BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Nancy Lange	Chair
Dan Lipschultz	Commissioner
Matthew Schuerger	Commissioner
Katie J. Sieben	Commissioner
John A. Tuma	Commissioner

In the Matter of Freeborn Wind Energy, LLC for a Large Wind Energy Conversion System Site Permit for the 84 MW Freeborn Wind Farm in Freeborn County

ISSUE DATE: December 19, 2018

DOCKET NO. IP-6946/WS-17-410

ORDER ISSUING SITE PERMIT AND TAKING OTHER ACTION

PROCEDURAL HISTORY

On June 15, 2017, Freeborn Wind Energy LLC (Freeborn Wind or the Company) filed a site permit application to erect a collection of wind turbines and related facilities (a wind farm) in Freeborn County, capable of generating up to 84 megawatts (the Project).

On June 21, 2017, the Commission issued a request for comments on the matter, with initial comments to be filed by July 6, and reply comments to be filed by July 13.

By July 6, 2017, the Commission had received comments on the application from roughly 50 interested parties.

On August 2, 2017, Freeborn Wind amended its application to reflect a change in the list of landowners who had consented to the Project and those who had not.

On August 31, 2017, the Commission issued its Order Finding Application Complete and Varying Time Limits. In that order, the Commission found that Freeborn Wind substantially complied with the filing requirements for a site permit—even though the application had omitted the Company's plans for decommissioning the Project and restoring the land to its prior condition. That order also referred this matter to the Office of Administrative Hearings for contested case proceedings and a public hearing to be conducted by an Administrative Law Judge (ALJ).

On September 20, 2017, the Minnesota Department of Commerce (Department) convened a public information meeting in Albert Lea. The Department solicited comments on issues and facts to be considered in the development of a draft site permit, including how the Project might affect people and the environment; how the parties might minimize, mitigate, or avoid those consequences; and the issues and facts the Department should address in the draft permit.

By October 9, 2017, the Commission had received multiple comments on the application. These included comments from various governmental agencies, including the Minnesota Department of Transportation (MnDOT), Minnesota Department of Natural Resources (MDNR), Shell Rock Township, and the London Township Town Board. And they included comments from the Association of Freeborn County Landowners (AFCL), a self-described "informal association of landowners in and adjacent to the site footprint of the [Project]."[1]

On December 5, 2017, the Department filed comments and a draft site permit. The Commission issued the draft site permit for comment on January 30, 2018.

On February 2, 2018, the Commission issued a notice of public hearing and draft site permit availability.

On February 20, 2018, ALJ LauraSue Schlatter convened the public hearing in Albert Lea; on February 21 and 22, the ALJ held evidentiary hearings with four parties: AFCL, the Department, Freeborn Wind, and KAAL-TV, LLC (KAAL-TV).

By April 4, 2018, the parties had filed briefs, reply briefs, or both.

On May 14, 2018, the ALJ issued her Findings of Fact, Conclusions of Law, and Recommendations (ALJ Report) recommending that the Commission deny the permit or, alternatively, grant Freeborn Wind time to submit a noise plan.

On June 8, 2018, the parties filed exceptions to the ALJ Report.[2] Non-parties also filed comments, generally supporting Freeborn Wind's position that the ALJ mischaracterized the application of applicable noise standards to the Project.

On September 12, 2018, the MPCA filed comments regarding its position on the application of state noise standards (Minn. R. 7030.0040) to LWEC projects. On September 17, Freeborn Wind filed a motion to exclude MPCA's comments as untimely. On September 18, 2018, AFCL filed comments regarding the late-filed comments and motion.

On September 19, 2018, Freeborn Wind filed proposed alternative Site Permit language addressing pre-construction noise modeling and post-construction noise monitoring.

On September 20, 2018, the Commission met to consider the matter.[3]

---

[1] AFCL Petition for Contested Case; Comment on Contested Material Issues of Fact, at 1 (July 6, 2017).

[2] Minn. R. 7829.2700 does not provide for non-parties to file exceptions to the ALJ Report.

[3] The Commission also considered Freeborn Wind's route permit application to build a transmission line for connecting the Project to the transmission grid. See Docket No. IP-6946/TL-17-322, *In the Matter of the Application of Freeborn Wind Energy LLC for a Route Permit for the Freeborn Wind Transmission Line in Freeborn County.*

FINDINGS AND CONCLUSIONS

I. Summary

In this order the Commission adopts the findings, conclusions, and recommendation of the ALJ Report with modifications.

The Commission will require Freeborn Wind to provide an updated pre-construction noise analysis demonstrating that the Project will comply with revised noise permit conditions. These conditions require the Company to propose a plan demonstrating that the Project will not cause or significantly contribute to an exceedance of the relevant noise standards, to monitor the noise generated by the Project, and to work with the Department to minimize and mitigate turbine noise as necessary.

The Commission has also made changes to the ALJ's proposed findings on shadow flicker, the complaint handling procedures for over-the-air television interference from turbines, and decommissioning, among other things.

Finally, the Commission will issue a site permit for the Freeborn Wind Large Wind Energy Conversion System based on a modified version of the Draft Site Permit authorized by the Commission in its January 30, 2018 order.

II. The Proposed Project

Freeborn Wind proposes to erect a collection of wind turbines capable of generating up to 84 megawatts (MW) in Freeborn County, Minnesota, and up to 116 MW in the neighboring jurisdiction of Worth County, Iowa. In Minnesota, the Project boundary would encompass approximately 26,273 acres,[4] and would involve erecting up to 42 2.0-MW wind turbines, an electrical and fiber optic communication system, associated equipment, gravel access roads, an operations and maintenance facility, a substation, and a permanent high-voltage transmission line. The Company proposes to use a combination of Vesta V110 or V116 turbine models for this project.

The Project was selected through a Commission-approved bidding process; therefore, under Minn. Stat. § 216B.2422 subd. 5, it is exempt from the certificate of need requirements. In addition, Freeborn Wind has entered into a contract with Northern States Power Company d/b/a Xcel Energy (Xcel) whereby Xcel will purchase the Project after it receives a site permit, and then construct, own, and operate the Project.

III. Legal Standard

Wind energy projects are governed by Minn. Stat. Ch. 216F and Minn. R. Ch. 7854. Minn. Stat. § 216F.01, subd. 2, defines a large wind energy conversion system (LWECS, or wind farm) as a combination of wind energy conversion systems with a combined nameplate capacity of five MW

[4] Freeborn Wind stated that additional lands may be leased or an easement obtained as necessary to complete the Project.

or more. Minn. Stat. § 216F.03 requires that an LWECS be sited in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources.

In addition, when deciding whether to issue a site permit for a LWECS, the Commission considers the factors set forth in Minn. Stat. § 216E.03, subd. 7, which specifies that the Commission shall be guided by, but not limited to, the following considerations:

- Evaluation of research and investigations relating to the effects on land, water, and air resources of large electric power generating plants and the effects of water and air discharges and electric and magnetic fields resulting from such facilities on public health and welfare, vegetation, animals, materials, and aesthetic values.
- Environmental evaluation of sites proposed for future development and expansion and their relationship to the land, water, air, and human resources of the state.
- Evaluation of the effects of new electric power generation and transmission technologies and systems related to power plants designed to minimize adverse environmental effects.
- Evaluation of the potential for beneficial uses of waste energy from proposed large electric power generating plants.
- Analysis of the direct and indirect economic impact of proposed sites including, but not limited to, productive agricultural land lost or impaired.
- Evaluation of adverse direct and indirect environmental effects that cannot be avoided should the proposed site be accepted.
- Evaluation of alternatives to the applicant's proposed site.
- Evaluation of governmental survey lines and other natural division lines of agricultural land so as to minimize interference with agricultural operations.
- Evaluation of irreversible and irretrievable commitments of resources should the proposed site be approved.
- Consideration of problems raised by other state and federal agencies and local entities, when appropriate.[5]

To facilitate its review of proposed wind-farm projects, the Commission requires permit applicants to include an analysis of the project's potential consequences, proposed mitigation measures, and any environmental harms that cannot be avoided, with respect to the following categories:

A. demographics, including people, homes, and businesses;
B. noise;
C. visual impacts;
D. public services and infrastructure;
E. cultural and archaeological impacts;
F. recreational resources;
G. public health and safety, including air traffic, electromagnetic fields, and security and traffic;

[5] Minn. Stat. § 216E.03, subd. 7(b)

H. hazardous materials;
I. land-based economics, including agriculture, forestry, and mining;
J. tourism and community benefits;
K. topography;
L. soils;
M. geologic and groundwater resources;
N. surface water and floodplain resources;
O. wetlands;
P. vegetation;
Q. wildlife; and
R. rare and unique natural resources.[6]

The Commission has the authority to establish conditions in a permit that the Commission determines are reasonable for protecting the environment, enhancing sustainable development, and promoting efficient use of resources.[7]

IV. Comments

A. State Agency Comments

Prior to Freeborn Wind filing its application for a site permit, the record shows that it communicated with MDNR several times. MDNR advised the Company on various state requirements, including avoidance areas, rare features, and avian and bat protection. MDNR filed comments on October 6, 2017, requesting a change to the draft site permit avian and bat protection section. After review of the draft site permit condition, MDNR declined to issue recommendations on the proposed turbine locations. MDNR also filed comments on March 15, 2018, encouraging Freeborn Wind to contact the U.S. Fish and Wildlife Service to discuss the occurrence of bald eagle fatalities in Minnesota.

MnDOT filed comments on the application on October 6, 2017. MnDOT included comments regarding the need to obtain permits or authorization from state road authorities, required setbacks to trunk highway right-of-way, and coordination with the agency to obtain any necessary permits during project construction.

The Minnesota Department of Health (MDH) communicated with Freeborn Wind on May 2, 2017. MDH recommended evaluating two issues that might bear on public health: noise and shadow flicker.

B. Public Comments

Approximately 100 written comments were received during the public comment period. The ALJ Report includes a summary of the public comments as Attachment A. The comments addressed visual impacts, shadow flicker, property values, wildlife impacts, effect on farmland, setback

[6] Minn. R. 7854.0500, subp. 7.

[7] Minn. Stat. §. 216F.04 (d); Minn. R. 7854.1000, subp. 4.

distances, interference with communications, noise, procedural concerns about public outreach, and other matters.

At the public hearing, Freeborn Wind, the Department, and Commission staff were available to make presentations and address questions from members of the public. Approximately 163 members of the public attended the hearing and 45 individuals spoke on the record. Participants offered 34 exhibits, which the ALJ received in the record. The ALJ Report includes a summary of the public hearing comments as Attachment B.

All public comments in this matter were filed in the case record. A summary of the public comments on the Draft Site permit is appended to the ALJ Report as Attachment C.

V. The ALJ Report

The ALJ held two days of formal evidentiary hearings and one public hearing. She reviewed the testimony of the parties' witnesses and related hearing exhibits. The ALJ issued the ALJ Report on May 8, 2018.

The ALJ received and reviewed initial and reply post-hearing briefs from the parties. She made 553 findings of fact, 11 conclusions of law, and a recommendation and alternative recommendation. She included a summary of public comments received, information about the proposed project, a procedural history of the matter, and an analysis of the siting criteria as applied to the proposed project. The ALJ Report stated that the draft site permit contains a number of mitigation measures and other conditions that adequately address the potential impacts of the Project on human and natural environments, and that it is reasonable to amend the draft site permit to incorporate additional permit conditions.

The ALJ analyzed each of the requirements in Minn. Stat. § 216E.03, subd. 7. The ALJ concluded that Freeborn Wind failed to demonstrate by a preponderance of the evidence that the proposed project would meet the requirements of the Noise Standards (Minn. R. 7030.0040); accordingly, she found that the Project does not comply with criteria set forth in Minnesota Statutes chapter 216F or Minnesota Rules, chapter 7854.[8]

The ALJ recommended that the Commission either deny Freeborn Wind's application for a site permit or, in the alternative, provide Freeborn Wind with time to submit a plan demonstrating how the Company will comply with the Noise Standards.

Finally, the ALJ recommended, should the Commission decide to issue a site permit, that the Commission make the following changes to the Draft Site Permit language:

1. Amend Section 5.2 (Construction and Operation Practices) to require Freeborn Wind to provide notice of the Project and its potential to interfere with over-the-air (OTA) television service to all "at risk" areas identified in Appendix D of the application and to each household in the

[8] ALJ Report, Conclusion 5.

communities of Albert Lea, Northwood, Silver Lake, Gordonsville, Glenville, Hayward, and Moscow. (Finding 544)

2. Amend Section 5.2.16 (Interference) to establish procedures for tracking, investigating, and reporting complaints and investigations about OTA TV, and for giving notice to landowners about potential transmission problems. (Finding 545)

3. Amend Section 7.2 (Shadow Flicker) as requested by the Department to require shadow flicker detection system utilization at reception locations, with a modification to require monitoring at houses expected to receive 27 or more hours of shadow flicker per year. (Finding 546)

4. Replace Special Condition 7.4 (Noise Studies) with a requirement for a post-construction noise study to be conducted during the first 12 months of operation. An independent engineer selected by the Department would be charged with developing the scope and conducting the study. In addition to incorporating the Department's Noise Study Protocol,[9] the study would require determining the extent to which turbine-only noise contributes to the overall decibel level, with emphasis on receptor locations expected to experience the highest turbine noise levels. The consultant would be charged with ensuring that there are no receptors (for example, homes) where ambient noise plus turbine noise exceed the relevant noise standards. Any exceedances would be required to be reported to the Commission within five working days, and a complete post-construction noise study filed with the Commission within 14 months after operations begin. (Finding 547) In addition, the ALJ recommended that the Company's study address low-frequency noise/infrasound. (Finding 243)

5. Amend Section 4.2 (Setbacks and Site Layout Restrictions – Residences) to require a 1500-foot setback to all landowners that have not consented to the Project. (Finding 548)

6. Amend Section 5.2.25 (Public Safety) to require the permittee to inspect all turbines located within 1,200 feet of structures, roads and trails during periods when ice accumulation is likely to occur. Turbines found with ice accumulation would be required to be deactivated until they are free from ice. (Finding 549)

7. Amend Section 11.1 (Special Conditions) with a requirement that the Project's successors or assigns bear the costs of decommissioning the Project. (Finding 550)

---

[9] *Guidance for Large Wind Energy Conversion System Noise Study and Report*, Department comments (October 5, 2013).

8. Amend Section 11.1 (Special Conditions) with a requirement that the permittee demonstrate that it can guarantee resources sufficient for decommissioning and restoration at least 45 days prior to beginning construction of the Project. (Finding 551)

VI. Summary of Principal Contested Issues

Parties proposed hundreds of changes to the ALJ Report. The following issues warrant further discussion:

- Setback standards
- Noise
- Public safety and ice throws
- Shadow flicker
- Interference with over-the-air television signals
- Decommissioning

VII. Turbine Setback Standards

A. Introduction

In its application, Freeborn Wind proposed to build its Project with a minimum setback of 1,000 feet from residences and 250 feet from public roads and trails. The Company claimed that the Project's layout follows the wind energy conversion facility siting criteria outlined in the Commission's Order Establishing General Wind Permit Standards (Wind Standards Order)[10] and Freeborn Wind's guidelines and best practices. With one limited exception (related to a wetland), the Project layout conforms to all applicable county ordinances, and where state and local setbacks differ for the same feature, the Company conforms to the more stringent setback standard.

B. The ALJ Report

The ALJ noted that Freeborn County revised its zoning ordinance (Ordinance) to establish a variety of standards for wind turbines, including standards for setbacks. While the Ordinance has no applicability to site permits subject to Commission jurisdiction,[11] it expresses community standards. More directly, the ALJ observed, the County also passed a resolution asking the Commission to adopt a 1,500 foot setback for the Project.

---

[10] *See In the Matter of Establishment of General Permit Standards for the Siting of Wind Generation Projects Less than 25 Megawatts,* Docket No. E,G-999/M-07-1102, Order Establishing General Wind Permit Standards (Jan. 11, 2008).

[11] By its terms, the Ordinance applies only to systems that are not otherwise subject to siting and oversight by the Commission. *See also* Minn. Stat. § 216F.07 (Commission siting jurisdiction preempts local land use regulations).

At Findings 301 and 302, the ALJ claimed that the Commission's Wind Standards Order adopted a standard for keeping wind turbines "at least 500 feet plus the distance required to meet the state noise standard" from the nearest home. The ALJ then construed this language as requiring a setback of between 750 and 1,500 feet. On this basis, the ALJ adopted Finding 548, recommending that the language of Draft Site Permit Section 4.2 incorporate a requirement that the turbines be set back at least 1,500 feet from any landowner who has not consented to the Project.

C. Positions of the Parties

1. AFCL

AFCL supported honoring Freeborn County's resolution seeking a 1,500 setback.

2. Freeborn Wind

Freeborn Wind noted that the Commission's jurisdiction preempts local land use regulations. Nevertheless, the Company also noted that its Project is designed to comply with the new ordinance, with one minor exception: While the ordinance prescribes a setback equal to three times the length of a turbine's rotor blades, and the Project meets that standard except with respect to one house—unoccupied and, according to the owners, not expected to be occupied—which is 2.9 rotor-blades distant from the Project. Consequently Freeborn Wind saw no need for additional setback requirements.

3. Department

The Department opposed the ALJ's recommendations regarding setbacks, arguing that the ALJ misconstrued the Wind Standards Order.

D. Commission Action

The Commission concurs with the Department.

First, the Commission observes that the Wind Standards Order pertained to projects generating less than 25 MW, and thus is not directly applicable to the current docket.

Moreover, the ALJ misconstrues the order. That order provides a table summarizing the Commission's wind turbine permit setbacks and standards for smaller wind projects, briefly stating (a) general permit setback standard and (b) minimum standards. In the row addressing setbacks from homes, the table lists the general standard as "At least 500 ft and sufficient distance to meet state noise standards." (Emphasis in original). And because the space for listing the minimum standard is smaller, the Commission abbreviated that standard as "500 feet + distance required to meet state noise standard." On its face, this minimum standard appears to be additive. But in context, it is apparent that the Commission used a "+" sign as a shorthand for "and." In other words, the Commission intends wind turbine developers to honor both the state

Noise Standards and the minimum setback standards *by implementing the larger of the two standards.* This interpretation is consistent with the Commission's past decisions.[12]

Accordingly, the Commission will decline to adopt the ALJ's recommendation to revise the language of the Draft Site Permit Section 4.2. In addition, the Commission will adopt the ALJ's Findings 301 and 302 revised to reflect the correct understanding of the Commission's order.

