

**Crowned Ridge Wind  
Grant and Codington Counties, South Dakota**

**2020 Sound Level Measurement Program Protocol – Curtailed Operations  
February 12, 2020**

## **Introduction**

This sound level measurement Protocol describes the methodology involved in evaluating the post-construction sound levels under curtailed operations for the Crowned Ridge Wind Energy Center (CRW) located in Grant and Codington Counties, South Dakota. Epsilon Associates, Inc. (Epsilon) has been retained by Crowned Ridge Wind, LLC (CRW) to conduct this evaluation of the post-construction sound levels. CRW is a 200-megawatt (MW) wind power generation facility composed of 87 General Electric (GE) wind turbines. All of the 87 wind turbines within the site are GE 2.3-116 units with a rotor diameter of 116 meters. Nine (9) GE 2.3-116 wind turbines have a hub height of 80 meters and 78 have a hub height of 90 meters.

All wind turbines were proposed and permitted to have Low Noise Trailing Edge (LNTE) blades. Currently only eight (8) of the 87 wind turbines have LNTE blades installed. These wind turbines are all GE 2.3-116 units at a 90-meter hub height. A temporary curtailment program has been designed, through predictive sound level modeling by EAPC, to mitigate sound levels produced by the Project such that compliance is demonstrated until all wind turbines are equipped with LNTE blades. The plan includes curtailing (shutting down) select wind turbines when the wind speeds reach 6 m/s at hub height. A total of 16 wind turbines in the layout will be curtailed in this manner.

## **Regulatory Requirements**

### ***Order Granting Temporary Waiver***

In the matter of the application by Crowned Ridge Wind, LLC for a permit of a wind energy facility in Grant and Codington Counties (EL 19-003) a temporary waiver was granted on January 9, 2020. This order included four (4) conditions as specified below:

- 1) The temporary waiver expires September 15, 2020;
- 2) Applicant shall file with the Commission beginning April 1, 2020, monthly progress reports explaining the status of the LNTE installation;
- 3) Applicant shall curtail 16 turbines at wind speeds above 6 meters per second in accordance with the sound model using a 0.3 ground attenuation factor; and
- 4) Applicant shall conduct post-construction sound compliance testing in accordance with Condition 26 of the Final Order during the Temporary Waiver period and again after the LNTEs are installed on all turbines.

***Final Decision and Order Granting Permit to Construct Facility; Notice of Entry***

CRW is subject to permit conditions per the “Final Decision and Order Granting Permit to Construct Facility; Notice of Entry” (Final Decision). Condition 26 pertains to sound level limits and monitoring methodologies. The language in Condition 26 defining sound level limits is the following:

*The Project, exclusive of all unrelated background noise, shall not generate a sound pressure level (10-minute equivalent continuous sound level, Leq) of more than 45 dBA as measured within 25 feet of any non-participating residence unless the owner of the residence has signed a waiver, or more than 50 dBA (10-minute equivalent continuous sound level, Leq) within 25 feet of any participating residence unless the owner of the residence has signed a waiver. The Project Owner shall, upon Commission formal request, conduct field surveys and provide monitoring data verifying compliance with specified noise level limits. If the measured wind turbine noise level exceeds a limit set forth above, then the Project Owner shall take whatever steps are necessary in accordance with prudent operating standards to rectify the situation.*

Sound level monitoring methodologies described in this Protocol have been designed to abide by the procedures outlined in subparts a) through f) of Condition 26 in the Final Decision.

***Codington County Ordinance***

A section of CRW is within Codington County, SD and is subject to the following sound level requirements in Section 5.22.03(12) of Ordinance #65 Zoning Ordinance of Codington County, Noise subsection of General Provisions for Wind Energy Systems (WES):

*Noise level generated by the wind energy system shall not exceed 50 dBA, average A-weighted Sound pressure level effects at the property line of existing non participating residences, businesses, and buildings owned and/or maintained by a governmental entity.*

*Noise level measurements shall be made with a sound level meter using the A-weighting scale, in accordance with standards promulgated by the American National Standards Institute. An L90 measurement shall be used and have a measurement period no less than ten minutes unless otherwise specified by the Board of Adjustment.*

A complaint has been issued by a residence in the vicinity of the Project to Codington County. As part of this study, an evaluation of sound level compliance will be made at the intervenor property line per the ordinance.

