet) hub height). However, only a maximum of 130 turbines in total will be constructed. Alternate turbines are included to provide flexibility through the permitting and construction process in the event an unforeseen condition arises during construction that indicates a primary turbine should be dropped and an alternate turbine activated. Table 6.3 identifies the wind turbine characteristics for the Project's selected turbine models.

Table 6.3 Wind Turbine Characteristics

Manufacturer	Model	Rotor Diameter	Hub Height	Generator Nameplate Capacity
GE	GE 2MW-116	116 meters	90 meters	2.3 MW
GE	GE 2MW-116	116 meters	80 meters	2.3 MW

The turbines are comprised of three major features being the tower, the nacelle, and the rotor:

Tower: The wind turbine is mounted on top of a tubular tower. The tubular towers proposed for the Project will be conical steel structures. The tubular tower is manufactured in sections from steel plate and the 3 tubular steel sections utilize bolted connections. A lockable steel door at the base of the tower provides secure access. An internal ladder with fall protection, connected to the steel wall of the tower, provides access to the top of the tower. There are service platforms within the tower. The turbines will be grounded in accordance with National Electrical Safety Code standards and comply with all FAA requirement in accordance with FAA regulations, the towers will be painted off-white to minimize visual impact.

Nacelle: The nacelle houses the main components of the wind turbine generator. Access from the tower into the nacelle is through the bottom of the nacelle. The nacelle is ventilated. It is illuminated with electric light. A hatch at the front end of the nacelle provides access to the blades and hub. The rotor can be secured in place with a rotor lock. The nacelle components include the drive train, gearbox, generator. The nacelle is housed in a steel-reinforced fiberglass shell that protects internal machinery from the environment. The housing is designed to allow for adequate ventilation to cool internal machinery. It is also contains an anemometer and a wind vane to measure wind speed and direction. The generated electricity is conducted through cables within the tower to the Down Tower Assembly mounted at the base of the turbine tower. Attached to the top of select nacelles, per FAA specifications, will be a single, medium-intensity aviation warning light. The preferred manner of lighting is by means of an Aircraft Detection Lighting System (“ADLS”). Subject to FAA approval, applicants will install an ADLS within one (1) year of approval by FAA for the specified project. In the event FAA does not approve the use of an ADLS system, CRW will comply with all lighting and markings otherwise required by FAA.

Rotor: A rotor assembly is mounted on the drive shaft and operates upwind of the tower. Rotor speed is regulated by a combination of blade pitch angle adjustment and generator/converter torque control. The rotor spins in a clock-wise direction under normal operating conditions when viewed from an upwind location.