VIII. Noise

A. Introduction

To protect public health and welfare from man-made noise pollution,[13] the MPCA promulgated the state's Noise Standards codified at Minn. R. 7030.0040. The standards establish time-weighted noise limits based on land use categories (Noise Area Classifications, or NACs) and times of day. Time-weighting allows for variation of sound intensities over time.

The MPCA Noise Standards set limits on total ambient sound levels, and regulate certain noise sources, including wind turbines, that contribute to this sound level. The MPCA Noise Guidance provides guidance on how to properly measure and isolate the contribution from the regulated source.

All permitees are required to comply with permit conditions, including those for noise. Permitees assume the risk of having to undertake any necessary mitigation measures, including curtailment, to ensure compliance with the applicable standards.

B. ALJ Report

The ALJ Report explains that sound intensity is typically measured in units of decibels (dB). Human capacity to distinguish sound intensity diminishes as the intensity increases—thus, a person can "hear a pin drop" in a silent room, but not on a noisy street. Accordingly, dBs are measured on a logarithmic scale, with an increase of three dB reflecting a barely-audible increase in pressure. However, the human ear senses not only intensity, but also sound frequency, measured in Hertz (Hz). To measure noise in a way that corresponds to how the ear perceives loudness, a measuring device must give greater weight to frequencies around 1,000 Hz, and less to higher and lower frequencies. "A-weighting" describes a weighting scheme intended to emulate the perception of the human ear, and is denoted dB(A).

The MPCA's Noise Standards establish different standards for daytime and nighttime noise levels, with those standards measured over a one-hour testing period. Thus, the notation *65*

---

[12] See, for example*, In the Matter of the Application of Red Pine Wind Farm, LLC for a Site Permit for the 200.1 Megawatt Red Pine Wind Project in Lincoln County, Minnesota*, Docket WS-16-618, Order Issuing Site Permit for Large Wind Energy Conversion System at Site Permit § 4.2 (June 27, 2017); *In the Matter of the Application of Prairie Rose Wind, LLC for a Site Permit for a 200 Megawatt Large Wind Energy Conversion System in Rock and Pipestone Counties*, Docket WS-10-425, Order Approving Findings of Fact and Issuing Permit at Site Permit § 4.2 (September 16, 2011) .

[13] Minn. Stat. Ch. 116D.

dB(A) L_{50}-one hour would refer to a noise standard that limits noise to no more than 65 A-weighted decibels for 50 percent of the time during a one-hour testing period.

The ALJ read the Noise Standard to say that noise at a residential location should not exceed 65 dB(A) more than 10 percent of the time, nor 60 dB(A) more than 50 percent of the time, during daytime; at night, noise should not exceed 55 dB(A) more than 10 percent of the time, nor 50 dB(A) more than 50 percent of the time. And, significantly, the ALJ read this standard to apply to all noise, regardless of source.

Finally the ALJ cited evidence suggesting that in some locations, background noise already exceeds the nighttime noise standard.

Accordingly, the ALJ ultimately recommended rejecting Freeborn Wind's application because it would contribute to an environment in which aggregate nighttime noise levels at some homes would exceed the Noise Standards. In the alternative, the ALJ recommended giving Freeborn Wind the opportunity to submit a plan demonstrating how it would comply with the Noise Standards, and to address how it would address low-frequency noise/infrasound—that is, noise with frequencies between 1 Hz and 20 Hz.

C. Positions of the Parties

1. AFCL

AFCL urged the Commission to declare that the Freeborn Wind Project must comply with the MPCA's Noise Standards, to adopt the ALJ's finding that the Project has not adequately demonstrated that it will comply with those standards, and thus to reject the Company's site permit.

AFCL argued that the Commission's past practices in analyzing and approving site permits for wind farms has been inadequate. Instead, AFCL asked the Commission to begin interpreting the Noise Standards to preclude a site permit for any project in any area where the Noise Standards might be exceeded—even when the noise comes from sources unrelated to the proposed project. AFCL claims that no wind farm in the state has been sited properly, because no wind farm has been sited consistent with AFCL's interpretation of the Noise Standards. Indeed, AFCL cited with approval the conclusion of Dan Lichfield, a senior manager for the Project, that AFCL's interpretation of the Noise Standards "is impossible to meet for a wind farm."[14]

Finally, AFCL argued that the communities concerns about infrasound had received insufficient attention.

2. The Department

The Department generally agreed with the ALJ that the MPCA's Noise Standards are designed to measure total noise levels, not just the level of the facility seeking a permit. But the Department

[14] AFCL Exceptions, at 3.

rejected the manner in which the ALJ applied the standards, arguing that the ALJ's method was too rigid and unworkable, especially in naturally noisy environments.

Instead, the Department proposed Site Permit language establishing a "middle ground" approach intended to guard public health and welfare while avoiding unreasonable restrictions to development. This approach would permit a project to proceed, even where noise levels are at or above the Noise Standards, provided the Project contributed only an indiscernible amount (one decibel) to the total noise level. The Department's proposed approach is set forth below:

> **7.4.1 Pre-Construction Demonstration of Compliance with Noise Standards**
>
> Freeborn Wind Energy LLC shall file a plan, including modeling and/or proposed mitigation, at least 60 days prior to the pre-construction meeting that demonstrates it will not cause or significantly contribute to an exceedance of the state noise standards using the following two-part protocol:
>
> 1. If background sound levels are less than the applicable standard at nearby receptors, the modeled turbine-only noise levels cannot cause an exceedance of the applicable state standard at nearby receptors, inclusive of the measured background noise level. "Cause" means that the project turbine-only contribution is in excess of the applicable state standard.
>
> 2. If background sound levels are equal to or greater than the applicable state standard at nearby receptors, the windfarm shall not contribute more than 45 dB(A) to total sound levels at the nearby receptors. Therefore, for example, when nighttime background sound levels are at 50 dB(A), a maximum turbine-only contribution of 45 dB(A) would result in a non-significant increase in total sound of 1 dB(A).
>
> **7.4.2 Post-Construction Noise Monitoring**
>
> The Permittee shall file a proposed methodology for the conduct of a post-construction noise study at least 14 days prior to the pre-construction meeting. The Permittee shall develop the post-construction noise study methodology in consultation with the Department of Commerce. The study must incorporate the most current Department of Commerce Noise Study Protocol to determine total sound levels and turbine-only contribution at different frequencies and at various distances from the turbines at various wind directions and speeds. The Permittee must conduct the post-

> construction noise study and file with the Commission the completed post-construction noise study within 12 months of commencing commercial operation.
>
> If the monitored turbine-only noise level is determined to be greater than the Minnesota State Noise Standard at nearby receptors or if the background sound levels exceed the Minnesota State Noise Standards and the turbine-only contribution exceeds 45 dB(A), the Permittee shall work with the Department of Commerce to develop a plan to minimize and mitigate turbine-only noise impacts.

In practice, the Department's standard would require Freeborn Wind to limit the noise from its wind farm to no more than 45 dBA.

During oral argument, however, the Department stated its support for Freeborn Wind's proposed special conditions (discussed below) and its willingness to work with the Company to develop noise testing protocols—and noise mitigation measures, if necessary. The Department envisions a study based on the current Noise Study Protocol to gauge both total sound levels and turbine-only contributions, analyzing various frequencies at various distances from the turbines at various wind speeds and directions.

Finally, the Department stated that the record developed in this case provided insufficient support to regulate infrasound.

3. Freeborn Wind

Freeborn Wind argued that the ALJ Report incorrectly interpreted the Minnesota Noise Standards as placing a limit on total noise without distinguishing between project noise and background or ambient noise. The Company asserted that the Legislature granted the MPCA jurisdiction solely over man-made noise sources, and the ALJ Report ignores MPCA's guidance.

According to Freeborn Wind, the Commission's past practice has been to cite the Noise Standards as the basis to limit noise coming from permitted facilities, without addressing ambient noise. The Company argued that when measuring noise in the outdoors, the measuring device would inevitably record background noise as well as the noise from the source of concern.[15] Indeed, Freeborn Wind acknowledged that it actively seeks to put its turbines in windy locations—that is, locations that inevitably experience a relatively high degree of wind noise. The Company asserted that background noise must then be subtracted from the total recorded measurements to determine the noise from the measured source (here, wind turbines). Doing so would be consistent with MPCA guidance, past Commission practice, and common sense, Freeborn Wind argued.

[15] Evidentiary Hearing Transcript Vol. 1B at 121 (Feb.21, 2018) (Hankard). Freeborn Exceptions at 7, fn 27.

Furthermore, Freeborn Wind argued that its noise modeling reflects the best evidence in the record, and incorporates conservative assumptions—for example, that no sound would be absorbed into the ground, and that all turbines would be operating at full capacity. Thus, the Company argued, residents would likely experience less noise than the model suggests.

But in an effort to better respond to comments and the ALJ Report, Freeborn Wind proposed two new special conditions to be added to the site permit that would take precedent over any conflicting permit provisions. Under these conditions, the Company would commit to designing and operating its wind farm in a manner that most of the time would generate no more than 47 dB(A), and would contribute less than 3 dB(A) to ambient noise levels—that is, contribute a smaller amount of additional noise than most humans can detect. The conditions are as follows:

> **6.1 Pre-Construction Noise Modeling**
>
> Freeborn Wind Energy LLC shall file a plan, including modeling and/or proposed mitigation, at least 60 days prior to the pre-construction meeting that demonstrates it will not cause or significantly contribute to an exceedance of the MPCA Noise Standards.
>
> To ensure that the turbine-only noise does not cause or significantly contribute to an exceedance of the MPCA Noise Standards, modeled wind turbine-only sound levels (NARUC ISO 9613-2 with 0.5 ground) at receptors shall not exceed 47 dB(A) L_{50}-one hour. Given this, at no time will turbine-only noise levels exceed the MPCA Noise Standards, and when total sound does exceed the limits it will be primarily the result of wind or other non-turbine noise sources. Under these conditions, the contribution of the turbines will be less than 3 dB(A), which is the generally recognized minimum detectible change in environmental noise levels (non-laboratory setting). For example, when nighttime background sound levels are at 50 dB(A) L_{50}-one hour, a maximum turbine-only contribution of 47 dB(A) L_{50}-one hour would result in a non-significant increase in total sound of less than 3 dB(A).
>
> **6.2 Post-Construction Noise Modeling**
>
> If the Noise Studies conducted under Section 7.4 document an exceedance of the MPCA Noise Standards where turbine-only noise levels produce more than 47 dB(A) L_{50}-one hour at nearby receptors, then the Permittee shall work with the Department of Commerce to develop a plan to minimize and mitigate turbine-only noise impacts.

Finally, and like the Department, Freeborn Wind argued that the record provided insufficient grounds for regulating infrasound.

4. MPCA

During oral argument, MPCA stated that it regarded Freeborn Wind's proposed special permit conditions to be a reasonable and balanced means of implementing the Noise Standards, similar to how MPCA has implemented the standards in the past. While the Company's proposal could result in a small increase in total noise levels when background noise is at or above the prescribed standard, MPCA concluded that this increase would be less than most people could perceive, and MPCA would not expect the increase to pose any threat to human health.

B. Commission Action

While AFCL urges the Commission to require Freeborn Wind to comply with the MPCA's Noise Standards, this requirement has never been in dispute. Indeed, the Draft Site Permit already requires compliance with the Noise Standards:

> **4.3 Noise**
>
> The wind turbine towers shall be placed such that the Permittee shall, at all times, comply with noise standards established by the Minnesota Pollution Control Agency as of the date of this permit and at all appropriate locations. The noise standards are found in Minnesota Rules Chapter 7030. Turbine operation shall be modified or turbines shall be removed from service if necessary to comply with these noise standards. The Permittee or its contractor may install and operate turbines as close as the minimum setback required in this permit, but in all cases shall comply with Minnesota Pollution Control Agency noise standards. The Permittee shall be required to comply with this condition with respect to all homes or other receptors in place as of the time of construction, but not with respect to such receptors built after construction of the towers.
>
> **7.4 Noise Studies**
>
> The Permittee shall file a proposed methodology for the conduct of a post-construction noise study at least 14 days prior to the pre-construction meeting. The Permittee shall develop the post-construction noise study methodology in consultation with the Department of Commerce. The study must incorporate the Department of Commerce Noise Study Protocol to determine the operating LWECS noise levels at different frequencies and at various distances from the turbines at various wind directions and speeds. The Permittee must conduct the post-construction noise study and file with the Commission the completed post-construction noise study within 18 months of commencing commercial operation.

The parties' dispute has not been about whether to apply the Noise Standards, but how to do so.

Various commenters have asked the Commission to make a definitive finding on how the Noise Standards should apply to wind farms generally. And indeed, at Finding 206 the ALJ interpreted the Noise Standards as establishing fixed limits on noise from all sources, even sources not subject to regulation. However, the Commission concludes that this is not the appropriate forum, nor the appropriate record, for making such a broad interpretation. Rather, the Commission will address the Freeborn Wind project specifically, seeking to reconcile the competing interests at play in this docket. Accordingly, the Commission will decline to rule on how the MPCA's Noise Standards should be applied generally—and will decline to adopt the ALJ's Finding 206.

Nor is the Commission persuaded that additional permit conditions are needed to address low-frequency noise/infrasound. 20 Hz is widely regarded as the lowest frequency that humans can hear; it is possible for people to hear lower frequencies, but only at very high amplitude. Wind turbines produce infrasound at a similar level to ocean waves or wind blowing through vegetation, and far lower than the levels experienced riding in a farm tractor. No known hearing test nor tests involving functional magnetic resonance imaging (fMRI) demonstrate that humans can perceive the level of infrasound emanating from contemporary wind turbines. Consequently it is not surprising that the Noise Standards do not regulate infrasound directly. But in practice they regulate it indirectly: Because noise from wind turbines has a relatively consistent spectral (frequency) shape, regulation of noise in the audible range has the effect of regulating the rest of the spectrum as well.[16]

In brief, the ALJ concluded that Freeborn Wind had not yet provided a sufficient basis to ensure that it would fulfill the requirements of the Noise Standards and, as an alternative recommendation, proposed granting the Company additional time to fulfill this step. Both the Department and Freeborn Wind have proposed permit conditions requiring the Company to submit a plan demonstrating that it will not cause or significantly contribute to exceedance of the Noise Standards, and to then test to ensure that it fulfills this requirement. The Commission finds these proposals to provide a reasonable method to fulfill its requirement to abide by the Noise Standards.

Accordingly, the Commission will direct Freeborn Wind to provide an updated pre-construction noise analysis demonstrating that the Project will comply with the noise permit conditions proposed by the Department, subject to the conditions proposed by the Company. And the Commission will incorporate these provisions into the Project's Site Permit. But the Commission will decline the ALJ's recommendation to require the Company to provide a plan for regulating infrasound. Finally, the Commission will adopt the ALJ's findings on noise, modified to reflect the views expressed herein.

IX. Public Safety and Ice Throws

A. Introduction

Ice throw refers to ice congealing on a turbine blade, then falling off or being flung as the blade rotates.

[16] Ex. FR-5 at 7 (Hankard Direct).

B. The ALJ Report

Generally the ALJ found that Freeborn Wind has taken appropriate steps to avoid and minimize the Project's effects on public safety, and that the language of the Draft Site Permit, when supplemented with the ALJ's proposed amendments, would provide for appropriate monitoring and mitigation of public safety threats. But the ALJ expressed concern about ice throws.

The ALJ noted (a) public comments expressing general concern about ice throws, including concerns for threats to people using the nearby snowmobile trail, (b) a 2006 document from GE Energy recommending measures to mitigate the risks of ice throw from their turbines, and (c) an allegation that ice flung from a Bent Tree Wind Farm turbine on February 22, 2018 dented a truck 300 feet away. While Draft Site Permit Section 4.4 directs a permittee to refrain from building turbines within 250 feet of any public road right-of-way or designated public trail, the ALJ concluded that this condition provided insufficient protection.

Accordingly, the ALJ recommended amending the language of Draft Site Permit Section 5.2.25 to require the permittee to conduct ice inspections of any turbine within 1200 feet of structures, roads, or trails—and to deactivate any ice-encrusted turbines until the ice can be removed.

C. Positions of the Parties

1. Freeborn Wind

Freeborn Wind objected to the ALJ's recommendation, arguing that (a) that the record provides insufficient basis to establish conditions related to ice throws, and (b) the proposed condition would be onerous and unworkable.

According to the Company, the events of February 22, 2018, have not been verified. Regarding the statement of GE Energy, Freeborn Wind noted that it plans to use turbines from Vestas, not GE Energy, and that contemporary Vestas turbines have technology that monitors the turbines for icing conditions and shuts them down in situations where significant ice accumulation causes an imbalance on the turbine blades.

2. Department

The Department stated that it judged the 250-foot setback standard in Draft Site Permit Section 4.4 to be an appropriate distance for significantly reducing the risk from ice throws. And while some commenters expressed concern for people on the nearby snowmobile trail, the Department noted that the nearest snowmobile trail is 538 feet from the turbine sites.

The Department could find no evidence in the record suggesting that turbines pose a threat to all structures, roads, or trails within 1,200 feet. In particular, the Department found no confirmation of the allegation that an ice throw dented a truck on February 22, 2018.

Accordingly the Department concluded that the reported ice throw and strike occurrence should not be used as evidence of turbine ice throw, and did not justify any new policy regarding turbine setbacks or ice accumulation monitoring.

D. Commission Action

The Commission concurs with the ALJ's general finding that Freeborn Wind has taken, or will take, the necessary measures to avoid or minimize any threat to public safety. For example, Draft Site Permit Sections 10.10 and 10.11 require a permittee to provide educational materials about the permitted project and any restrictions or dangers associated with the project. Freeborn Wind will also provide any necessary safety measures such as warning signs and gates for traffic control or to restrict public access. And after construction is completed, Freeborn Wind will inform Gopher State One Call of the location of all underground facilities.

The record already identifies appropriate setback standards for the Project. For homes, the Commission's Wind Standards Order states that turbines must be setback at least 500 feet and a sufficient distance to comply with the Noise Standards, whichever is greater, and the Draft Site Permit provides a setback of not less than 1,000 feet. Regarding pubic road rights-of-way and designated public trails, the Draft Site Permit provides a setback of 250 feet. The Department concludes that these setbacks provide an appropriate measure of safety, and the Commission concurs.

The record regarding ice throws is insufficient to justify the adoption of novel policies regarding turbine setbacks or the need to monitor turbine blades for ice accumulation. Bent Tree Wind Farm staff investigated the events of February 22, 2018, and could not confirm that the damage to the truck resulted from an ice throw from the Bent Tree Wind Farm. Thus the reported ice throw and strike occurrence should not be used as evidence of turbine ice throw, and it should not be used to establish turbine setback distances or the need to establish turbine ice accumulation monitoring protocols.