## **Sound Level Measurement Methodology**

The Final Decision specifies that methods from the American National Standard Institute shall be followed. The monitoring program will generally follow Method #1: “General method for routine measurements” in ANSI S12.18-1994 (R2019) “Procedures for Outdoor Measurement of Sound Pressure Level”.

The Final Decision suggests measurements at 4 to 6 locations. Broadband A-weighted (dBA) and one-third octave-band (dB) sound levels will be measured at six (6) locations in the vicinity of the Project to collect post-construction sound level data. Per the Final Decision, measurements are to be performed at “non-participating and participating residences with the highest expected noise levels”. Sound level modeling was performed by EAPC to determine those residences predicted to experience the highest sound levels from the Project under the curtailment scenario. The attached Table 1 presents the modeling results for all participating structures and the attached Table 2 presents the modeling results for all non-participating structures from which the proposed measurement locations were selected. The tables are both sorted from the highest to the lowest modeled sound level and include the measurement location ID’s in the right-most column. In addition to the required criteria set forth in the Final Decision, five (5) measurement locations were selected to be representative of the whole Project area where wind turbines are located with a focus on measuring at non-participating residences. A sixth location is proposed based on a complaint filed with Codrington County.

The six (6) proposed measurement locations and five (5) alternate locations in Codrington and Grant Counties are shown in Figure 1 and are briefly described below. Five monitoring locations are proposed to be at a residence. At the intervenor location (ID #6), sound levels will be measured at the property line. Non-participating homeowners may be unwilling to grant permission at a particular location; if permission is not granted, measurements will be conducted at an alternate location when practical. In addition, the alternate location may be selected if site conditions realized during setup warrant relocation, e.g. unexpected local noise source. If permission cannot be obtained at a minimum of six locations, the number of measurement locations will be reduced accordingly. No alternate location is proposed for Location #6; if that homeowner declines permission, sound level measurements will be conducted at only five (5) locations.

### **Primary**

- ◆ **Location 1:** Participating – Modeling Receptor CR1-C30-P
  - Modeled Project-Only Curtailment Sound Level = 50 dBA
  - Highest modeled receptor

- ◆ **Location 2:** Non-Participating – Modeling Receptor CR1-G68-NP
  - Modeled Project-Only Curtailment Sound Level = 43 dBA
- ◆ **Location 3:** Non-Participating – Modeling Receptor CR1-C41-NP
  - Modeled Project-Only Curtailment Sound Level = 44 dBA
- ◆ **Location 4:** Non-Participating – Modeling Receptor CR1-C34-NP
  - Modeled Project-Only Curtailment Sound Level = 45 dBA
  - Highest modeled Project-Only sound level at non-participating receptor
- ◆ **Location 5:** Non-Participating – Modeling Receptor CR1-C14-NP
  - Modeled Project-Only Curtailment Sound Level = 44 dBA
- ◆ **Location 6:** Non-Participating – Modeling Receptor CR1-C29-NP
  - Intervenor (Christianson)

#### Alternate

- ◆ **Location 1Alt:** Participating – Modeling Receptor CR1-C19-P
  - Modeled Project-Only Curtailment Sound Level = 49 dBA
  - Second highest modeled receptor
- ◆ **Location 2Alt:** Non-Participating – Modeling Receptor CR1-G16-NP
  - Modeled Project-Only Curtailment Sound Level = 44 dBA
- ◆ **Location 3Alt:** Non-Participating – Modeling Receptor CR1-C44-NP
  - Modeled Project-Only Curtailment Sound Level = 44 dBA
- ◆ **Location 4Alt:** Non-Participating – Modeling Receptor CR1-C40-NP
  - Modeled Project-Only Curtailment Sound Level = 43 dBA
- ◆ **Location 5Alt:** Non-Participating – Modeling Receptor CR1-C16-NP
  - Modeled Project-Only Curtailment Sound Level = 44 dBA