Accordingly the Commission will decline the ALJ's recommendation to adopt additional safeguards related to ice throw, and will adopt the ALJ's findings of fact as amended to reflect the views presented in this order.

X. Shadow Flicker

A. Introduction

Shadow flicker from wind turbines occurs when rotating wind turbine blades move between the sun and the observer. Many members of the public expressed concern about the potential shadow flicker that may result from the Project's wind turbines. In addition to finding the flicker irritating, people feared adverse health effects. Freeborn County's Ordinance on shadow flicker contains a requirement to conduct a flicker analysis and states that flicker at a receptor should not exceed 30 hours per year.[17] While the Commission's jurisdiction pre-empts application of the Ordinance, the law provides evidence of local community standards.

[17] Freeborn County, Minn. Code of Ordinances § 26-56 (2015), ALJ Report, Finding 253.

Over the course of the proceeding, the parties and the ALJ offered differing proposals for a site permit post-construction monitoring condition to include in the draft site permit.

B. The ALJ Report

The ALJ generally agreed with the Department's recommendation to require post-construction measurements of shadow flicker at receptor locations that are anticipated to receive more than 30 hours of shadow flicker per year. And the ALJ found that Freeborn Wind conducted a good-faith analysis estimating the number of hours landowners will be exposed to shadow flicker. But the ALJ questioned the reliability of the results.

Noting that Freeborn Wind's analysis identified at least two locations predicted to receive between 27 and 30 hours of shadow flicker per year, the ALJ recommended revising the language of Draft Site Permit section 7.2 to require use of a flicker detection system at locations anticipated to come within 10 percent of the limit set by ordinance—that is, locations anticipated to receive 27 hours of flicker.

C. Positions of the Parties

1. Freeborn Wind

Freeborn Wind disputed the ALJ's findings challenging the reliability of the Company's estimates of shadow flicker exposure at various locations. The Company emphasized that it hired a consultant to address the issue of shadow flicker potential with the Project's turbine layout. The consultant used modeling software, turbine coordinates and specification, and the locations of 254 homes and businesses within two kilometers of any turbine to develop its shadow flicker model. The Company's modeling assumed all turbines would be the Vestas V116 model (in lieu of the smaller V110 option) to obtain more conservative results.

The Company conducted an additional assessment of each of the non-participating residences where its modeling indicated flicker could potentially exceed 30 hours per year. The Company concluded that visual obstructions (e.g. trees or buildings) would diminish the potential for shadow flicker to occur at the four residences at which modeling demonstrated higher than 30 hours of flicker could occur.

Finally, Freeborn Wind identified several potential mitigation measures it could implement for area residents, based on individual circumstances.

The Company argued that the Commission has never before required mitigation for a designated amount of shadow flicker. However, in recognition of the County Ordinance's 30-hour limit and the community's concerns, the Company agreed to adopt a limit of 30 hours per year. But Freeborn Wind asserted that the record provides no basis whatsoever for adopting a 27-hour standard.

2. AFCL

AFCL argued that Freeborn Wind's own modeling demonstrates more than 30 hours of flicker per year on some receptors, and asserted that there might be a greater number than acknowledged by Freeborn Wind. The AFCL also argued that the Company has the burden to demonstrate why it cannot comply with the County Ordinance.

3. The Department

While acknowledging that the record does not demonstrate that shadow flicker posed risks to human health, the Department did not oppose use of a 30 hour-per-year exposure standard from shadow flicker as contained in the County Ordinance. But the Department opposed the ALJ's proposal to amend this standard to 27 hours per year, finding no record support whatsoever for this change. In its June 8, 2018 filing, the Department recommended the use of post-construction shadow flicker detection systems during the operation of any receptors that are anticipated to experience that level of shadow flicker.

Finally, the Department recommended revising the language of Section 7.2 of the Draft Site Permit to add more procedural structure to the enforcement of shadow flicker limits, as follows:

> **Section 7.2 Shadow Flicker**
>
> At least 14 days prior to the pre-construction meeting, the Permittee shall provide data on shadow flicker for each residence of non-participating landowners and participating landowners within and outside of the project boundary potentially subject to turbine shadow flicker exposure. Information shall include the results of modeling used, assumptions made, and the anticipated levels of exposure from turbine shadow flicker for each residence. The Permittee shall provide documentation on its efforts to avoid, minimize and mitigate shadow flicker exposure. ~~The~~ A Shadow Flicker Management Plan will be prepared by the Permittee, which will include the results of any shadow flicker modeling, assumptions made, levels of exposure prior to implementation of planned minimization and mitigation efforts, planned minimization and mitigation efforts, and planned communication and follow up with residence. The Shadow Flicker Management Plant shall be filed with the Commission at least 14 days prior to the pre-construction meeting to confirm compliance with conditions of this permit.
>
> Should shadow flicker modeling identify any residence that will experience 30 hours, or more, of shadow flicker per year, the Permittee must specifically identify these residences in the Shadow Flicker Management Plan. If through minimization and mitigation efforts identified in the Shadow Flicker Management Plan the Permittee is not able to reduce a residence's anticipated shadow flicker exposure to less than 30 hours per year a shadow flicker

detection systems will be utilized during project operations to monitor shadow flicker exposure at the residence. ~~at receptor locations that were anticipated to receive over 30 hours of shadow flicker per year. The Permittee will submit a Shadow Flicker Monitoring and Management Plan at least 14 days prior to the pre-construction meeting~~. The Shadow Flicker Monitoring and Management Plan will detail the placement and use of any shadow flicker detection systems, how the monitoring data will be used to inform turbine operations, and a detailed plan of when and how turbine operations will be adjusted to mitigate shadow flicker exposure exceeding 30 hours per year at any one receptor. The results of any shadow flicker monitoring and mitigation implementation will be reported by the Permittee in the Annual Project Energy Production Report identified in Section 10.8 of this Permit.

Commission staff and EERA staff will be responsible for the review and approval of the Shadow Flicker Management Plan. The Commission may require the Permittee to conduct shadow flicker monitoring at any time during the life of this Permit.

D. Commission Action

While the ALJ questioned the reliability of Freeborn Wind's prediction of shadow flicker exposure at various locations, the Commission concludes that Freeborn Wind's testimony remains the best evidence in the record on this question. Accordingly, the Commission will decline to adopt the ALJ's Finding 260 to the extent that the finding challenges the reliability of the Company's analysis without proffering a more reliable substitute standard.

Also, the Commission finds no record support for adopting a shadow flicker standard of 27 hours per year. The Commission notes that it has not previously required any mitigation for a designated amount of flicker. The Company's shadow flicker analysis used readily measurable data and its predictive value appears sound. The assumptions Freeborn Wind used underlying its analysis provide a worst-case scenario, meaning homes in the area can reasonably expect to experience lower levels of shadow flicker. Further, should residents in the area experience excessive shadow flicker, the Site Permit will include a compliance procedure to initiate investigations and mitigation measures as appropriate. Accordingly, the Commission will not adopt the 27-hour standard set forth in Finding 261 or the proposed language for Site Permit Section 7.2.

The Commission finds that the Department's proposed revisions to the language of the Draft Site Permit contribute appropriate procedural rigor to the permit's requirements. Accordingly, the Commission will incorporate into the Project's Site Permit the language of Draft Site Permit 7.2 with the Department's modifications.

XI. Over-the-Air Television Interference

A. Introduction

KAAL is the licensee of television station KAAL in Austin, Minnesota. KAAL intervened in this proceeding to raise concerns regarding the potential for wind turbine operations to interfere with its microwave radio transmission and disrupt its over-the-air (OTA) broadcast operations. Dozens of comments in the record expressed concern about television interference, largely over the potential for signal interference during weather emergencies.

B. The ALJ Report

The ALJ recognized the potential for the Project to interfere with OTA TV signals, especially in those areas where there is no line of sight to a television transmitter. While the ALJ concluded that KAAL did not provide sufficient support for its proposal to expand the scope of the designated "at-risk area," the ALJ also determined that the Company's proposal for an expanded "at-risk area" did not sufficiently address KAAL's concerns.

The ALJ recommended expanding the number of people that Freeborn Wind would notify of its proposed project, and expanding the content of the proposed notice, as follows:

> [Finding] 544. The Administrative Law Judge recommends that Section 5.2 of the Draft Site Permit should be amended, as follows:
>
> Freeborn Wind must provide notice which includes a description of the Project's potential to interfere with OTA TV service, Freeborn Wind's mitigation program, and copies of the Site Permit and Complaint Procedure to households in the following areas:
>
> a. all households in "at risk" areas identified for all six local television stations, as identified in Appendix D of the Site Permit Application; and
>
> b. each household in the communities of Albert Lea, Northwood, Silver Lake, Gordonsville, Glenville, Hayward, and Moscow.

Further, the ALJ recommended that the Commission require a permittee to investigate and document any non-frivolous claims of OTA TV interference, as follows:

> [Finding] 545. The Administrative Law Judge recommends that Section 5.2.16 of the Draft Site Permit be amended as follows:
>
> - Upon receiving a complaint from a household within the required Notice area regarding interference, Freeborn Wind shall evaluate the complaint to determine whether Freeborn Wind's operations are the likely cause of the interference. In the event that the wind farm is determined to be the likely cause of

interference, Freeborn Wind should offer the mitigation measures it has proposed as listed in paragraph 378 of this Report.

- Freeborn Wind shall investigate any non-frivolous claims of OTA TV interference.

- Freeborn Wind shall not dismiss a complaint on the basis that it arises from a location further than 10 kilometers distant from any turbine, or because its location is not within an "at risk" area.

- Freeborn Wind shall file a report with the Commission on the first working day of each month. The report shall inform the Commission of the results of the previous month's investigations of TV interference complaints, including the role of the wind farm in causing the interference, and whether Freeborn Wind's remedial measures resolved the interference issues.

- Freeborn Wind shall maintain and submit with its monthly report, a map showing the location of the complainant households, their distance to the nearest turbine, and their locations in relation to the "at risk" areas. Freeborn Wind will report the date of each complaint, its response, and the date the complaint is closed.

- Freeborn Wind shall make these reports publicly available.

C. Positions of the Parties

1. Freeborn Wind

Freeborn Wind filed numerous exceptions to the ALJ Report regarding OTA interference.

Freeborn Wind acknowledged that wind turbines located between a station transmitter and a digital antenna may interfere with OTA TV reception. But in defense of its Project, Freeborn Wind stated that (a) there is no practical way to anticipate the location of each impaired residence, given the number of residents and the imprecision in turbine siting at this stage of the proceedings, (b) the number is not likely to be large, and (c) the record reveals no unresolved complaints of transmission interference.

To better address the concerns raised by KAAL, however, the Company agreed to expand its notice area and diligently implement a program to promptly respond and mitigate any problems observed once operations commence, using the Commission's standard procedures for addressing complaints arising from permitted energy facilities.

The Company challenged the suggestion that its wind turbines would have much likelihood to impair signals at locations more than 10 kilometers away. Nevertheless, the Company agreed to provide notice to people in an expanded "at risk" area depicted on Figure 7 of the TV Coverage Impact Study, included as Appendix D to its application, and proposed language to incorporate this commitment into the site permit.

2. KAAL and AFCL

KAAL argued that the potential OTA interference could be problematic for homes and businesses in the areas identified by the ALJ, and argued that its viewers could be deprived not only of entertainment, but weather announcements which could have a significant impact on the lives of those in the area.

KAAL asserted that Freeborn Wind's methodology to determine the geographic area of viewers who could potentially be affected by OTA interference is flawed, and that 20 kilometers (not 10) is the appropriate distance from which to measure turbine interference with signals. KAAL claimed that the number of potentially affected viewers is higher than Freeborn Wind estimated. And KAAL argued that the appropriate way to mitigate the threat to human life posed by this transmission interference is for Freeborn Wind to pay for a door-to-door survey of all residents within 20 kilometers of a wind turbine after the turbines begin operating.

KAAL generally agreed with the ALJ's Findings on OTA Interference, with the exception of Finding 386, wherein the ALJ concluded that residents could rely on AM or FM radio signal rather than OTA television signals during weather events. This finding, KAAL argued, would relieve Freeborn Wind of its duty to restore "natural conditions" as required by Minnesota law.[18] Instead, KAAL recommended that the Commission require Freeborn Wind to conduct a survey, both before and after construction, to determine if there is any OTA interference from the Project that cannot be corrected with a new receiver, or to pay for the construction of a new transformer with translator.

Finally, KAAL proposed revising the Site Permit Complaint Handling Procedures attached to the Draft Site Permit. KAAL proposed expanding the definition of complaint to include expressions of dissatisfaction or concern about television or communication signals, or site restorations. And KAAL proposed clarifying that Freeborn Wind would have to continue reporting the level of customer complaints throughout the life of the site permit.

AFCL agreed with KAAL's position generally, including its proposed modifications to the ALJ Report findings and Draft Site Permit language.

3. The Department

The Department argued that the ALJ's proposal to expand the number of households to receive notice and a copy of the complaint procedure is unwarranted in that it is unsupported by the record, and would impose costs out of proportion to any anticipated benefits. The Department also opposed requiring Freeborn Wind to serve notice on the viewers in the "at risk" area of

[18] Minn. R. 7854.1000, subp. 4.

television stations other than KAAL, as they have not raised concerns about the Project causing OTA interference.

Nor did the Department support the ALJ's Finding 545, which recommended significant modifications to Section 5.2.16 of the Draft Site Permit. The Department argued that the ALJ appeared to disregard the Company's modeling effort with no evidence that the results were inaccurate. And the Department argued that the ALJ's proposed changes to 5.2.16 of the Draft Site Permit appear to create a separate complaint procedure for OTA television interference not supported by the record. The Department recommended retaining the Draft Site Permit's language at Section 5.2.16, and that complaints of OTA television interference be handled and reported using the Draft Site Permit's complaint procedures.

That said, the Department proposed one revision of its own to the Draft Site Permit regarding OTA signal interference: The Department recommended amending Draft Site Permit Section 5.2 to direct the Permittee to provide notice of its project, its mitigation program, and its complaint procedures, to all television stations with signal service in the Project area.

D. Commission Action

As an initial matter, the Commission observes that KAAL characterized the issue of OTA signal interference as a matter of life and death, due to the role of TV signals to inform people of impending weather conditions. The ALJ found this description to be overstated, and suggested that the public could listen to AM or FM radio instead. KAAL took exception to these findings. The Commission will decline to characterize KAAL's position on this issue, and will therefore refrain from adopting the ALJ's language—for example, at Finding 387—that does so. Nor will the Commission adopt language recommending reliance on one form of broadcast rather than another.

The Commission largely agrees with the ALJ's view that the most appropriate means to address a problem such as OTA signal interference is mitigation—addressing the few problem areas that may actually arise rather than trying to anticipate and address the many places where a problem could arise. Accordingly, the Commission accepts and adopts the ALJ Findings on OTA interference, but with certain modifications.

No party objected to KAAL's proposed additions to the Draft Site Permit's Complaint Handling Procedures, including modifications to the Definition and Reporting sections. The Commission believes adding this language is reasonable and consistent with the record, and will therefore incorporate it into its Site Permit.

Additionally, the Commission will generally adopt the ALJ's recommendations set forth at Finding 545 to amend and incorporate into the Site Permit a requirement that Freeborn Wind provide notice of its project's potential to interfere with OTA TV service and its program for mitigating these harms. Notwithstanding the Department's views, in this instance the Commission believes that providing people with greater notice about how to address potential problems, and more process for addressing those problems, reflects a reasonable strategy. Moreover, Freeborn Wind has agreed to expand the scope of the notices it would provide to

landowners—and the Commission will adopt a modified version of ALJ Finding 386 to recognize this fact.

But based on the parties' comments, the Commission will adopt the ALJ's recommendation at Finding 545 in a slightly altered form.

First, the Commission concurs with the ALJ's recommendation that Freeborn Wind serve notice on all households in the "at risk" areas identified in its Site Permit Application. Indeed, the Commission will go further and direct the Company to also serve notice on each of the over-the-air broadcasters serving this area, so that they will be informed about how to address customer concerns. But the Commission is not persuaded that the Company should also serve notice on every household in Albert Lea, Northwood, Silver Lake, Gordonsville, Glenville, Hayward, and Moscow, which are further away and less likely to experience signal interference. It will suffice for Freeborn Wind to give notice to the local governmental offices in those municipalities instead.

Second, in giving notice, the Commission is not persuaded that Freeborn Wind should have to provide a physical copy of the entire site permit, including complaint procedures. It will suffice to notify people that copies are available upon request.

Finally, while the ALJ proposed amending the language of Draft Site Permit Section 5.2, the Commission prefers to codify this language as its own special condition within the site Permit, superseding the language of any conflicting conditions.

XII. Decommissioning, Turbine Abandonment, and Restoration

A. Introduction

According to the terms of the easements the Company has acquired, at the end of the Project's useful life—anticipated to be 30 years—the Project would be decommissioned, the facilities removed, and the land restored to a condition reasonably similar to its original condition. Parties disagree about the steps Freeborn Wind should take to demonstrate its ability to fulfill these terms.

However, Freeborn Wind's decommissioning plans stumbled over an initial procedural hurdle: Minn. R. 7854.0500, subp. 13, directs an applicant for a site permit for a wind farm to include decommissioning and restoration plans as part of its application, but the Company neglected to do so. The Department failed to detect this oversight when it recommended that the Commission find the application was complete. And the Commission failed to detect the oversight when it issued an order finding the application complete.

B. The ALJ Report

Noting the defect in Freeborn Wind's initial site permit application, the ALJ found this procedural shortcoming irrelevant for purposes of analyzing the merits of the Company's petition.

The ALJ made a number of recommendations related to decommissioning. The ALJ recommended that Freeborn Wind demonstrate that it has the capacity to guarantee it can fund the decommissioning and restoration of its Project prior to commencing construction. She also recommended that when the Company complied with this recommendation, the Commission should provide public notice of Freeborn Wind's demonstration in accordance with Minn. R. 7854.0900. Finally, the ALJ recommended that the Commission clarify that any of Freeborn Wind's successors or assigns would have to adopt the Company's decommissioning obligations (unless the Company elected to retain the obligation).

C. Positions of the Parties

1. Freeborn Wind

Freeborn Wind acknowledged the responsibility it bears—and that its successor would assume—for decommissioning the Project. Freeborn Wind argued that the ALJ's recommendations are already reflected in the terms of the Draft Site Permit, but stated that it had no objection to providing a pre-construction submittal documenting that the Company will have resources available to fund decommissioning and restoration obligations. If the Commission wants Freeborn Wind to give public notice that it had made such a filing, as the ALJ recommended, then the Company would propose to consolidate this notice with the other forms of notice it would provide to landowners under Draft Site Permit Section 5.1.

2. AFCL

AFCL argued that Freeborn Wind's failure to include its decommissioning plans as part of its initial Application deprived the public of a fair opportunity to scrutinize those plans.

AFCL argued that Freeborn Wind should have to provide additional documentation demonstrating its commitment and ability to decommission its Project. And because Freeborn Wind failed to provide decommissioning information in its initial application, AFCL argued that the Commission should ensure that there is extra time for scrutinizing the Company's filing.

3. Department

The Department concurred with Freeborn Wind that the ALJ's proposals largely duplicate provisions already found in the Draft Site Permit. And where the ALJ goes beyond those provisions—for example, proposing that the Company guarantee it can fund the decommissioning—the Department argued that this language is unnecessary and creates the potential for needless disputes. The Department claimed that the Commission has not previously required a permittee to provide full financing for decommissioning before operations begin; rather, the Commission typically grants a permittee several years to amass the necessary funds, aided by the revenues generated by the permitted project. The Department found insufficient reason to adopt a different policy regarding Freeborn Wind's Project.

D. Commission Action

The Commission concurs with the ALJ that Freeborn Wind erred in omitting its decommissioning plan from its initial application, and that the Commission erred in overlooking this omission. However, the Commission's Order Finding Application Complete and Varying Time Limits; Notice and Order for Hearing (August 31, 2017) stated, "The Commission concurs with the [Department] that the application is substantially complete. The Commission will, however, direct Freeborn Wind to respond to all reasonable requests regarding the Project and to facilitate in every reasonable way the continued examination of the issues by the [Department] and Commission staff." Thus the Commission's order, though flawed, did not deprive any party of the opportunity of obtaining a copy of the plan from the Company. The Commission will adopt the ALJ's Finding 518 as amended to take note of this aspect of the Commission's order.

Draft Site Permit Section 11.1 provides language governing the decommissioning of a permitted project, and this language largely addresses the concerns raised. For example, this language provides for a permittee to submit a decommissioning plan—identifying all surety and financial securities available to finance the decommissioning—before the Project could begin operations.

Nevertheless, the Commission is persuaded that some revisions are warranted to address the unique circumstances of this case. In particular, given the late development of this issue, the Commission finds it reasonable to grant additional time for reviewing the decommissioning plan. Thus, while Section 11.1 directs a permittee to submit its decommissioning plan 14 days before the pre-operation meeting, the Commission will direct the Company to make its filing 60 days before the meeting. This will provide an additional 46 days to evaluate the plan.

And while the Commission will retain the ALJ's recommendation that the Company provide public notice when it submits its decommissioning plan, the Commission will grant Freeborn Wind's proposal to permit the Company combine this notice with its other forms of landowner notice set forth in Section 5.1 of the Draft Site Permit.

To avoid needless confusion, however, the Commission will decline to adopt language purporting to require Freeborn Wind to "guarantee" or "ensure" the funds for decommissioning—whether that language appears in the ALJ's findings (for example, Findings 527 and 530) or the Draft Site Permit.

Finally, the Commission will decline to adopt the ALJ's recommendation to modify the site permit to address the obligations of Freeborn Wind's successors and assigns. The Commission already has jurisdiction over the transfer of site permits under Minn. R. 7854.1400, and therefore need not address the issue of successors and assigns in the context of a site permit.

XIII. Other Issues

The ALJ made some 553 findings of fact and 11 conclusions of law, largely analyzing the site permit considerations identified in Minn. Stat. § 216E.03, subdivision 7, as well as a conclusion to deny the site permit, or to establish additional conditions.

Parties took exception to many aspects of the ALJ Report and proposed hundreds of changes. The Commission concurs with many of these arguments, and has articulated above its rationale for differing with the ALJ regarding noise, shadow flicker, interference with over-the-air transmission signals, and decommissioning. In other instances, the Commission finds that the parties' proposed language better articulates the state of the record than the ALJ's findings do. Those instances are set forth in Attachment 1.

But, having reviewed the record of the case, the Commission generally concludes that the ALJ's findings are thorough, well-reasoned, and well-supported, and that the remainder of the parties' proposed revisions should be declined on the grounds that –

- The record does not support the proposed change, or the party proposing a change offered no rationale or citation to the record supporting the change;
- The ALJ better articulated the state of the record;
- The proposed change reflects a non-substantive or *de minimis* change from the ALJ's language; or
- The proposed change is redundant of language elsewhere in the ALJ Report.

Accordingly, the Commission will adopt the ALJ's findings, conclusions, and recommendation, modified as discussed above and in Attachment 1. Based on these findings, and bolstered by additional Site Permit conditions discussed in this order, the Commission will issue the Site Permit set forth in Attachment 2.

ORDER

1. The Commission approves and adopts the findings, conclusions, and recommendation of the Administrative Law Judge's July 26, 2018 Findings of Fact, Conclusions of Law, and Recommendations except as set forth in Attachment 1 or otherwise stated in this order.

2. Freeborn Wind Energy LLC shall provide an updated pre-construction noise analysis demonstrating that the Project will comply with the noise permit conditions recommended by the Department as modified by the conditions proposed by the Company.

3. The Commission hereby issues the Site Permit as set forth in Attachment 2, incorporating various changes to the Draft Site Permit language, including changes related to –

    - setback standards,
    - noise,
    - ice throw,

- shadow flicker,
- over-the-air signal interference, and
- decommissioning.

4. This order shall become effective immediately.

BY ORDER OF THE COMMISSION

Daniel P. Wolf
Executive Secretary

This document can be made available in alternative formats (e.g., large print or audio) by calling 651.296.0406 (voice). Persons with hearing loss or speech disabilities may call us through their preferred Telecommunications Relay Service or email consumer.puc@state.mn.us for assistance.

In the Matter of Freeborn Wind Energy LLC for a Large Wind Energy Conversion System Site Permit for the 84 MW Freeborn Wind Farm in Freeborn County	DOCKET NO. IP-6946/WS-17-410 ORDER ISSUING SITE PERMIT

Attachment 1: Modifications to the ALJ Report

The Commission adopts the findings, conclusions, and recommendations of the Administrative Law Judge's Findings of Fact, Conclusions of Law, and Recommendations (May 14, 2018), except as modified below. Strike-outs indicate texts not adopted by the Commission; underscoring represent clarifying or supplementary text adopted by the Commission.

Finding 154

There was conflicting testimony regarding the ability of agricultural pilots to conduct aerial spraying within the perimeter of a wind farm. ~~AFCL provided no expert testimony regarding the impact of wind turbines on neighboring agricultural property or practices.~~ Freeborn Wind has committed to work with landowners on coordinating aerial spraying activities.[1]

Footnote(s)

1. 239 Ex. FR-1 at 60 (Application).

Finding 160

Mr. MaRous also used the "matched pair" method to examine the effect of proximity to a wind turbine on a property's value. This method analyzes the ~~impact of a single feature on a property's value by finding the sale value of a nearly identical property but for the single feature~~ importance of a selected characteristics—in this instance proximity to a wind turbine—to a property's value. This method compares the selling price of a property close to the selected characteristic to the sale value of a similar property in the same market area and under similar market conditions but without the selected characteristic.

Finding 164

Mr. MaRous provided additional support for his conclusion that property values were not affected by proximity to a wind farm by examining similarly matched ~~properties~~ pairs in three counties in Illinois. Mr. MaRous found three matched property pairs in Mclean County, two in LaSalle County, and one in Livingston County.[245] The distances of the dwellings from the nearest wind turbine in feet were 1,865 feet, 2,210 feet, 1,573 feet, 3,160 feet, 2,325 feet, and 2,322 feet. There are just two matched pairs where the distance to the nearest turbine is less than the average distance for the Project Area. Mr. MaRous found no indication that proximity to a wind turbine lowered the value of non-participating properties.

Finding 175

Several members of the public believe ~~maintained~~ that Freeborn Wind should be required to provide each non-participating landowner with a Property Value Guarantee (PVG) to ensure that they do not suffer losses in property values as a result of the Project.[263]

Finding 181

It is generally accepted that if a wind farm complies with Minnesota noise regulations, people living and working near its turbines will not suffer direct physical damage to their hearing.[274] But, it is also

believed by some that "subaudible infrasound can be detected inside homes near operating wind turbines, and that such sound can be identified from up to 10 kilometers distant." [275]

Finding 181

While it has not been shown that wind turbines cause harm to human hearing, people's reactions to wind turbine noise vary widely. Some people may not be bothered by the noise of the rotating turbines and some may only experience mild annoyance from time to time. But there may be others who are especially sensitive to the noise patterns and inaudible low frequency emissions of the turbines. ~~Their reactions to wind turbines may include nausea, sleeplessness, headaches, chest pains, and high levels of stress.~~[276]

Finding 185

Wind turbines produce sound patterns which the ear and audio processing functions in the brain recognize. [278] The equipment inside a wind turbine's nacelle produces some noise, but the more recent models of turbine nacelles produce very little noise. ~~The main subject of noise complaints is the "broadband 'whooshing' sound produced by interaction of turbine blades with the wind."~~[279] ~~There is also a concern that wind turbines generate "[r]hythmic, low frequency pulsing of higher frequency noise (like the sound of an amplified heart beat) … one type of sound that can be caused by wind turbine blades under some conditions."~~[280] ~~Another pattern is "a tonal signal of sharply rising and falling pulses in the infrasound range."~~[281]

Finding 189

Human ears are not equally sensitive to all sound frequencies. "The human ear is sensitive primarily to the level (loudness) of a noise (sound), but also to its pitch (frequency)." The ear is more sensitive to frequencies ~~in the~~ at about 1,000 Hertz [Hz] [286] ~~to 4,000 Hz~~ than it is to lower or higher frequencies. [287]

Finding 191A

20 Hz is widely regarded as the lowest frequency that humans can hear.[1] Humans' sensitivity to sound at 20 Hz and at lower frequencies is so low that the amplitude has to be extremely high in order for humans to hear them.[2] Infrasound is generally defined as sound in the 1 Hz to 20 Hz frequency range.[3] Infrasound is produced by natural sources such as the wind blowing through trees and vegetation and against houses, ocean waves, and earthquakes[4], and can also be experienced inside a moving car, or inside a house near an operating washing machine.[5] Infrasound is also produced by other man-made sources, such as conventional power plants, aircraft, and agricultural equipment.[6] Levels of wind turbine infrasound are similar to infrasound from natural sources such as the wind blowing through vegetation and ocean waves, and far lower than the levels of infrasound experienced riding inside a vehicle, such as a farm tractor. [7] The levels of infrasound produced by wind turbines are many orders of magnitude below all currently accepted thresholds of human hearing, including every major hearing threshold test dating back to the 1930s and recent fMRI-based hearing response tests. [8]

Footnote(s)

1. Ex. FR-5 at 4 (Hankard Direct).
2. See Ex. FR-6, Sched. 4 at 4 (Roberts Direct).
3. Ex. FR-5 at 5 (Hankard Direct).
4. Ex. FR-5 at 5 (Hankard Direct).
5. Ex. FR-1 at 33 (Application).
6. Ex. FR-5 at 5 (Hankard Direct).
7. Ex. FR-5 at 6 (Hankard Direct).
8. Ex. FR-5 at 5 (Hankard Direct).

Finding 192

~~Most available e~~Evidence suggests that reported health effects are related to inaudible (to most people) low frequency noise. Wind turbines generate a broad spectrum of low intensity noise.[293]

Finding 193

A decibel is the unit in which the intensity of sound (sound pressure level) is typically measured. ~~A barely audible sound (near total silence) is assigned a measure of 0 decibels (dB). The decibel is a logarithmic unit in base 10. A sound that is 10 dB is 10 times louder than the just barely audible 0 dB sound.~~[294]

Finding 195

An alternative to A-weighting is C-weighting. C-weighting does not filter out low frequency sound as the A-weighting does, making C-weighting better if the concern is to measure absolute sound pressure levels rather than loudness to the human ear.[298] ~~The C-weighting is flat to within 1dB down to about 50 Hz and then attenuation commences, but not as rapidly as with A-weighting.~~

Finding 197

Sound levels measured in the environment are almost always the result of many sources being present at any one time, and contain ~~Most sound is~~ a mixture of frequencies. Sound meters ~~add~~ measure all of the sound pressure changes in the environment and display the corresponding A-weighted or C-weighted level ~~levels of the various frequencies across the audible spectrum to compute a single loudness metric~~. When you have two noise sources of equal strength, you add them together for a total noise level that is three dB greater than either one alone. [301] An increase of three dB in the total noise level in an outdoor environment will not be noticeable to most people, and ~~but~~ just barely to others. [302] In an outdoor environment, 3 dB is the smallest change in noise level that most people will notice.[1]

Footnote(s)

1. Tr. Vol. 1B at 115 (Hankard).

Finding 198

Sounds from different sources can occur at the same time. If a 50 dB noise is added to an existing 50 dB noise, the resulting noise level is 53 dB, which is enough of an increase in sound pressure to be noticeable. Freeborn Wind provided the following rules of thumb for adding noise from a point source to ambient noise: when one source is 10 dB less than another, it is irrelevant. If a wind turbine is generating 50 dB and ambient noise is 45 dB, the total sound level is 51 dB.[303]

Finding 205

[The Department] issued the "Guidance for LWECS Noise Study Protocol and Report" in 2012 to assist permittees in conducting post-construction noise compliance surveys; it does not provide detailed recommendations or guidance on pre-construction noise modeling analysis.[1] The MPCA's interpretation of its rule is that, to estimate the effect of wind farm noise on total noise levels, the ambient level of noise must be known. In its Comment on the DOC's Guidance for Large Wind Energy Conversion Systems Noise Protocol and Report, the MPCA noted:

> Although the noise rules apply to total noise measured at a wind farm, the culpability of the wind turbines depends on attribution. If noise exceedances are recorded, it is necessary to determine the increment due to the turbine noise. Background noise information is very important to this effort.

This is where background data might be "subtracted." Compliance is based on the inclusion of background total noise, whereas attribution depends on the use of the background information to adjust the measured noise to the source (turbines).[314]

Footnote(s)

1. Ex. EERA-9 (2012 Noise Protocol Guidance) and Evid. Hearing Tr. Vol 2 at 183, 186 (Feb. 22, 2018) (Davis).

Finding 206

~~The Administrative Law Judge agrees with [the Department]'s interpretation of the noise limits in Minn. R. 7030.0400 for a number of reasons. First, [the Department]'sinterpretation is consistent with the MPCA's interpretation of its own rule. Second, Freeborn Wind appears to equate the pre-construction environment with the "natural environment." However, the Project Area has roads, vehicles, farm equipment, and other non-natural sources of sound and is not solely a "natural environment." Third, subpart 1 explicitly provides that the standards in subpart 2 do not apply to impulsive noise. If the rule was intended not to apply to ambient noise, it would have similarly distinguished and excluded ambient noise. Fourth, the noise standards are "consistent with speech, sleep, annoyance, and hearing conservation requirements." This implies a focus on the protecting the recipients of the noise and these goals are frustrated when total noise levels are exceeded. [the Department]'s analysis correctly identifies the total noise levels experienced by receptors when the wind turbines are operating as the regulated sound from "all sources."~~

Finding 207A

The Noise Standards also contain specific measurement procedures to be used for accurately measuring the noise from the source only, while taking care not to include noise from "background noise", which is defined as "any ambient noise other than the noise to be measured, including wind, precipitation, traffic, etc."[1] The MPCA provides guidance on the implementation of its Noise Standards.[2]

The MPCA separately defines sound occurring in the natural environment. "Background, or ambient, noise" consists of "all noise sources other than the noise source of concern."[3] Because wind is often a major source of background noise (particularly during full operation of a wind farm), it can frequently present problems when trying to isolate and monitor a specific source of noise.[4] Accordingly, MPCA's measurement protocols and guidance state that high wind and rainy weather conditions should be avoided when measuring the noise source.[5] Further, when analyzing a specific noise source along with other noise sources, correction factors can be used to isolate the noise source being monitored and calculate its individual noise level. Specifically, total noise levels from all sources are to be measured and recorded. Then the noise source being measured should be turned off, and a noise level reading taken with all other existing noise sources in operation. Then, the background noise is subtracted from the total noise level to find the noise level of the source being measured.[6] It is the source noise that must meet the levels set in the Noise Standards.[7]

Footnote(s)

1. MPCA Guide at 11.
2. Id.
3. MPCA Guide at 11.
4. Id.
5. Minn. R. 7030.0060 and MPCA Guide at 11.
6. MPCA Guide at 12.

7. 348 See Minn. Stat. §§ 116.07, subd. 2(c), 116.06, subd. 15; Minn. R. 7030.0040 and 0060; MPCA Guide at 12.

Finding 207B

The Legislature authorized the MPCA to regulate "noise", as defined in the statute. MCPA's guidance further confirms that the regulated noise source to be measured must be isolated from background noise when measuring sound at a given location. Accordingly, Freeborn Wind has correctly interpreted the Noise Standards to require that Project-related noise cannot exceed a nighttime L50 of 50 dB(A).