The Final Decision requires that compliance evaluation periods be when the five closest wind turbines to the measurement locations are operating (assumed to be exclusive of those wind turbines that are curtailed as that was not considered at the time of the Final Decision) and when the absolute closest wind turbine (assumed to be non-curtailed) is operating at maximum sound power (within 1.0 dBA). Typically this condition is evaluated through a comparison of the electrical power specification and the sound power level specification. All wind turbines at CRW are operating under Enhanced Power Curve Operation (EPCO). Although preliminary confidential sound and power curve information have been made available by GE, those specifications have not been finalized and therefore cannot be relied upon to make determinations regarding maximum or worst-case conditions. Therefore, evaluation periods will conservatively be when electrical output is at its rated maximum from the wind turbines, i.e. 2,300 kW unless valid and finalized data are provided by GE prior to sound level evaluation.

There may be periods of time during the measurement program when there are elevated sound levels which are due to sources other than the wind turbines. Depending on the sound levels measured during the operational periods, it may be necessary to identify the portion of the sound attributed to CRW; therefore, sound level measurements with the wind turbines turned off (or “shutdown”) will be made during the program. The following language is provided in the Final Decision regarding shutdowns:

*10 on/off tests shall be carried out during the survey period when the Project is operating at full power production irrespective of the ground level wind speed. For the on/off tests, all units in the Project shall be shut down for a 10-minute period synchronized with the monitor’s clocks (starting, for example, at the top of the hour or 10 minutes after, 20 minutes after, etc.).*

Although full power production for the Project is stated, based on the other components of the condition and Epsilon’s experience in measuring sound levels at wind energy facilities, this requirement is being applied to the closest operating wind turbine to each of the measurement locations. NextEra Energy Resources, LLC (NEER) personnel will monitor wind forecasts and actual operating conditions specifically for the key wind turbines and will conduct the shutdowns accordingly when electrical output is 2,300 KW (2.3 MW) at the closest operating wind turbines to the measurement locations. All wind turbines in the Project will be shut down for these “off” tests. Once all wind turbines are completely shut down<sup>1</sup>, the operator must wait for a full 10-minute clock-synchronized period (e.g. 1:00 - 1:10 PM) to pass before the wind turbines are turned back on. As wind conditions can vary significantly over the course of two weeks, shutdown requirements over the course of the measurement program are specified herein to allow for a sufficient number of shutdowns which will exceed 10:

- a) When all six identified wind turbines<sup>2</sup> are operating at maximum electrical output (2,300 kW) for a period of 10 minutes synchronized with the monitor’s clocks, a site-wide wind turbine shut down will be initiated. Following the end of a shutdown period (one full 10-minute time-synchronized period), the wind turbines will be allowed to operate normally per the curtailment program for three (3) full 10-minute periods (30 minutes) until another shutdown is implemented if output conditions persist. This will provide opportunity for the collection of several valid operational sound measurement periods. This approach of identifying the desired electrical output conditions and shutting down wind turbines will continue until 10 such shutdowns have occurred. Shutdowns as described below do not count towards that total.
- b) A minimum of one (1) shutdown must occur during each nighttime period (10:00 PM – 7:00 AM). If none of the 10 required maximum output shutdowns are planned for that period based on wind forecasts, a shutdown is to occur at 1:00 AM. If the forecast does

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<sup>1</sup> The blades will be allowed to pinwheel.

<sup>2</sup> The closest operating wind turbine to each of the six measurement locations

indicate the potential for a shutdown later at night but those conditions do not occur resulting in no shutdowns prior to 6:00 AM, a shutdown is to occur at 6:00 AM.

- c) If none of the 10 required maximum output shutdown occur during daytime hours (7 AM – 10 PM) the following day shall include one daytime shutdown at 3:00 PM assuming no shutdowns have already occurred during that daytime period.
- d) Once the required 10 required shutdowns have been orchestrated during the two-week measurement program, nighttime shutdowns will occur each night at 1:00 AM and daytime shutdowns will occur every other day at 1:00 PM.

The shutdowns will be performed by onsite personnel at the operations and maintenance (O&M) building during regular working hours<sup>3</sup> and by the NEER Renewable Operations Control Center (ROCC) during all other times including, but not limited to, nights and weekends.