Finding 209

~~While infrasound and LFN may not pose noise issues per se, that is an artifact of our hearing. Physically, infrasound and LFN are electromagnetic waves just like audible sounds, and they may have physical effects on humans, just like audible sounds.~~ The Minnesota Department of Health found that wind turbine-related noise complaints "appear to rise with increasing outside noise levels above 35 dB(A)" and "[t]he Minnesota nighttime standard of 50 dB(A) not to be exceeded more than 50% of the time in a given hour, appears to underweight penetration of low frequency noise into dwellings."[320]

Finding 209A

LFN from wind turbines, from 20 to 200 Hz, is audible, but at levels that are generally less than those produced by other sources, such as traffic, wind, and other methods of power generation.[1]

Footnote(s)

1. Ex. FR-1 at 33 (Application).

Finding 211

Mr. Hankard affirmed that the primary source of LFN and infrasound is ambient noise such as "wind blowing through vegetation and against buildings such as houses."[323] This is especially so when ground winds exceed 10 miles per hour, which is when wind turbines tend to operate. During periods of high ground winds (greater than approximately 10 mph), which occurs often during wind turbine operations, ambient LFN levels exceed those produced by wind turbines.[1] Mr. Hankard stated that ambient levels of LFN in the Project area "range from about 45 to 80 dBC under windy conditions."[~~324~~] while LFN from the project is predicted to be 62dBC at one residence and less than 60dBC at all other residences.[2]

Footnote(s)

1. Ex. FR-5 at 8 (Hankard Direct).
2. 361 Id. at 8 (Hankard Direct); see also Ex. FR-1, Appendix B at 9 (Noise Analysis) (Application)

Finding 213

~~Freeborn Wind did not follow this guidance "b~~ "Because the frequency spectrum of noise from wind turbines is relatively fixed, and once one part of the spectrum becomes limited, so does every ~~other~~ part of the audible spectrum."[326] The 50 dB(A) limit for receptors was attained by placing the wind turbines at certain distances from the receptors. For the Project, the 50 dB(A) limit at residences controls Project LFN levels to about 60 dB(C) or less at residences, and limits infrasound to levels orders of magnitude below the human hearing threshold." [326]

Finding 214

The Minnesota Noise Standards indirectly regulate LFN and infrasound. While there are no dB(C) or other LFN noise limits, or any limits pertaining to infrasound, contained in Minnesota's noise standards,

it is well understood that limiting wind turbine noise emissions using a dB(A) standard automatically limits LFN and infrasound. Because wind turbine noise has a relatively consistent spectral (frequency) shape, once one part of the spectrum is limited, the rest of the spectrum is limited as well. ~~the record evidence legitimates concerns over the Project's potential to generate harmful LFN and infrasound, opponents of the Project are correct that Minnesota's noise standards do not address them.~~ [The Department] did not recommend the addition of any conditions or special conditions specific to infrasound or low frequency noise.[328] While the Department of Health, the Department of Commerce, and the Pollution Control Agency all acknowledge public complaints concerning wind turbine generated infrasound and LFN merit concern, in 2012, the MPCA Commissioner, in response to a rulemaking Petition, stated that "After consulting with colleagues at the Minnesota Departments of Health and Commerce, I have concluded that the current understanding of wind turbine noise and its potential effects is insufficient to support rule making at this time,"3 and in 2016, that "the present knowledge of the potential health effects of infrasound does not lend itself to the development of an appropriate standard at this time." [329]

Finding 219

Carol Overland requested that the MPCA develop rules governing wind turbine noise. In response, John Linc-Stine, Commissioner of the Minnesota Pollution Control Agency, stated: "After consulting with colleagues at the Minnesota Departments of Health and Commerce, I have concluded that the current understanding of wind turbine noise and its potential effects is insufficient to support rulemaking at this time.[2] However, as explained above, the Noise Standards indirectly regulate LFN and infrasound. It is well understood that limiting wind turbine noise emissions using a dB(A) standard automatically limits LFN and infrasound.[1] Because wind turbine noise has a relatively consistent spectral (frequency) shape, once one part of the spectrum is limited, the rest of the spectrum is limited as well. [2] Further, some experts agree that regulating wind turbine noise using acceptable A-weighted limits is appropriate."[3]

Footnote(s)

1. FR-5 at 7 (Hankard Direct).
2. FR-5 at 7 (Hankard Direct).
3. See FR-1 at 33-34 (Application).

Finding 220

The Department of Commerce, Energy Facility Permitting is the author of Guidance for Developing and e-Filing the LWECS Noise Study Protocol and Report Submittals to the Minnesota Public Utilities Commission (Oct. 8, 2012) [LWECS Noise Study Protocol].[337] The Guidance document is intended to assist permittees in conducting post-construction noise compliance surveys; it does not provide detailed recommendations or guidance on pre-construction noise modeling analysis.[1] The document's purpose is:

> to aid wind developers in the preparation and use of a noise study protocol that standardizes sound monitoring methodologies, analysis, and presentation. The purpose of the protocol and the resulting noise study report are to quantify sound generated by an operational Large Wind Energy Conversion System (LWECS) at receptors: sound that is present during the measurement, project-related and otherwise. [338]

Footnote(s)

1. See Evidentiary Hearing Tr. Vol 2 at 183, 186 (Feb. 22, 2018) (Davis) and Ex. EERA-9 (2012 Noise Protocol Guidance).

Finding 222

The purpose of the pre-construction noise analysis is to inform the placement of wind turbines so as to comply with Minnesota noise regulations. ~~because, once built, a properly functioning wind turbine's noise output can only be changed by taking it out of service.~~

Finding 223

Mr. Hankard prepared the Pre-Construction Noise Analysis Report included in Freeborn Wind's Site Permit Application as Appendix B.[340] He drew upon his familiarity with the noise emissions of Vestas wind turbines from previous work.[341] Hankard Environmental conducted an ambient noise measurement survey at the Project site in ~~April 2016~~ the spring of 2017 and modeled noise emissions from the Project to assist in designing the turbine layout so as to comply with Minnesota's noise standards. [342]

Finding 224

Mr. Hankard used the International Organization for Standardization (ISO) standard 9613-2, Attenuation of Sound During Propagation Outdoors – Part 2: General method of calculation modeling method.[343] This method assumes "optimal acoustic propagation in all directions~~.~~," – specifically, that a well-developed, moderate ground-based temperature inversion is present or, equivalently, that all receptors are downwind of all noise sources at all times.[344]

Finding 227

Mr. Hankard measured ambient noise at three wind speeds: the speed at which the blades "cut-in" and begin to generate power; the speed at which the turbines generate full acoustic output; and the speed at which full power is generated. It appears that the five measurement sites chosen were in the Project Area. At three of five measuring locations, full power produced ambient sound levels of 50 or 51 dB(A).[347]

At 3 m/s, which represents calm conditions when turbines would be off or just beginning to operate, ambient noise levels are low (20 to 30 dB(A)). At 7 m/s, when the turbines would be operating at a moderate capacity, ambient noise levels range from about 30 to 40 dB(A). At 10 m/s the turbines would be producing full acoustic emissions, and ambient noise levels range from about 45 to 50 dB(A). LFN noise levels were also measured. Levels range from about 35 to 45 dB(C) under calm conditions, 45 to 65 dB(C) under moderately windy conditions, and 65 to 80 dB(C) under very windy conditions.[1]

Footnote(s)

1. Ex. FR-1, Appendix B at 9 (Noise Analysis) (Application).

Finding 236

The ISO 9613-2 methodology Mr. Hankard employed has a margin of error to its noise level measurements of plus or minus three dB.[366] An increase of three dB corresponds to a doubling of sound power but only a slightly noticeable increase in loudness. Mr. Hankard contends that, by using the most conservative values for the model's parameters, the margin of error with respect to underestimating sound levels is much smaller than three dB.[366]

Finding 238

Another cause for uncertainty is the absence of certain empirical data. That is, sound measurements are not made when one would expect the loudest levels to occur. ~~As Mr. Hankard pointed out, t~~The American National Standards Institute (ANSI) "discourages measurements when the local wind speed is 11 miles an hour or greater. And that's because what you're actually measuring at that point is

distortion of the microphone and not actual sound in the air."[369] Accordingly, Mr. Hankard did not include any noise monitoring results for wind speeds over 11 miles per hour (approximately 4.9 meters per second), measured at the microphone height (approximately 5 feet above the ground).[1] The ~~average monthly~~ mean annual wind speed in the Freeborn Project Area measured at 80 meters above ground level (hub height) is predicted to be greater than 11 miles per hour.[370] While the wind speed at the hub height of a turbine may differ from the wind speed near ground level for a variety of reasons,[371] Freeborn Wind's Application stated that, at 80 meters above the ground, predicted wind speeds near the Project Area are 6.0 to 8.8 meters per second.[372] At 8.8 meters per second, this is just under 20 miles per hour. No expert testimony was presented to challenge the ANSI methodology.

~~**Finding 240**~~

~~The turbines have yet to be built. One or more of the sound estimation model's assumptions or its data may be wrong. For example, the location of a turbine when finally erected could differ from its assumed location, or the location of a house could be incorrect. Or, post-construction measurements may not be made under identical atmospheric conditions as pre-construction measurements.~~

Finding 241

Table 2 in FR-18 shows that there are many instances where total noise will be quite close to, or could exceed, 50 dB(A). There are approximately 254 homes in the Freeborn Wind Project footprint.[373] The turbines have yet to be built. However, pre-construction, it is the modeling Freeborn Wind conducted that is relevant for determining whether the Project will comply with the Noise Standards once operational. The record here demonstrates that Freeborn Wind included very conservative assumptions in its modeling and calibrated its modeling with real world data to ensure that modeled estimates are conservatively high.[1] If changes are made to the turbine layout, number of turbines, or turbine type, the Noise Analysis will be updated accordingly. According to Table 2, any time the ambient noise level is 50 dB(A), added wind turbine noise results in 53 homes experiencing levels of 51 dB(A) and 25 homes at levels of 52 dB(A), for a total of 78 homes experiencing more noise than permitted by Minn. R. 7030.0040.[374] Two of the homes will experience 58 dB(A) if the ambient noise is 57 dB(A).[375] None of these homes was predicted to experience wind turbine noise alone above 48.9 dB(A). Many were predicted to experience wind turbine noise alone in the very low-to-mid 40's range.[376] ~~Thus, the addition of ambient noise is significant in that it raises the predicted nighttime noise exposure of more than 30 percent of the homes in the footprint of the Project beyond what is allowed in Minn. R. 7030.0040.~~ Table 2 in Ex. FR-18 shows that when background noise levels are 45 dB(A) or less, total sound levels are 50 dB(A) or less regardless of the turbine-only noise level. When background noise levels are in the 45 to 50 dB(A) range, turbines contribute to the total when turbine-only noise levels are approximately 44 dB(A) or greater.

Footnote(s)

1. See evidentiary hearing transcript Volume 1B at 111-112 (February 21, 2018 (Hankard).

Finding 243

Should the Commission choose to do so, it could provide Freeborn Wind with an opportunity to submit a plan demonstrating how it will comply with Minnesota's noise standards at all times throughout the footprint of the Freeborn Wind Project. ~~The plan should include low-frequency noise measurements for evaluation in consultation with MDH.~~

Finding 244

The Administrative Law Judge further recommends that the plan be made available for public and agency comment and a hearing held with a summary report. The Commission should then review and

approve a pre-construction noise mitigation plan that best assures that turbine noise will not cause noise levels that exceed Minnesota's noise standards.[377]

Finding 245

Freeborn Wind cannot lawfully operate its turbines if their operation results in total noise at any receptor in a violation ~~excess a violation~~ of the standards in Minn. R. 7030.0400. Condition 4.3 of the Draft Site Permit requires turbines to be placed in appropriate locations to ensure compliance with the Noise Standards. If the Commission grants a Site Permit and post-construction measurements show that total noise levels exceed L50 dB(A) for any receptor, Freeborn Wind must adjust its operations, including shutting down one or more turbines, if doing so will result in complying with the standards.

~~**Finding 246**~~

~~Site Permit Condition 7.4 requires the Permittee to file its post-construction noise study within 18 months of commencing commercial operation. The Administrative Law Judge finds this condition is insufficient in light of the many instances in which the operation of the Project may exceed what Minn. R. 7030.0040 allows, and the lack of analysis of infrasound in light of the combined ambient and turbine sound totals.~~

Finding 247

Because of the many potential sources of inaccuracy in the pre-construction noise level measurements and post-construction noise level predictions, should the Commission decide to grant Freeborn Wind's Site Permit Application, the Administrative Law Judge recommends a special permit condition requiring that post-construction noise level measurements be made during the first year of operation by an independent consultant selected by [the Department] at Freeborn Wind's expense. The measurements should be taken at multiple locations including locations near receptors that are predicted to experience the highest turbine noise levels. ~~The consultant should be charged with ensuring that there are no receptors where levels of ambient noise plus turbine noise exceed L50 50 dB(A) during nighttime hours.~~

Finding 260

The record demonstrates that Freeborn Wind has taken steps to avoid and minimize impacts from shadow flicker. ~~However, the shadow flicker exposure predictions may be incorrect to a greater or lesser extent because data used in the model is incorrect. The shadow flicker exposure estimates, for example, are based in part on measurements of wind direction and speed taken from "temporary meteorological towers located within the Project."[400] To the extent that "temporary" measurements of wind direction and speed differ from their long run values, the shadow flicker exposure estimates will be wrong. Similarly, the estimates do not reflect the impact of any longer-term weather trends such as increased (or decreased) cloudiness.~~

Finding 261

The Administrative Law Judge finds Freeborn Wind has provided reasonable estimates for the hours landowners will be exposed to shadow flicker, but they are only estimates. ~~With one modification, the Administrative Law Judge agrees with [the Department]'s recommendation to require post-construction measurements of shadow flicker. [The Department] recommends measuring shadow flicker "at receptor locations that were anticipated to receive over 30 hours of shadow flicker per year." Because the exposure predications may be incorrect, it is possible that a location expected to receive under 30 hours of exposure, might receive over 30 hours. In particular, Shadow Receptors 303 and 401 are predicted to receive more than 27 hours of shadow flicker.[401] Because they are within 10 percent of exceeding the 30 hour limit, the Administrative Law Judge finds it reasonable to monitor their exposure as well.~~ [The Department] proposed, and the Administrative Law Judge recommends that, if

the Commission issues a Site Permit in this docket, section 7.2 of the Site Permit be revised as recommended by [the Department], with one modification:

> Shadow flicker detection systems will be utilized during project operations to monitor shadow flicker exposure at receptor locations that were anticipated to receive over ~~27~~ 30 hours of shadow flicker per year. The Permittee will submit a Shadow Flicker Monitoring and Management Plan at least 14 days prior to the pre-construction meeting. The Shadow Flicker Monitoring and Management Plan will detail the placement and use of any shadow flicker detection systems, how the monitoring data will be used to inform turbine operations, and a detailed plan of when and how turbine operations will be adjusted to mitigate shadow flicker exposure exceeding 30 hours per year at any one receptor. The results of shadow flicker monitoring and mitigation implementation will be reported by the Permittee in the Annual Project Energy Production Report identified in Section 10.8 of this Permit.

Footnote(s)

~~400. Ex. FR-1 at App. C at 28 (Shadow Flicker Assessment).~~
~~401. Ex. FR-1 at App. B (Shadow Receptor Coordinates & Realistic Shadow Hours).~~

Finding 280

A number of AFCL members and other members of the public raised concerns about ~~threats that wind turbines pose to those who live close to them~~ potential health impacts. One landowner worried about her son who has autism and gets dizzy watching other children play baseball. She worries about his response to seeing the turbines turning every day.[424] Another landowner suffers from migraines, which she states are triggered by vibrations, and could be triggered by the whooshing and flicker of the turbines.[425] Similar concerns were raised by AFCL witness Hansen, who is a cancer survivor, on daily chemotherapy which causes her to be sensitive to motion and other stimuli.[426] A landowner who is a veteran with post-traumatic stress disorder and tinnitus wrote that the turbine noise and shadow flicker will trigger problems, both because of the noise and possible triggering of flashbacks. [427]

Finding 284

Before submitting its application to the Commission in this proceeding, Freeborn Wind invited comments from MDH about the proposed Freeborn Wind project. MDH Assistant Commission Paul Allwood replied with a letter to Applicant (2017 MDH Letter).[434] Referring to the noise standards at Minn. R. 7030.0040, the MDH response warned "The MPCA nighttime standard for noise intensity of 50 dB(A), not to be exceeded more than 50% of the time in a given hour, appears to underestimate how much low frequency noise can enter into dwellings. Prior to site development, MDH recommends that low frequency noise and total noise from turbines be evaluated."[435] The MDH response repeated the setback recommendations it made for shadow flicker in 2009. The MDH comments closed with the following recommendations:

- "Prior to development, low frequency noise and total noise from turbines should be evaluated by qualified acoustical engineers to determine measurable noise components from wind turbines that engender complaints and to assess noise impacts from proposed wind farms." Low frequency noise and total noise from the proposed wind turbines were addressed by a qualified acoustical professional, Mr. Mike Hankard, in his Direct Testimony and in his Affidavit and Noise Tables.[510] The LFN from wind turbines is (1) effectively mitigated by the State of Minnesota's 50 dBA limit, (2) similar in level to the LFN produced by traffic and wind, and (3) below other non-binding LFN standards. Total noise from turbines, meaning the A-weighted overall noise level from the combined operation of all turbines, was addressed in the Pre-Construction Noise Analysis and in Mr. Hankard's Direct Testimony and Affidavit and Noise Tables.[1]

- "Wind turbine noise estimates should include cumulative impacts (40- 50 dB(A) isopleths) of all wind turbines." The recommended isopleths (noise level contours) were provided in Figures A1 and A2 in the Pre-Construction Nosie Analysis Report.[2]

- Isopleths for dB(C) – dB(A) greater than 10 dB should be determined to evaluate the low frequency noise component.

- The impacts of aerodynamic modulation noise and shadow flicker should be modeled and evaluated.

- "Evaluations of turbine noise generation and shadow flicker should be incorporated into decisions when determining the appropriate setback distances of homes from wind turbines." In Sections 8.3 and 8.4 of the Application and in the Direct Testimonies of Mr. Litchfield and Mr. Hankard, Freeborn Wind considered noise and shadow flicker in developing the Project layout.

- Any noise criteria beyond current state standards used for placement of wind turbines should reflect priorities and attitudes of the community.

- Recognizing that it is unknown whether reported health impacts are direct health effects or indirect stress impacts from annoyance and/or lack of sleep resulting from turbine noise or shadow flicker, potential health impacts from wind turbine projects should be acknowledged, and provision should be made to mitigate these effects for residents within and near proposed project areas.

  The project should be designed so that exposure to residents is minimized and inclusion of all potential residents as compensated participants should be considered.[436] As discussed extensively in the Application and in Mr. Litchfield's Direct Testimony, Freeborn Wind designed the Project with setbacks and other measures that minimize impacts to area residents. Freeborn Wind also offered easements and Good Neighbor Agreements to landowners throughout the Project Area.

Footnote(s)

1. See Ex. FR-5 at 4-5, 7-8 (Hankard Direct); Ex. FR-13, Sched. 1 (Hankard Rebuttal; Ex. FR-18 (Hankard Affidavit and Noise Tables).
2. See Ex. FR-5 at 11 (Hankard Direct); Ex. FR-1, Appendix B (Noise Analysis) (Application); Ex. FR- 18 (Hankard Affidavit and Noise Tables).
3. Ex. FR-1, Appendix B at Figures A1 and A2 (Noise Analysis) (Application).

Finding 299

~~The Administrative Law Judge observes that the Project is predicted to exceed the 30 hour shadow flicker limit with regard to seven homes (three participating and four non-participating homeowners) under Freeborn County's Ordinance, a limit to which Freeborn Wind stated it would adhere.460 Based on these concerns, and on the public health concerns arising from evidence of chronic annoyance, sleeplessness, and headache, the Administrative Law Judge recommends that the Commission amend the Draft Site Permit regarding shadow flicker consistent with the recommendations made in Section XI.E. of this Report.~~ The published literature has shown some association between wind turbine noise emissions and annoyance. While annoyance is at times associated with various symptoms, it is not a disease.[1]

Footnote(s)

1. Ex. FR-6 at 3 (Roberts Direct).

Finding 301

The Commission's January 11, 2008 Order Establishing General Wind Permit Standards states that turbines must be setback from homes at least 500 feet and sufficient distance to meet the State noise standard, whichever is greater~~. While Freeborn Wind's proposed project meets the setback requirements based on Freeborn County's ordinance, it is not clear that it meets the requirements of the Commission's 2008 Order Establishing General Wind Permit Standards.[463] Those standards call for a setback distance of 750-1,500 feet~~, "depending on turbine model, layout, and specific site conditions."[464] ~~In addition, for homes, the required setback is "at least 500 feet plus the distance required to meet the state noise standard."[465]~~

Footnote(s)

~~463. Ex. AFCL-8 (Order Establishing General Standards, PUC Docket No. E,G-999/M-07-1102 (Jan.11, 2008)).~~
~~465. Id. at 8.~~

Finding 302

The Draft Site Permit issued for the project incorporated a residential setback of not less than 1,000 feet from all residences or the distance required to comply with the noise standards pursuant to Minn. R. 7030.0040, established by the Minnesota Pollution control Agency, whichever is greater.[1] ~~In light of the revised total noise predictions, and the lack of evidence that Freeborn Wind took the required 500 additional feet into account in establishing residential setbacks, the Administrative Law Judge recommends that, if the Commission issues a Site Permit in this docket, the Draft Site Permit conditions be amended to require Residential setbacks of 1500 feet for all non-participating landowners.[466]~~

Footnote(s)

~~466. There are four non-participating landowners with setbacks of less than 1500 feet. Ex. FR-4 at 19 (Litchfield Direct).~~
1. 562 562 DSP at Condition 4.2 (emphasis added); see also In the Matter of the Application of Red Pine Wind Farm, LLC for a Site Permit for the 200.1 Megawatt Red Pine Wind Project in Lincoln County, Minnesota, MPUC Docket WS-16-618, Order Issuing Site Permit for Large Wind Energy Conversion System at Site Permit § 4.2 (June 27, 2017) (eDocket No. 20176-133173-01); In the Matter of the Application of Prairie Rose Wind, LLC for a Site Permit for a 200 Megawatt Large Wind Energy Conversion System in Rock and Pipestone Counties, MPUC Docket WS-10-425, Order Approving Findings of Fact and Issuing Permit at Site Permit § 4.2 (September 16, 2011) (eDocket No. 20119-66430-01).

Finding 304

The Administrative Law Judge finds, should the Commission issue a Site Permit to Freeborn Wind, that the ~~amended shadow flicker, noise, setback and monitoring, minimizing, and mitigating potential impacts~~ site permit conditions once amended as supported by the record will provide adequate public health protections, while still allowing for the public health benefits of the proposed Project.

Finding 308

On February 22, 2018, the final day of the evidentiary hearing in this matter, a large piece of ice was thrown from a wind turbine on the Bent Tree Wind Farm, just to the northwest of Albert Lea. The ice struck and damaged a truck being driven on Highway 13 at the time. Freeborn County Commissioner Dan Belshan provided a public comment with information about the incident. Commissioner Belshan estimated that the ice traveled a distance of approximately 300 feet, based on the distance from the truck to the nearest wind turbine.[474] He provided a document from GE Energy titled, "Ice Shedding and Ice Throw – Risk and Mitigation." [475] The GE document recommends that turbines be sited a safe distance from occupied structures, roads, and public use areas to mitigate ice throw risk. Another mitigation suggestion is that turbines be deactivated when site personnel detect ice accumulation on the blades. [476]

The reported incident of ice throw and strike at the Bent Tree Wind Farm was investigated by Bent Tree Wind Farm staff, and the vehicle strike occurrence was never confirmed to have occurred due to turbine ice throw. The reported ice throw and strike occurrence should not be used as evidence of turbine ice throw, and it should not be used to establish turbine setback distances or the need to establish turbine ice accumulation monitoring protocols.

Finding 310

Draft Site Permit Condition 4.4, which provides for a setback of 250 feet from public road ROW and designated public trails (such as the identified snowmobile trail), ~~does not fully address~~ adequately addresses this concern.[477] The turbine closest to the snowmobile trail (turbine 20) is 538 feet away from the snowmobile trail, far exceeding the minimum setback in the Draft Site Permit (250 feet), as well as the setback required by Section 26-51 of the Freeborn County Ordinance (1.1 times the turbine height~~), and the likely distance the ice was thrown from the turbine at the Bent Tree Wind farm on February 22, 2018~~. [478]

~~**Finding 311**~~

~~The Administrative Law Judge recommends that, if the Commission issues a Site Permit in this docket, the Site Permit Condition 5.2.25 be amended to require that site personnel inspect any turbines closer than 1200 feet to structures, roads or trails for ice when weather conditions are such that ice is likely to accumulate on turbine blades. To the extent that ice is accumulating on the blades of turbines located within 1200 feet of structures, roads, or trails, the turbines must be deactivated until such time as the turbine blades are free from ice.~~

Finding 312

Aside from the above concern, if the Project is built, construction and operation of the Project is not anticipated to have a significant impact to public safety. The record demonstrates that Freeborn Wind has taken steps to avoid and minimize impacts to public safety. Further, the Draft Site Permit, with the recommended amendments, contains adequate conditions to monitor and mitigate the Project's potential impacts on public safety.[479]

For example, in accordance with conditions of the Draft Site Permit, Freeborn Wind will provide educational materials to landowners adjacent to the site and, upon request, to interested persons about the Project and any restrictions or dangers associated with the Project. Freeborn Wind will also provide any necessary safety measures such as warning signs and gates for traffic control or to restrict public access. In addition, Freeborn Wind will submit the location of all underground facilities to Gopher State One Call after construction is completed.[1]

Footnote(s)

1. Draft Site Permit at 13 (January 30, 2018) (eDocket No. 20181-139549-01); see also Id. at 23 (Conditions 10.10 and 10.11).

Finding 324

Commenter Allie Olson advised the Commission that the 34.5 kV transmission lines that would transmit the power generated by the Project could cause interference with the underground copper cables of the Sleepy Eye Telephone Company.[500] Commenter Kristi Rosenquist also expressed concern that the wind farm's sporadic electricity transmissions over its power lines would interfere with landline service over copper cables.[501] ~~Both Ms. Olson and Ms. Rosenquist refer to prior Commission proceedings where this issue has arisen.~~[502]

Footnote(s)

~~502. In re AWA Goodhue Wind, LLC's Application for a Certificate of Need for a 78 MW Wind Project and Associated Facilities in Goodhue County, PUC Docket No. IP-6701/CN-09-1186; Large Wind Energy Convers System Site In the Matter of the Application of AWA Goodhue Wind, LLC for a Site Permit for the 78 MW Goodhue Wind Farm in Goodhue County, PUC Docket No. IP-6701/WS-08-1233.~~

Finding 338

The Administrative Law Judge concludes that there is no evidence to support the need for Freeborn Wind to relocate or remove additional turbines in order to minimize the potential for the Project to interfere with AM or FM radio reception.

Section 5.2.16 of the site permit prohibits ~~In the event that the Commission issues a Site Permit in this docket, the Administrative Law Judge recommends that Section 5.2.16 be amended to require~~ Freeborn Wind ~~to investigate concerns about~~ from operating the Project in a manner that causes radio interference in violation of Federal Communications Commission regulations or other laws and requires timely measure and mitigation if such ~~caused by the Project. If the Project's operations contribute to the~~ interference should occur~~, Freeborn Wind must undertake measures to mitigate the interference~~.

Finding 379

If a resident complains of ongoing TV reception interference, Freeborn Wind proposed to do the following:

a. It will review the Comsearch report to assess whether the impacts are likely Project-related.

b. If Freeborn Wind believes the impacts are likely project~~ed~~-related, it will send Mr. Veldman to visit the landowner and determine the current status of TV equipment and reception.

c. If project-related interference is found, Freeborn Wind will give the landowner an option between having Freeborn Wind install a high gain antenna and/or a low-noise amplifier, or, providing monetary compensation "equal to the cost of comparable satellite TV services at the residence."

d. If the new equipment restores reception to pre-wind farm operations, the matter will be closed.

e. If interference remains an issue, Freeborn Wind will offer monetary compensation equal to the cost of comparable satellite TV service.

f. If the landowner and Freeborn Wind cannot agree to resolve interference issues, Freeborn Wind will report the issue to the Commission's dispute resolution process.[598]

Finding 386

The Administrative Law Judge does not entirely rule out the possibility that, if the Commission issues a Site Permit in this docket, significant numbers of households could experience OTA TV reception interference from the wind farm and concludes that all potentially affected households should receive notice of the wind farm, its potential effects on OTA TV service, Freeborn Wind's mitigation commitment, and a copy of the site permit and complaint procedure~~.~~, Freeborn Wind has agreed to expand the notice to include additional potentially affected KAAL viewers. After receiving adequate notice, viewers who experience interference can either initiate the complaint and mitigation procedures, or accept the interference as inconsequential.

Finding 387

Given KAAL's estimated translator costs of up to $450,000, and up to three times that amount if a new tower is required,[606] its demand for Freeborn Wind to incur these costs if a single household is not satisfied by antenna or receiver adjustments, replacements, or by satellite service, is unreasonable. ~~KAAL's insistence that its OTA TV reception is a matter of life and death because it provides news of weather and other emergencies is overstated.~~ The record demonstrates no problems with AM or FM radio service which can provide emergency weather information to households whose OTA TV and satellite service are both disrupted, one by the Project and the other by the weather.

Finding 434

In public comments and at the public hearing, concerns were raised about the potential for the Project to impact agricultural aerial spraying operations. Commenters Linda Herman, Brian Olson, and Judy Olson expressed concern that farmers would be unable to perform aerial spraying because of the turbines.[653]

Footnote(s)

653. See Public Hearing Tr. at 82-83 (Feb. 20, 2018) (Rauenhorst) ("I just spray around those wind turbines."); Public Hearing Tr. at 90 (Feb. 20, 2018) (Thisius) ("[y]ou cannot safely fly within a wind farm.") Comments by Luke Steier (March 14, 2018) (eDocket No. 20183-140986-01) ("We are asked the question often it seems "do you fly around wind turbines?". The answer is yes, we work around the 18 wind turbines that make up the Big Blue wind farm near Blue Earth. The answer is no if asked to work in the Bent Tree wind farm or one similar too it.").

Finding 436A

436.A While the installation of wind turbine towers, aboveground transmission lines and other associated aboveground facilities in active croplands adds the potential for collisions with crop-dusting aircraft, the turbines will be visible from a distance and lighted according to FAA guidelines.[1] Permanent meteorological towers will be freestanding with no guy wires, and temporary meteorological towers with supporting guy wires have been marked with alternating red and white paint at the top and colored marking balls on the guy wires for increased visibility.[2]

Footnote(s)

1. Ex. FR-1 at 59-60 (Application).
2. Ex. FR-1 at 60 (Application).

Finding 437

~~In a previous position,~~ Freeborn Wind employee Mr. ~~Dan~~ Litchfield ~~had~~ has experience, from a previous position, with landowners and the operations team on issues related to aerial spraying. He explained that aerial spraying and seeding only occurs when wind speeds are low. At those speeds,

turbines barely operate, if at all.[656] Mr. Litchfield testified that best practices are for the wind farm operator and aerial sprayers to coordinate to improve safety for both the pilots and wind farm operations personnel that are working onsite.[1] Mr. Litchfield states that many farmers find aerial applications expensive and inaccurate and use other methods. On behalf of Freeborn Wind, he committed the Applicant would cooperate with landowners in the Project Area to coordinate ~~accommodate~~ aerial spraying activities~~, which could involve shutting turbines down during spraying~~.[657]

Footnote(s)

1. Evidentiary Hearing Tr. Vol. Vol 1A at 18-19 (February 21, 2018) (Litchfield).

Finding 438

AFCL argues based on the testimony of John Thisus, a pilot actively in the business of aerial spraying, that Project will result in barring aerial spraying and seeding in the Project Area causing farmers to incur more expense to accomplish these tasks or the project eliminates the option of aerial spraying and seeding.[658] AFCL provided no ~~testimony~~ witness on the issue of aerial spraying and seeding.

Finding 442

Tier 1, 2, and 3 studies have been completed for the Project. The Tier 1 and 2 studies include preliminary site evaluation and site characterization to identify and characterize habitat and biological resources present within and surrounding the Project Area. These studies also summarize potential species of concern and sensitive ecological areas in the region.[660]

Finding 512

The Administrative Law Judge finds that the Easement Agreement requires that any future owners of any wind energy facilities built as part of the Freeborn Wind Project will be required to bear the costs of decommissioning, as defined in ~~the~~ any Site Permit the Commission grants to Freeborn Wind, to the same extent as Freeborn Wind is required to bear those costs.

Finding 515

AFCL objects to Freeborn Wind's proposal to develop its decommissioning and restoration plan after the Site Permit is issued. AFCL ~~argues~~ notes that Minn. R. 7854.0500, subp. 13 requires these plans be submitted with the application.[793] AFCL argues the Commission should deny the permit application because Freeborn Wind has not provided these plans.

Finding 518

The Commission issued its Order Finding Application Complete and Varying Time Limits; Notice and Order for Hearing [Order] on August 31, 2017.[797] In the Commission Action paragraph, the Order stated, "The Commission concurs with the [Department] that the application is substantially complete. The Commission will, however, direct Freeborn Wind to respond to all reasonable requests regarding the project and to facilitate in every reasonable way the continued examination of the issues by the [Department] and Commission staff." AFCL did not raise its decommissioning and restoration plan concerns in comments prior to the issuance of the Order. No one requested reconsideration of the Order. Accordingly, the Commission's Order is final.

Finding 527

The Administrative Law Judge concludes that the requirements of chapter 7854 are not met unless Freeborn Wind demonstrates its capacity to ~~guarantee it can~~ fund the decommissioning and restoration of its Project prior to commencing construction. Furthermore, the Draft Site Permit contains appropriate conditions to ensure proper decommissioning and restoration of the Project site, with the exception of demonstrating that it has the resources necessary to carry out decommissioning and restoration.[809]

~~**Finding 528**~~

~~The Administrative Law Judge recommends that, if the Commission issues a Site Permit in this docket, Section 11.1 be amended to require that any successors or assigns of Freeborn Wind be obligated to bear the costs of decommissioning to the same extent that Freeborn Wind is, unless Freeborn Wind retains those obligations for itself.~~

Finding 529

Furthermore, if a Site Permit is issued, the Administrative Law Judge recommends that Section 11.1 be amended to require a pre-construction demonstration that the ~~applicant can guarantee that the~~ resources needed for decommissioning and restoration will be available. The Administrative Law Judge recommends that the Commission provide the public notice of Freeborn's submission ~~as required by Minn. R. 7854.0900. In future wind farm site permit proceedings, an applicant should provide this information in its initial filings~~ along with the notice required by Condition 5.1 of the Site Permit.

Finding 544

The Administrative Law Judge recommends that ~~Section 5.2 of~~ the Draft Site Permit should be amended to include a special condition, as follows:

Freeborn Wind must provide notice which includes a description of the Project's potential to interfere with OTA TV service, Freeborn Wind's mitigation program, and availability ~~copies~~ of the Site Permit and Complaint Procedure to households in the following areas:

- All households in "at risk" areas identified for all six local television stations, as identified in Appendix D of the Site Permit Application; ~~and~~
- Each local government office ~~household~~ in the communities of Albert Lea, Northwood, Silver Lake, Gordonsville, Glenville, Hayward, and Moscow; and
- Local over-the-air television broadcasters serving the Project area.

Finding 546

~~The Administrative Law Judge recommends that~~ Special Condition Section 7.2 of the Site Permit should be ~~revised~~ adopted as recommended by [the Department]~~, with one modification~~:

Draft Site Permit Section 7.2 Shadow Flicker

At least 14 days prior to the pre-construction meeting, the Permittee shall provide data on shadow flicker for each residence of non-participating landowners and participating landowners within and outside of the project boundary potentially subject to turbine shadow flicker exposure. Information shall include the results of modeling used, assumptions made, and the anticipated levels of exposure from turbine shadow flicker for each residence. The Permittee shall provide documentation on its efforts to avoid, minimize and mitigate shadow flicker exposure. The results of any modeling shall be filed with the Commission at least 14 days prior to the pre-construction meeting to confirm compliance with conditions of this permit.

Shadow flicker detection systems will be utilized during project operations to monitor shadow flicker exposure at receptor locations that were anticipated to receive over ~~30~~ ~~27~~ 30 hours of shadow flicker per year. The Permittee will submit a Shadow Flicker Monitoring and Management Plan at least 14 days prior to the pre-construction meeting. The Shadow Flicker Monitoring and Management Plan will detail the placement and use of any shadow flicker detection systems, how the monitoring data will be used to inform turbine operations, and a detailed plan of when and how

turbine operations will be adjusted to mitigate shadow flicker exposure exceeding 30 hours per year at any one receptor. The results of shadow flicker monitoring and mitigation implementation will be reported by the Permittee in the Annual Project Energy Production Report identified in Section 10.8 of this Permit.

~~**Finding 548**~~

~~In light of the revised total noise predictions, and the lack of evidence that Freeborn Wind took the required 500 additional feet into account in establishing residential setbacks, the Administrative Law Judge recommends that Draft Site Permit Condition 4.2 be amended to require Residential setbacks of 1500 feet for all non-participating landowners.[818]~~

~~**Footnote(s)**~~

~~818. There are four non-participating landowners with setbacks of less than 1500 feet. Ex. FR-4 at 19 (Litchfield Direct).~~

~~**Finding 549**~~

~~The Administrative Law Judge recommends that Site Permit Section 5.2.25 be amended as follows:~~

~~Site personnel shall inspect any turbines located closer than 1,200 feet to structures, roads, or trails for ice when weather conditions are such that ice is likely to accumulate on turbine blades. To the extent that ice is accumulating on the blades of turbines located within 1,200 feet of structures, roads, or trails, the turbines shall be deactivated until such time as the turbine blades have been re-inspected and found free from ice.~~

~~**Finding 550**~~

~~The Administrative Law Judge recommends that Special Conditions Section 11.1 be amended as follows:~~

~~Any successors or assigns of Freeborn Wind will be obligated to bear the costs of decommissioning to the same extent that Freeborn Wind is, unless Freeborn Wind retains those obligations, in writing, to itself.~~

Finding 551

The Administrative Law Judge recommends that Special Conditions Section 11.1 be amended to require:

The Applicant must demonstrate, at least 45 prior to the scheduled start of construction, ~~that it can guarantee~~ that the resources needed for decommissioning and restoration will be available.