### **Measurement Equipment**

The sound level measurements will be made using Larson Davis (LD) model 831 sound level meters (or equivalent). The meters meet “Type 1 Precision” requirements set forth in American National Standards Institute (ANSI) S1.4-2014 (R2019) standard for sound level meters. The meters will log values of various broadband A-weighted (dBA) sound level measurement parameters including the  $L_{eq}$ ,  $L_{max}$ , and  $L_{90}$ , and one-third octave band sound levels. The meters will be programmed to log these statistical data on a 10-minute basis. In addition, a subset of these data will be collected by the meters at one-second intervals. The microphones will be tripod-mounted at a height of 1.5 meters (5 feet) above ground. A 7-inch windscreen will be placed on all microphones. Audio recordings will be made during the sound level measurements. These recordings will be either continuous or made only if the sound levels at the location exceed 45 dBA.

The measurement equipment will be calibrated in the field before and after the surveys with the manufacturer’s acoustical calibrator which meets the standards of IEC 942 Class 1L and ANSI S1.40-2006 (R2016). All calibrations will be within  $\pm 1.0$  dB from the most recent calibration otherwise the data collected during that period will be discarded. The meters are calibrated and certified as accurate to standards set by the National Institute of Standards and Technology by an independent laboratory within the past 12 months.

Ground-level wind speed data will be continuously measured at all sound level monitoring locations for the duration of the study per the Final Decision. A HOBO H21-002 micro-weather station, or comparable instrumentation, with a tripod and data logger will be used at the monitoring locations. The wind sensors will be mounted at an approximately 2-meter height and log data every 10 minutes to be consistent with the sound level measurements. This wind

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<sup>3</sup> Epsilon anticipates this to be approximately 7 AM to 3 PM on weekdays.

instrument has a measurement range of 0 to 45 m/s (100 mph) and an accuracy of  $\pm 1.1$  m/s (2.4 mph). The starting threshold is  $\leq 1$  m/s (2.2 mph).

Additional meteorological parameters, e.g. temperature, precipitation, etc. will be collected through additional instrumentation deployed by Epsilon at one location and downloaded from the closest National Weather Service station.

### **Schedule**

The sound level measurement program is planned to commence during the first week of March 2020. Following the approach outlined in the Final Decision, the sound level measurement program will run for at least two weeks (14 days). The equipment will not be staffed continuously; however, observations will be made four times during the program (see below). The field scientist will leave the site either the same day or the day after all equipment is running and return in approximately one week. The observation periods will be as follows:

- ◆ Upon deployment (daytime),
- ◆ During the 1<sup>st</sup> night when all monitors are running (nighttime),
- ◆ During the 1-week interim check (daytime), and
- ◆ During the pick-up (daytime).

Epsilon expects to provide a preliminary summary of the basic results (the measured project-only sound levels at the test points) to the Commission within 30 days after the completion of the field survey. A report, which summarizes the measurement program that will include figures depicting the wind turbine and measurement locations and tabular results, will be submitted on or before May 15, 2020.

### **Evaluation of the Sound Levels**

The ‘total’  $L_{eq}$  sound level (wind turbines + background) measured during each of at least 10 periods meeting the conditions specified in the Final Decision will initially be compared to the wind energy facility limits. This is conservative since it includes both wind turbines plus background. The sound level during background conditions will be measured during a period when wind turbines are shutdown but would otherwise be operating. If necessary, a representative background sound level will be subtracted (on an energy basis) from the operational sound level to obtain the “wind turbine only”  $L_{eq}$  sound pressure level. This subtraction procedure is supported by ANSI S12.18. The “wind turbine only” sound pressure level will then be compared to the wind energy facility limits.