Attachment B: Summary of Public Hearing Comments

I. Party Appearances and Opening Statements

11. Kevin Parzyck appeared on behalf of Freeborn Wind. Mr. Parzyck, Vice President for Development for Invenergy an acoustical engineer, stated that he ~~conducted~~ is responsible for Invenergy's renewable development in the Midwest including the Project ~~studies on the project to demonstrate compliance with the Minnesota standards~~.[10]

13. Mark Roberts appeared on behalf of Freeborn Wind. Dr. Roberts, a physician and epidemiologist, stated he is a consultant regarding "various exposures to communities and industrial settings."[12] ~~Dr. Roberts is an environmental permit manager with Invenergy, who oversaw the wildlife and natural resources surveys in the project area.~~[13]

In the Matter of Freeborn Wind Energy LLC for a Large Wind Energy Conversion System Site Permit for the 84 MW Freeborn Wind Farm in Freeborn County	DOCKET NO. IP-6946/WS-17-410 ORDER ISSUING SITE PERMIT AND TAKING OTHER ACTION

Attachment 2: Site Permit

STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

SITE PERMIT FOR A LARGE WIND ENERGY CONVERSION SYSTEM

IN
FREEBORN COUNTY

ISSUED TO
FREEBORN WIND ENERGY LLC

PUC DOCKET NO. IP-6946\WS-17-410

In accordance with the requirements of Minnesota Statutes Chapter 216F and Minnesota Rules Chapter 7854, this site permit is hereby issued to:

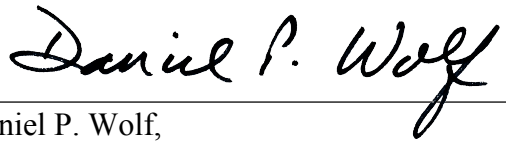
FREEBORN WIND ENERGY LLC

The Permittee is authorized by this site permit to construct and operate an up to 84 megawatt nameplate capacity Large Wind Energy Conversion System in Freeborn County, Minnesota. The Large Wind Energy Conversion System and associated facilities shall be built within the site identified in this permit and as portrayed on the official site maps, and in compliance with the conditions specified in this permit.

This site permit shall expire 30 years from the date of this approval.

Approved and adopted this 19th day of December, 2018.

BY ORDER OF THE COMMISSION



Daniel P. Wolf,
Executive Secretary

CONTENTS

ATTACHMENTS

1.0 SITE PERMIT

The Minnesota Public Utilities Commission (Commission) hereby issues this site permit to Freeborn Wind Energy LLC (Permittee) pursuant to Minnesota Statutes Chapter 216F and Minnesota Rules Chapter 7854. This permit authorizes the Permittee to construct and operate the Freeborn Wind Farm (Project), an 84 megawatt (MW) nameplate capacity Large Wind Energy Conversion System (LWECS) and associated facilities in Freeborn County. The LWECS and associated facilities shall be built within the site identified in this permit and as identified in the attached official site permit map(s), hereby incorporated into this document.

1.1 Preemption

Pursuant to Minn. Stat. § 216F.07, this permit shall be the sole site approval required for the location, construction, and operation of this project and this permit shall supersede and preempt all zoning, building, and land use rules, regulations, and ordinances adopted by regional, county, local, and special purpose governments.

2.0 PROJECT DESCRIPTION

The Freeborn Wind Farm, when fully constructed and operational will have a nameplate capacity up to 200 MW, of which, 84 MW will be located in Freeborn County, Minnesota and the remaining 106 MW will be located in Worth County, Iowa. The Project will consist of 42 2-MW wind turbines, consisting solely of one turbine model or a combination of turbine models, which may include Vestas V110 and Vestas V116 as identified in the Permittee's Site Permit Application.

The project area includes approximately 26,273 acres of land, of which the Project currently holds leases on 17,435 acres. Upon completion, the project site will include no more than 100 acres of land converted to wind turbines and associated facilities approved by this site permit.

2.1 Associated Facilities

Associated facilities for the Project will include access roads, an operations and maintenance (O&M) facility, project substation, permanent meteorological tower and associated weather collection data systems, electrical collection lines, and fiber optic communication lines.

The Project substation will interconnect to the Glenworth Substation with an approximately seven mile long 161 kilovolt (kV) high voltage transmission line (HVTL). The Freeborn Wind Transmission Line Project 161 kV HVTL is under PUC Docket No. IP6946/TL-17-322, and issuance of the HVTL Route Permit is independent of this site permit process.

2.2 Project Location

The project is located in the following:

County	Township Name	Township	Range	Section
Freeborn	Hayward	102	20	12-15, 22-26, 35, 36
Freeborn	London	101	19	13, 14, 19-24, 27-33
Freeborn	Oakland	102	19	7-9, 16-21
Freeborn	Shell Rock	101	20	1, 2, 8, 11-17, 21-28, 35, 36

3.0 DESIGNATED SITE

The site designated by the Commission for the Freeborn Wind Farm is the site depicted on the official site permit maps attached to this permit. Within the site permit boundary, the Project and associated facilities shall be located on lands for which the permittee has obtained wind rights. Wind rights or easements have been obtained by the Permittee and include approximately 17,435 acres of land under easement and with participation agreements.

3.1 Turbine Layout

The preliminary wind turbine and associated facility layouts are shown on the official site maps attached to this permit. The preliminary layout represents the approximate location of wind turbines and associated facilities within the project boundary and identifies a layout that seeks to minimize the overall potential human and environmental impacts of the project, which were evaluated in the permitting process.

The final layout depicting the location of each wind turbine and associated facility shall be located within the project boundary. The project boundary serves to provide the Permittee with the flexibility to make minor adjustments to the preliminary layout to accommodate requests by landowners, local government units, federal and state agency requirements, and unforeseen conditions encountered during the detailed engineering and design process. Any modification to the location of a wind turbine and associated facility depicted in the preliminary layout shall be done in such a manner to have comparable overall human and environmental impacts and shall be specifically identified in the site plan pursuant to Section 10.3.

4.0 SETBACKS AND SITE LAYOUT RESTRICTIONS

4.1 Wind Access Buffer

Wind turbine towers shall not be placed less than five rotor diameters on the prevailing wind directions and three rotor diameters on the non-prevailing wind directions from the perimeter of the property where the Permittee does not hold the wind rights, without the approval of the Commission. This section does not apply to public roads and trails.

4.2 Residences

Wind turbine towers shall not be located closer than 1,000 feet from all residences or the distance required to comply with the noise standards pursuant to Minn. R. 7030.0040, established by the Minnesota Pollution Control Agency, whichever is greater.

4.3 Noise

The wind turbine towers shall be placed such that the Permittee shall, at all times, comply with noise standards established by the Minnesota Pollution Control Agency as of the date of this permit and at all appropriate locations. The noise standards are found in Minnesota Rules Chapter 7030. Turbine operation shall be modified or turbines shall be removed from service if necessary to comply with these noise standards. The Permittee or its contractor may install and operate turbines as close as the minimum setback required in this permit, but in all cases shall comply with Minnesota Pollution Control Agency noise standards. The Permittee shall be required to comply with this condition with respect to all homes or other receptors in place as of the time of construction, but not with respect to such receptors built after construction of the towers.

4.4 Roads

Wind turbines and meteorological towers shall not be located closer than 250 feet from the edge of the nearest public road right-of-way and the nearest designated public trail.

4.5 Public Lands

Wind turbines and associated facilities including foundations, access roads, underground cable, and transformers, shall not be located in publicly-owned lands that have been designated for recreational or conservation purposes, including, but not limited to, Waterfowl Production Areas, State Wildlife Management Areas, Scientific and Natural Areas or county parks, except in the event that the public entity owning those lands enters into a land lease and easement with the Permittee. Wind turbine towers shall also comply with the setbacks of Section 4.1.

4.6 Wetlands

Wind turbines and associated facilities including foundations, access roads, underground cable and transformers, shall not be placed in public waters wetlands, as shown on the public water inventory maps prescribed by Minnesota Statutes Chapter 103G, except that electric collector or feeder lines may cross or be placed in public waters or public waters wetlands subject to permits and approvals by the Minnesota Department of Natural Resources and the United States Army Corps of Engineers, and local units of government as implementers of the Minnesota Wetlands Conservation Act.

4.7 Native Prairie

Wind turbines and associated facilities including foundations, access roads, collector and feeder lines, underground cable, and transformers shall not be placed in native prairie, as defined in Minn. Stat. § 84.02, subd. 5, unless addressed in a prairie protection and management plan and shall not be located in areas enrolled in the Native Prairie Bank Program. Construction activities, as defined in Minn. Stat. § 216E.01, shall not impact native prairie unless addressed in a prairie protection and management plan.

The Permittee shall prepare a prairie protection and management plan in consultation with the Minnesota Department of Natural Resources if native prairie, as defined in Minn. Stat. § 84.02, subd. 5, is identified within the site boundaries. The Permittee shall file the plan 30 days prior to submitting the site plan required by Section 10.3 of this permit. The plan shall address steps that will be taken to avoid impacts to native prairie and mitigation to unavoidable impacts to native prairie by restoration or management of other native prairie areas that are in degraded condition, by conveyance of conservation easements, or by other means agreed to by the Permittee, the Minnesota Department of Natural Resources, and the Commission.

4.8 Sand and Gravel Operations

Wind turbines and all associated facilities, including foundations, access roads, underground cable, and transformers shall not be located within active sand and gravel operations, unless otherwise negotiated with the landowner Wind Turbine Towers.

Structures for wind turbines shall be self-supporting tubular towers. The towers may be up to 80 meters (262.5 feet) above grade measured at hub height.

4.9 Turbine Spacing

The turbine towers shall be constructed within the site boundary as shown in the official site maps. The turbine towers shall be spaced no closer than three rotor diameters in the non-

prevailing wind directions and five rotor diameters on the prevailing wind directions. If required during final micro-siting of the turbine towers to account for topographic conditions, up to 20 percent of the towers may be sited closer than the above spacing but the Permittee shall minimize the need to site the turbine towers closer.

4.10 Meteorological Towers

Permanent towers for meteorological equipment shall be free standing. Permanent meteorological towers shall not be placed less than 250 feet from the edge of the nearest public road right-of-way and from the boundary of the Permittee's site control, or in compliance with the county ordinance regulating meteorological towers in the county the tower is built, whichever is more restrictive. Meteorological towers shall be placed on property the Permittee holds the wind or other development rights.

Meteorological towers shall be marked as required by the Federal Aviation Administration. There shall be no lights on the meteorological towers other than what is required by the Federal Aviation Administration. This restriction shall not apply to infrared heating devices used to protect the wind monitoring equipment.

All meteorological towers shall be fitted with the necessary equipment to deploy/attach acoustic recording devices to monitor wildlife activity.

4.11 Aviation

The Permittee shall not place wind turbines or associated facilities in a location that could create an obstruction to navigable airspace of public and private airports (as defined in Minn. R. 8800.0100, subp. 24(a) and 24(b)) in Minnesota, adjacent states, or provinces. The Permittee shall apply the minimum obstruction clearance for private airports pursuant to Minn. R. 8800.1900, subp. 5. Setbacks or other limitations shall be followed in accordance with the Minnesota Department of Transportation, Department of Aviation, and the Federal Aviation Administration. The Permittee shall notify owners of all known airports within six miles of the project prior to construction.

4.12 Footprint Minimization

The Permittee shall design and construct the LWECS so as to minimize the amount of land that is impacted by the LWECS. Associated facilities in the vicinity of turbines such as electrical/electronic boxes, transformers, and monitoring systems shall, to the greatest extent feasible, be mounted on the foundations used for turbine towers or inside the towers unless otherwise negotiated with the affected landowner.

5.0 GENERAL CONDITIONS

The Permittee shall comply with the following conditions during construction and operation of the LWECS and associated facilities over the life of this permit.

5.1 Notification

Within 14 days of permit issuance, the Permittee shall send a copy of the permit and the complaint procedures to any regional development commission, county auditor and environmental office, and city and township clerk in which any part of the site is located. Within 30 days of permit issuance, the Permittee shall provide all affected landowners with a copy of this permit and the complaint procedures. In no case shall the landowner receive this site permit and complaint procedures less than five days prior to the start of construction on their property. The Permittee shall contact landowners prior to entering the property or conducting maintenance within the site, unless otherwise negotiated with the affected landowner.

5.2 Construction and Operation Practices

The Permittee shall comply with the construction practices, operation and maintenance practices, and material specifications described in the Freeborn Wind Farm Site Permit Application for a LWECS filed with the Commission on June 15, 2107, and the record of the proceedings unless this permit establishes a different requirement in which case this permit shall prevail.

5.2.1 Field Representative

The Permittee shall designate a field representative responsible for overseeing compliance with the conditions of this permit during construction of the project. This person shall be accessible by telephone or other means during normal business hours throughout site preparation, construction, cleanup, and restoration.

The Permittee shall file with the Commission the name, address, email, phone number, and emergency phone number of the field representative 14 days prior to commencing construction. The Permittee shall provide the field representative's contact information to affected landowners, residents, local government units and other interested persons 14 days prior to commencing construction. The Permittee may change the field representative at any time upon notice to the Commission, affected landowners, residents, local government units and other interested persons.

5.2.2 Site Manager

The Permittee shall designate a site manager responsible for overseeing compliance with the conditions of this permit during the commercial operation and decommissioning phases of the project. This person shall be accessible by telephone or other means during normal business

hours for the life of this permit.

The Permittee shall file with the Commission the name, address, email, phone number, and emergency phone number of the site manager 14 days prior to commercial operation of the facility. The Permittee shall provide the site manager's contact information to affected landowners, residents, local government units and other interested persons 14 days prior to commercial operation of the facility. The Permittee may change the site manager at any time upon notice to the Commission, affected landowners, residents, local government units and other interested persons.

5.2.3 Employee Training and Education of Permit Terms and Conditions

The Permittee shall inform all employees, contractors, and other persons involved in the construction and ongoing operation of the LWECS of the terms and conditions of this permit.

5.2.4 Topsoil Protection

The Permittee shall implement measures to protect and segregate topsoil from subsoil on all lands unless otherwise negotiated with the affected landowner.

5.2.5 Soil Compaction

The Permittee shall implement measures to minimize soil compaction of all lands during all phases of the project's life and shall confine compaction to as small an area as practicable.

5.2.6 Soil Erosion and Sediment Control

The Permittee shall implement those erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency Construction Stormwater Program.

If construction of the facility disturbs more than one acre of land, or is sited in an area designated by the Minnesota Pollution Control Agency as having potential for impacts to water resources, the Permittee shall obtain a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater Permit from the Minnesota Pollution Control Agency that provides for the development of a Stormwater Pollution Prevention Plan (SWPPP) that describes methods to control erosion and runoff.

The Permittee shall implement reasonable measures to minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage,

blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions.

5.2.7 Wetlands

Construction in wetland areas shall occur during frozen ground conditions to minimize impacts, to the extent feasible. When construction during winter is not possible, wooden or composite mats shall be used to protect wetland vegetation. Soil excavated from the wetlands and riparian areas shall be contained and managed in accordance with all applicable wetland permits. Wetlands and riparian areas shall be accessed using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts.

Wetland and water resource areas disturbed by construction activities shall be restored to pre-construction conditions, in accordance with all applicable wetland permits. Restoration of the wetlands will be performed by the Permittee in accordance with the requirements of applicable state and federal permits or laws and landowner agreements.

5.2.8 Vegetation Management

The Permittee shall disturb or clear the project site only to the extent necessary to assure suitable access for construction, safe operation and maintenance of the project. The Permittee shall minimize the number of trees to be removed in selecting the site layout specifically preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation, to the extent that such actions do not violate sound engineering principles.

5.2.9 Application of Pesticides

The Permittee shall restrict pesticide use to those pesticides and methods of application approved by the Minnesota Department of Agriculture, Minnesota Department of Natural Resources, and the U.S. Environmental Protection Agency. Selective foliage or basal application shall be used when practicable. All pesticides shall be applied in a safe and cautious manner so as not to damage adjacent properties including crops, orchards, tree farms, apiaries, or gardens. The Permittee shall contact the landowner or designee to obtain approval for the use of pesticide at least 14 days prior to any application on their property. The landowner may request that there be no application of pesticides on any part of the site within the landowner's property. The Permittee shall provide notice of pesticide application to affected landowners, and known beekeepers operating apiaries within three miles of the project site at least 14 days prior to such application.

5.2.10 Invasive Species

The Permittee shall employ best management practices to avoid the potential spread of invasive

species on lands disturbed by project construction activities. The Permittee shall develop an Invasive Species Prevention Plan to prevent the introduction and spread of invasive species on lands disturbed by project construction activities and file with the Commission 14 days prior to the pre-construction meeting.

5.2.11 Noxious Weeds

The Permittee shall take all reasonable precautions against the spread of noxious weeds during all phases of construction. When utilizing seed to establish temporary and permanent vegetative cover on exposed soil, the Permittee shall select site appropriate seed certified to be free of noxious weeds. The Permittee shall consult with landowners on the selection and use of seed for replanting. To the extent possible, the Permittee shall use native seed mixes.

5.2.12 Public Roads

At least 14 days prior to the pre-construction meeting, the Permittee shall identify all state, county, or township roads that will be used for the project and shall notify the Commission and the state, county, or township governing body having jurisdiction over the roads to determine if the governmental body needs to inspect the roads prior to use of these roads. Where practical, existing roadways shall be used for all activities associated with the project. Where practical, all-weather roads shall be used to deliver cement, turbines, towers, assembled nacelles, and all other heavy components to and from the turbine sites.

The Permittee shall, prior to the use of such roads, make satisfactory arrangements with the appropriate state, county, or township governmental body having jurisdiction over roads to be used for construction of the project, for maintenance and repair of roads that may be subject to increased impacts due to transportation of equipment and project components. The Permittee shall notify the Commission of such arrangements upon request.