In order to compare the measured sound data to the applicable sound pressure level limits, Epsilon will evaluate the sound level data meeting the following criteria:

1. There is no precipitation during the measurement period.<sup>4</sup>
2. The average ground level wind speed is 5 m/s (11.2 mph) or less.<sup>5</sup>
3. According to ANSI S12.18 the sound level measurements are to be during a wind direction under which the measurement location is  $\pm 45$  degrees within the downwind direction of the sound source.<sup>6</sup> Evaluating only downwind periods is not a specific requirement identified in the conditions of the Final Decision. In addition, according to a 2016 Massachusetts Clean Energy Center report<sup>7</sup> on wind turbine acoustics, wind direction only affects sound levels by “generally less than 1 dB”. Therefore, it is reasonable to include additional wind directions in the analysis when downwind periods meeting the other criteria are not present and potentially uncommon.
4. Operational condition - Closest five wind turbines that are not being curtailed are operating. Closest wind turbine operating at maximum sound power (within 1.0 dBA). As the sound power determination cannot be made based on a comparison to wind turbine electrical output due to insufficient data on the EPCO operations, maximum electrical output, i.e. 2,300 kW, will be necessary at the closest wind turbine. If valid data are provided by GE in advance of the evaluation, it will be incorporated into the analysis.

Each period meeting the criteria will be analyzed following the approach outlined above and compared to the broadband sound level limit. The sound level measurement program and analysis will be summarized in a comprehensive report.

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<sup>4</sup> According to ANSI S12.18-1994 (R2019), “No measurements shall be made during measurable precipitation or freezing rain.” This condition is also required per the Final Decision.

<sup>5</sup> According to ANSI S12.18-1994 (R2019), “No sound level measurement shall be made when the average wind velocity exceeds 5 m/s when measured at a height of  $2 \pm 0.2$  m above the ground.” This condition is also required per the Final Decision.

<sup>6</sup> Orientation between the source and receiver required for Method #1 in the ANSI standard. One exception is during an inversion with low ground level winds.

<sup>7</sup> RSG et al, “Massachusetts Study on Wind Turbine Acoustics,” Massachusetts Clean Energy Center and Massachusetts Department of Environmental Protection, 2016.



**Table 1 - Highest Modeled Participating Structures (Sorted High to Low)**

<b>Modeling Receptor ID</b>	<b>Participation Status</b>	<b>Easting (m)</b>	<b>Northing (m)</b>	<b>Modeled Project-Only Sound Level (dBA)</b>	<b>Proposed Sound Level Measurement Location ID</b>
CR1-C30-P	Participant	661,699	4,988,957	50	1
CR1-C19-P	Participant	659,243	4,987,276	49	1A
CR1-C68-P	Participant	662,652	4,987,606	48	-
CR1-C36-P	Participant	663,181	4,990,600	48	-
CR1-G18-P	Participant	668,678	4,990,722	48	-
CR1-C69-P	Participant	662,685	4,987,619	48	-
CR1-G32-P	Participant	669,477	4,995,401	48	-
CR2-C150-P	Participant	657,178	4,985,788	48	-
CR1-G21-P	Participant	666,766	4,991,807	47	-
CR1-C17-P	Participant	658,031	4,986,373	47	-
CR1-C50-P	Participant	656,806	4,994,388	46	-
CR1-G19-P	Participant	671,018	4,990,744	46	-
CR1-C20-P	Participant	663,054	4,987,455	46	-
CR1-G66-P	Participant	670,802	4,994,681	46	-
CR1-C35-P	Participant	662,025	4,990,475	46	-
CR1-G65-P	Participant	671,496	4,994,973	45	-
CR1-C48-P	Participant	664,247	4,993,646	45	-
CR1-C11-P	Participant	664,111	4,985,679	45	-
CR1-G67-P	Participant	669,597	4,993,440	45	-
CR1-C57-P	Participant	656,628	4,995,266	45	-
CR1-G25-P	Participant	671,391	4,992,858	44	-
CR1-C56-P	Participant	655,953	4,995,244	44	-
CR1-C26-P	Participant	657,767	4,988,493	43	-
CR1-G24-P	Participant	673,058	4,992,440	43	-
CR1-C18-P	Participant	663,651	4,987,157	42	-
CR1-C42-P	Participant	659,458	4,992,229	42	-
CR1-C64-P	Participant	659,436	4,992,174	42	-
CR1-C51-P	Participant	657,455	4,995,160	42	-
CR1-G15-P	Participant	668,396	4,989,607	42	-
CR1-G33-P	Participant	668,911	4,995,550	42	-
CR1-C47-P	Participant	662,825	4,993,508	40	-
CR1-C49-P	Participant	662,250	4,993,731	38	-
CR1-G26-P	Participant	672,589	4,993,869	38	-
CR1-C8-P	Participant	660,532	4,984,445	37	-
CR1-C10-P	Participant	663,510	4,985,195	36	-
CR1-C6-P	Participant	662,989	4,995,228	36	-
CR1-C23-P	Participant	660,619	4,984,078	36	-
CR1-C21-P	Participant	660,756	4,984,086	36	-
CR1-C22-P	Participant	660,755	4,984,082	36	-
CR1-G41-P	Participant	671,563	4,997,050	35	-
CR1-G28-P	Participant	673,113	4,994,772	35	-
CR1-G81-P	Participant	671,478	4,997,523	33	-
CR1-G38-P	Participant	673,972	4,996,493	30	-
CR1-G129-P	Participant	673,111	4,997,703	30	-
CR1-G59-P	Participant	675,755	4,994,888	29	-
CR1-G60-P	Participant	675,830	4,995,687	28	-
CR1-G127-P	Participant	669,534	4,999,939	28	-
CR1-C59-P	Participant	661,548	5,000,754	27	-

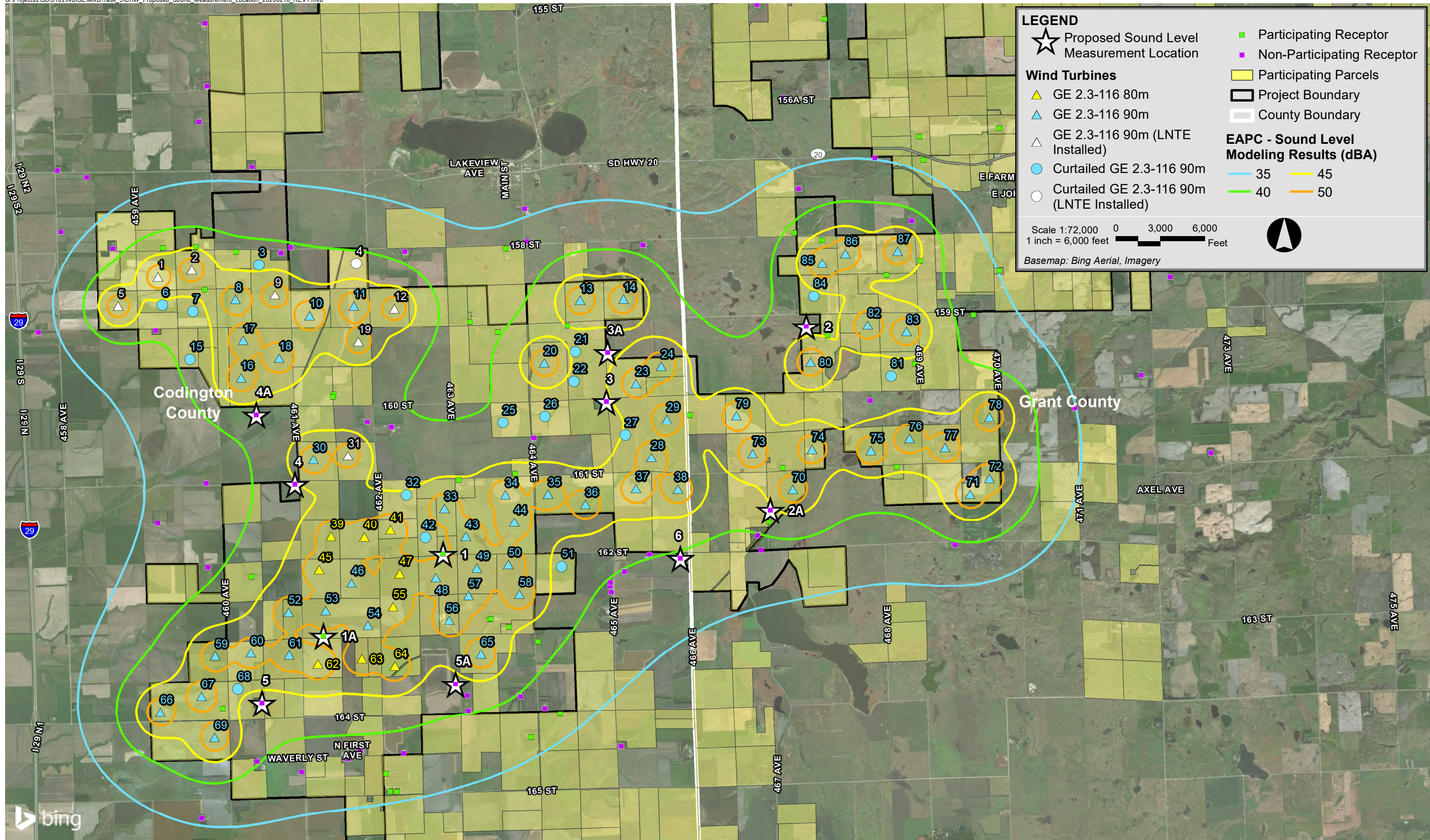
<b>Modeling Receptor ID</b>	<b>Participation Status</b>	<b>Easting (m)</b>	<b>Northing (m)</b>	<b>Modeled Project-Only Sound Level (dBA)</b>	<b>Proposed Sound Level Measurement Location ID</b>
CR1-G124-P	Participant	669,843	5,000,605	27	-
CR1-G126-P	Participant	672,157	5,000,446	26	-
CR1-G108-P	Participant	669,516	5,001,186	26	-
CR1-G128-P	Participant	670,242	5,001,314	26	-
CR1-G149-P	Participant	669,284	5,003,283	24	-
CR1-G136-P	Participant	667,706	5,004,861	22	-
CR1-G137-P	Participant	666,501	5,005,136	22	-
CR1-G132-P	Participant	669,098	5,004,948	22	-
CR1-G131-P	Participant	668,466	5,005,145	22	-
CR1-G135-P	Participant	668,616	5,005,161	22	-
CR1-G133-P	Participant	669,881	5,005,460	21	-
CR1-G138-P	Participant	664,809	5,006,456	21	-
CR1-G140-P	Participant	664,546	5,007,269	20	-
CR1-G139-P	Participant	668,199	5,008,062	20	-

**Table 2 - Highest Modeled Non-Participating Structures (Sorted High to Low)**

Receptor ID	Participation Status	Easting (m)	Northing (m)	Modeled Project-Only Sound Level (dBA)	Proposed Sound Level Measurement Location ID
CR1-C34-NP	Non-Participating	658,661	4,990,389	45	4
CR1-C41-NP	Non-Participating	665,053	4,992,084	44	3
CR1-G16-NP	Non-Participating	668,419	4,989,861	44	2A
CR1-C44-NP	Non-Participating	665,076	4,993,095	44	3A
CR1-C14-NP	Non-Participating	657,982	4,985,894	44	5
CR1-C16-NP	Non-Participating	661,960	4,986,288	44	5A
CR1-G68-NP	Non-Participating	669,159	4,993,632	43	2
CR1-C40-NP	Non-Participating	657,865	4,991,818	43	4A
CR1-G23-NP	Non-Participating	670,471	4,992,104	43	-
CR1-G34-NP	Non-Participating	671,320	4,995,798	43	-
CR1-C39-NP	Non-Participating	660,144	4,991,670	42	-
CR1-C37-NP	Non-Participating	663,563	4,991,342	42	-
CR1-C12-1-NP	Non-Participating	662,199	4,986,047	42	-
CR1-C62-NP	Non-Participating	658,375	4,995,138	42	-
CR1-C38-NP	Non-Participating	660,639	4,991,557	41	-
CR1-C46-NP	Non-Participating	655,802	4,993,540	41	-
CR1-C63-NP	Non-Participating	658,566	4,995,254	41	-
CR1-C31-NP	Non-Participating	665,939	4,988,950	40	-
CR1-C3-NP	Non-Participating	657,888	4,984,697	40	-
CR1-C12-NP	Non-Participating	662,222	4,985,736	40	-
CR1-G14-NP	Non-Participating	668,156	4,989,332	40	-
CR1-C28-NP	Non-Participating	665,429	4,988,598	40	-
CR1-C71-NP	Non-Participating	665,137	4,988,378	40	-
CR1-C15-NP	Non-Participating	663,291	4,986,026	40	-
CR1-C70-NP	Non-Participating	665,135	4,988,293	40	-
CR1-C55-NP	Non-Participating	660,914	4,995,169	40	-
CR1-G13-NP	Non-Participating	672,216	4,989,142	39	-
CR1-C29-NP	Non-Participating	666,572	4,988,867	39	6
CR1-C67-NP	Non-Participating	659,789	4,985,057	39	-
CR1-C27-NP	Non-Participating	656,876	4,988,683	39	-
CR1-C72-NP	Non-Participating	665,158	4,988,170	39	-
CR1-C66-NP	Non-Participating	659,718	4,985,032	39	-
CR1-C65-NP	Non-Participating	665,805	4,995,305	39	-
CR1-C112-NP	Non-Participating	660,002	4,984,908	39	-
CR1-C52-NP	Non-Participating	654,924	4,995,231	39	-
CR1-G12-NP	Non-Participating	668,229	4,989,039	39	-
CR1-C5-NP	Non-Participating	659,958	4,984,794	38	-
CR1-C4-NP	Non-Participating	659,744	4,984,749	38	-
CR1-C7-NP	Non-Participating	660,893	4,984,861	38	-
CR1-C2-NP	Non-Participating	658,791	4,984,483	38	-
CR1-C33-NP	Non-Participating	656,839	4,990,404	38	-
CR1-C13-NP	Non-Participating	663,792	4,985,785	37	-
CR1-G37-NP	Non-Participating	668,998	4,996,452	37	-
CR1-C54-NP	Non-Participating	663,421	4,995,376	37	-
CR1-C32-NP	Non-Participating	655,843	4,989,581	36	-
CR1-C1-NP	Non-Participating	656,743	4,983,525	36	-
CR1-G22-NP	Non-Participating	674,670	4,991,955	35	-
CR1-G42-NP	Non-Participating	670,566	4,997,097	35	-

Receptor ID	Participation Status	Easting (m)	Northing (m)	Modeled Project-Only Sound Level (dBA)	Proposed Sound Level Measurement Location ID
CR1-C53-NP	Non-Participating	663,376	4,996,043	35	-
CR1-C58-NP	Non-Participating	657,781	4,996,906	34	-
CR1-C45-NP	Non-Participating	653,390	4,993,503	33	-
CR1-C111-NP	Non-Participating	653,857	4,995,573	33	-
CR1-C9-NP	Non-Participating	665,352	4,985,004	33	-
CR1-C110-NP	Non-Participating	654,385	4,996,686	32	-
CR1-C61-NP	Non-Participating	656,690	4,997,831	31	-
CR1-G36-NP	Non-Participating	673,559	4,996,344	31	-
CR1-G105-NP	Non-Participating	668,696	4,998,325	31	-
CR1-C109-NP	Non-Participating	653,780	4,996,828	31	-
CR1-G77-NP	Non-Participating	676,031	4,992,629	30	-
CR1-C60-NP	Non-Participating	656,855	4,998,565	30	-
CR1-C107-NP	Non-Participating	656,811	4,999,855	28	-
CR1-G27-NP	Non-Participating	676,630	4,994,642	28	-
CR1-G70-NP	Non-Participating	677,465	4,991,043	28	-
CR1-G130-NP	Non-Participating	668,147	5,000,233	27	-
CR1-G109-NP	Non-Participating	667,064	5,000,425	27	-
CR1-G125-NP	Non-Participating	668,289	5,000,643	27	-
CR1-C105-NP	Non-Participating	658,372	5,001,257	26	-
CR1-G43-NP	Non-Participating	661,141	5,001,721	26	-
CR1-G44-NP	Non-Participating	661,781	5,001,732	26	-
CR1-G117-NP	Non-Participating	663,801	5,005,084	22	-
CR1-G113-NP	Non-Participating	666,228	5,005,549	22	-
CR1-G110-NP	Non-Participating	671,218	5,005,064	21	-
CR1-G115-NP	Non-Participating	664,933	5,006,731	21	-
CR1-G114-NP	Non-Participating	666,214	5,006,667	21	-
CR1-G600-NP	Non-Participating	674,301	5,005,773	20	-





Crowned Ridge Wind Energy Center Grant and Codrington Counties, South Dakota