5.2.13 Turbine Access Roads

The Permittee shall construct the least number of turbine access roads necessary to safely and efficiently operate the project and satisfy landowner requests. Access roads shall be low profile roads so that farming equipment can cross them and shall be covered with Class 5 gravel or similar material. Access roads shall not be constructed across streams and drainage ditches without required permits and approvals. When access roads are constructed across streams, drainage ways, or drainage ditches, the access roads shall be designed and constructed in a manner so runoff from the upper portions of the watershed can readily flow to the lower portion of the watershed. Any access roads that are constructed across streams or drainage ditches shall be designed and constructed in a manner that maintains existing fish passage. Access roads that are constructed across grassed waterways, which provide drainage for surface waters that are ephemeral in nature, are not required to maintain or provide fish passage. Access roads shall be constructed in accordance with all necessary township, county or state road requirements and

permits.

5.2.14 Private Roads

The Permittee shall promptly repair private roads or lanes damaged when moving equipment or when obtaining access to the site, unless otherwise negotiated with the affected landowner.

5.2.15 Archaeological and Historic Resources

The Permittee shall make every effort to avoid impacts to identified archaeological and historic resources when constructing the LWECS. In the event that a resource is encountered, the Permittee shall contact and consult with the State Historic Preservation Office and the State Archaeologist. Where feasible, avoidance of the resource is required. Where not feasible, mitigation must include an effort to minimize project impacts on the resource consistent with State Historic Preservation Office and State Archaeologist requirements.

Prior to construction, workers shall be trained about the need to avoid cultural properties, how to identify cultural properties, and procedures to follow if undocumented cultural properties, including gravesites, are found during construction. If human remains are encountered during construction, the Permittee shall immediately halt construction at such location and promptly notify local law enforcement and the State Archaeologist. Construction at such location shall not proceed until authorized by local law enforcement and the State Archaeologist.

5.2.16 Interference

At least 14 days prior to the pre-construction meeting, the Permittee shall submit to the Commission, an assessment of television and radio signal reception, microwave signal patterns, and telecommunications in the project area. The assessment shall be designed to provide data that can be used in the future to determine whether the turbines and associated facilities are the cause of disruption or interference of television or radio reception, microwave patterns, or telecommunications in the event residents should complain about such disruption or interference after the turbines are placed in operation. The Permittee shall be responsible for alleviating any disruption or interference of these services caused by the turbines or any associated facilities.

The Permittee shall not operate the project so as to cause microwave, television, radio, telecommunications, or navigation interference in violation of Federal Communications Commission regulations or other law. In the event the project or its operations cause such interference, the Permittee shall take timely measures necessary to correct the problem.

5.2.17 Livestock Protection

The Permittee shall take precautions to protect livestock during all phases of the project's life.

5.2.18 Fences

The Permittee shall promptly replace or repair all fences and gates removed or damaged during all phases of the project's life unless otherwise negotiated with the affected landowner. When the Permittee installs a gate where electric fences are present, the Permittee shall provide for continuity in the electric fence circuit.

5.2.19 Drainage Tiles

The Permittee shall take into account, avoid, promptly repair or replace all drainage tiles broken or damaged during all phases of project's life unless otherwise negotiated with affected landowner.

5.2.20 Equipment Storage

The Permittee shall not locate temporary equipment staging areas on lands under its control unless negotiated with affected landowner. Temporary equipment staging areas shall not be located in wetlands or native prairie as defined in Sections 4.6 and 4.7.

5.2.21 Restoration

The Permittee shall, as soon as practical following construction of each turbine, restore the areas temporarily affected by construction to the condition that existed immediately before construction began, to the extent possible. The time period to complete restoration may be no longer than 12 months after completion of the construction, unless otherwise negotiated with the affected landowner. Restoration shall be compatible with the safe operation, maintenance and inspection of the project. Within 60 days after completion of all restoration activities, the Permittee shall advise the Commission in writing of the completion of such activities.

5.2.22 Cleanup

All waste and scrap that is the product of construction shall be removed from the site and all premises on which construction activities were conducted and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis.

5.2.23 Pollution and Hazardous Waste

All appropriate precautions to protect against pollution of the environment shall be taken by the Permittee. The Permittee shall be responsible for compliance with all laws applicable to the generation, storage, transportation, clean up and disposal of all wastes generated during

construction and restoration of the site.

5.2.24 Damages

The Permittee shall fairly restore or compensate landowners for damage to crops, fences, private roads and lanes, landscaping, drain tile, or other damages sustained during construction.

5.2.25 Public Safety

The Permittee shall provide educational materials to landowners adjacent to the site and, upon request, to interested persons about the project and any restrictions or dangers associated with the project. The Permittee shall also provide any necessary safety measures such as warning signs and gates for traffic control or to restrict public access. The Permittee shall submit the location of all underground facilities, as defined in Minn. Stat. § 216D.01, subd. 11, to Gopher State One Call following the completion of construction at the site.

5.2.26 Tower Identification

All turbine towers shall be marked with a visible identification number.

5.2.27 Federal Aviation Administration Lighting

Towers shall be marked as required by the Federal Aviation Administration. There shall be no lights on the towers other than what is required by the Federal Aviation Administration. This restriction shall not apply to infrared heating devices used to protect the wind monitoring equipment.

5.3 Communication Cables

The Permittee shall place all communication and supervisory control and data acquisition cables underground and within or adjacent to the land necessary for turbine access roads unless otherwise negotiated with the affected landowner.

5.4 Electrical Collector and Feeder Lines

Collector lines that carry electrical power from each individual transformer associated with a wind turbine to an internal project interconnection point shall be buried underground. Collector lines shall be placed within or adjacent to the land necessary for turbine access roads unless otherwise negotiated with the affected landowner.

Feeder lines that carry power from an internal project interconnection point to the project substation or interconnection point on the electrical grid may be overhead or underground. Feeder line locations shall be negotiated with the affected landowner. Any overhead or

underground feeder lines that parallel public roads shall be placed within the public rights-of-way or on private land immediately adjacent to public roads. If overhead feeder lines are located within public rights-of-way, the Permittee shall obtain approval from the governmental unit responsible for the affected right-of-way.

Collector and feeder line locations shall be located in such a manner as to minimize interference with agricultural operations including, but not limited, to existing drainage patterns, drain tile, future tiling plans, and ditches. Safety shields shall be placed on all guy wires associated with overhead feeder lines. The Permittee shall submit the engineering drawings of all collector and feeder lines in the site plan pursuant to Section 10.3.

5.5 Other Requirements

5.5.1 Safety Codes and Design Requirements

The LWECS and associated facilities shall be designed to meet or exceed all relevant local and state codes, Institute of Electrical and Electronics Engineers, Inc. standards, the National Electric Safety Code, and North American Electric Reliability Corporation requirements. The Permittee shall report to the Commission on compliance with these standards upon request.

5.5.2 Other Permits and Regulations

The Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations. A list of the permits known to be required is included in the permit application. At least 14 days prior to the preconstruction meeting, the Permittee shall submit a filing demonstrating that it has obtained such permits. The Permittee shall provide a copy of any such permit upon Commission request.

The Permittee shall comply with all terms and conditions of permits or licenses issued by the counties, cities, and municipalities affected by the project that do not conflict with or are not pre-empted by federal or state permits and regulations.

6.0 SPECIAL CONDITIONS

Special conditions shall take precedence over other conditions of this permit should there be a conflict.

6.1 Pre-Construction Noise Modeling

Freeborn Wind Energy LLC shall file a plan, including modeling and/or proposed mitigation, at least 60 days prior to the pre-construction meeting that demonstrates it will not cause or significantly contribute to an exceedance of the MPCA Noise

Standards.

To ensure that the turbine-only noise does not cause or significantly contribute to an exceedance of the MPCA Noise Standards, modeled wind turbine-only sound levels (NARUC ISO 9613-2 with 0.5 ground) at receptors shall not exceed 47 dB(A) L_{50}-one hour. Given this, at no time will turbine-only noise levels exceed the MPCA Noise Standards, and when total sound does exceed the limits it will be primarily the result of wind or other non-turbine noise sources. Under these conditions, the contribution of the turbines will be less than 3 dB(A), which is the generally recognized minimum detectible change in environmental noise levels (non-laboratory setting). For example, when nighttime background sound levels are at 50 dB(A) L_{50}-one hour, a maximum turbine-only contribution of 47 dB(A) L_{50}-one hour would result in a non-significant increase in total sound of less than 3 dB(A).

6.2 Post-Construction Noise Modeling

If the Noise Studies conducted under Section 7.4 document an exceedance of the MPCA Noise Standards where turbine-only noise levels produce more than 47 dB(A) L_{50}-one hour at nearby receptors, then the Permittee shall work with the Department of Commerce to develop a plan to minimize and mitigate turbine-only noise impacts.

7.0 SURVEYS AND REPORTING

7.1 Biological and Natural Resource Inventories

The Permittee, in consultation with the Commission and the Department of Natural Resources, shall design and conduct pre-construction desktop and field inventories of existing wildlife management areas, scientific and natural areas, recreation areas, native prairies and forests, wetlands, and any other biologically sensitive areas within the project site and assess the presence of state- or federally-listed, or threatened, species. The results of the inventories shall be filed with the Commission at least 30 days prior to the pre-construction meeting to confirm compliance of conditions in this permit. The Permittee shall file with the Commission any biological surveys or studies conducted on this project, including those not required under this permit.

7.2 Shadow Flicker

At least 14 days prior to the pre-construction meeting, the Permittee shall provide data on shadow flicker for each residence of non-participating landowners and participating landowners within and outside of the project boundary potentially subject to turbine shadow flicker exposure. Information shall include the results of modeling used, assumptions made, and the anticipated

levels of exposure from turbine shadow flicker for each residence. The Permittee shall provide documentation on its efforts to avoid, minimize, and mitigate shadow flicker exposure. A Shadow Flicker Management Plan will be prepared by the Permittee, which will include the results of any shadow flicker modeling, assumptions made, levels of exposure prior to implementation of planned minimization and mitigation efforts, planned minimization and mitigation efforts, and planned communication and follow up with residence. The Shadow Flicker Management Plan shall be filed with the Commission at least 14 days prior to the pre-construction meeting to confirm compliance with conditions of this permit.

Should shadow flicker modeling identify any residence that will experience in 30 hours, or more, of shadow flicker per year, the Permittee must specifically identify these residences in the Shadow Flicker Management Plan. If through minimization and mitigation efforts identified in the Shadow Flicker Management Plan the Permittee is not able to reduce a residence's anticipated shadow flicker exposure to less than 30 hours per year a shadow flicker detection systems will be utilized during project operations to monitor shadow flicker exposure at the residence. The Shadow Flicker Management Plan will detail the placement and use of any shadow flicker detection systems, how the monitoring data will be used to inform turbine operations, and a detailed plan of when and how turbine operations will be adjusted to mitigate shadow flicker exposure exceeding 30 hours per year at any one receptor. The results of any shadow flicker monitoring and mitigation implementation will be reported by the Permittee in the Annual Project Energy Production Report identified in Section 10.8 of this Permit.

Commission staff and EERA staff will be responsible for the review and approval of the Shadow Flicker Management Plan. The Commission may require the Permittee to conduct shadow flicker monitoring at any time during the life of this Permit.

7.3 Wake Loss Studies

At least 14 days prior to the pre-construction meeting, the Permittee shall file with the Commission the pre-construction micro-siting analysis leading to the final tower locations and an estimate of total project wake losses. As part of the annual report on project energy production required under Section 10.8 of the permit the Permittee shall file with the Commission any operational wake loss studies conducted on this project during the calendar year preceding the report.

7.4 Noise Studies

7.4.1 Pre-Construction Demonstration of Compliance with Noise Standards

Freeborn Wind Energy LLC shall file a plan, including modeling and/or proposed mitigation, at least 60 days prior to the pre-construction meeting that demonstrates it will not cause or significantly contribute to an exceedance of the state noise standards using the

following two-part protocol:

1. If background sound levels are less than the applicable standard at nearby receptors, the modeled turbine-only noise levels cannot cause an exceedance of the applicable state standard at nearby receptors, inclusive of the measured background noise level. "Cause" means that the project turbine-only contribution is in excess of the applicable state standard.

2. If background sound levels are equal to or greater than the applicable state standard at nearby receptors, the windfarm shall not contribute more than 45 dB(A) to total sound levels at the nearby receptors. Therefore, for example, when nighttime background sound levels are at 50 dB(A), a maximum turbine-only contribution of 45 dB(A) would result in a non-significant increase in total sound of 1 dB(A).

7.4.2 Post-Construction Noise Monitoring

The Permittee shall file a proposed methodology for the conduct of a post-construction noise study at least 14 days prior to the pre-construction meeting. The Permittee shall develop the post-construction noise study methodology in consultation with the Department of Commerce. The study must incorporate the most current Department of Commerce Noise Study Protocol to determine total sound levels and turbine-only contribution at different frequencies and at various distances from the turbines at various wind directions and speeds. The Permittee must conduct the post-construction noise study and file with the Commission the completed post-construction noise study within 12 months of commencing commercial operation.

A post-construction noise study must be made, commencing as soon as the Project begins operations, and continuing for the first 12 months of its operation. The study shall be conducted by an independent consultant selected by the Department of Commerce at Freeborn Wind's expense. The independent consultant shall assist the Department of Commerce in developing a study methodology upon consultation with the Minnesota Department of Health and Minnesota Pollution Control Agency. The study must incorporate the Department of Commerce Noise Study Protocol to determine the operating LWECS noise levels at different frequencies and at various distances from the turbines at various wind directs and speeds. In addition, the study must demonstrate the extent to which turbine-only noise contributes to the overall decibel level. Special attention should be paid to receptors predicted to experience the highest turbine noise levels. The completed post-construction noise study shall be filed with the Commission within 14 months after the Project becomes operational.

If the monitored turbine-only noise level is determined to be greater than the Minnesota State Noise Standard at nearby receptors or if the background sound levels exceed the Minnesota State Noise Standards and the turbine-only contribution exceeds 45 dB(A), the Permittee

shall work with the Department of Commerce to develop a plan to minimize and mitigate turbine-only noise impacts.

7.5 Avian and Bat Protection

7.5.1 Avian and Bat Protection Plan

The Permittee shall comply with the provisions of the Avian and Bat Protection Plan (ABPP) submitted for this project as Appendix H of the June 15, 2017 site permit application and revisions resulting from the annual audit of ABPP implementation. The first annual audit and revision will be filed with the Commission 14 days before the preconstruction meeting and revisions should include any updates associated with final construction plans. The ABPP must address steps to be taken to identify and mitigate impacts to avian and bat species during the construction phase and the operation phase of the project. The ABPP shall also include formal and incidental post-construction fatality monitoring, training, wildlife handling, documentation (e.g., photographs), and reporting protocols for each phase of the project.

The Permittee shall, by the 15th of March following each complete or partial calendar year of operation, file with the Commission an annual report detailing findings of its annual audit of ABPP practices. The annual report shall include summarized and raw data of bird and bat fatalities and injuries and shall include bird and bat fatality estimates for the project using agreed upon estimators from the prior calendar year. The annual report shall also identify any deficiencies or recommended changes in the operation of the project or in the ABPP to reduce avian and bat fatalities and shall provide a schedule for implementing the corrective or modified actions. The Permittee shall provide a copy of the report to the Minnesota Department of Natural Resources and to the U.S. Fish and Wildlife Service at the time of filing with the Commission.

7.5.2 Quarterly Incident Reports

The Permittee shall submit quarterly avian and bat reports to the Commission. Quarterly reports are due by the 15th of January, April, July, and October commencing the day following commercial operation and terminating upon the expiration of this permit. Each report shall identify any dead or injured avian and bat species, location of find by turbine number, and date of find for the reporting period in accordance with the reporting protocols. If a dead or injured avian or bat species is found, the report shall describe the potential cause of the occurrence (if known) and the steps taken to address future occurrences. The Permittee shall provide a copy of the report to the Minnesota Department of Natural Resources and to the U.S. Fish and Wildlife Service at the time of filing with the Commission.

7.5.3 Immediate Incident Reports

The Permittee shall notify the Commission, U.S. Fish and Wildlife Service, and the Minnesota

Department of Natural Resources within 24 hours of the discovery of any of the following:

(a) five or more dead or injured birds or bats within a five day reporting period;

(b) one or more dead or injured state threatened, endangered, or species of special concern;

(c) one or more dead or injured federally listed species, including species proposed for listing; or

(d) one or more dead or injured bald or golden eagle(s).

In the event that one of the four discoveries listed above should be made, the Permittee must file with the Commission within seven days, a compliance report identifying the details of what was discovered, the turbine where the discovery was made, a detailed log of agencies and individuals contacted, and current plans being undertaken to address the issue.

7.5.4 Turbine Operational Curtailment

The Permittee shall operate all facility turbines so that all turbines are locked, or feathered, up to the manufacturer's standard cut-in speed from one-half hour before sunset to one-half hour after sunrise of the following day, from April 1 to October 31 of each year of operation.

All operating turbines at the facility must be equipped with operational software that is capable of allowing for adjustment of turbine cut-in speeds.

7.5.5 Karst Geology Investigations

Should initial geotechnical and soils testing at proposed turbine locations identify areas with karst bedrock within 50 feet or less of the soil surface, which may lead to sinkhole formation, additional geotechnical investigations will be performed to insure the area safe for the construction of a wind turbine.

Additional geotechnical investigations may include the following:

1. A geophysical investigation (electrical resistivity) to explore for voids in the bedrock.
2. Soil/bedrock borings to check and confirm the results of the electrical resistivity survey.
3. A series of electric cone penetrometer (CPT) soundings if the potential for loose zones in the soil overburden are suspected.

The Permittee must file with the Commission, a report for all geotechnical investigations completed. The reports must include methodology, results, and conclusions drawn from

the geotechnical investigation.

8.0 AUTHORITY TO CONSTRUCT LWECS

8.1 Wind Rights

At least 14 days prior to the pre-construction meeting, the Permittee shall demonstrate that it has obtained the wind rights and any other rights necessary to construct and operate the project within the boundaries authorized by this permit. Nothing in this permit shall be construed to preclude any other person from seeking a permit to construct a wind energy conversion system in any area within the boundaries of the project covered by this permit if the Permittee does not hold exclusive wind rights for such areas.

8.2 Power Purchase Agreement

In the event the Permittee does not have a power purchase agreement or some other enforceable mechanism for sale of the electricity to be generated by the project at the time this permit is issued, the Permittee shall provide notice to the Commission when it obtains a commitment for purchase of the power. This permit does not authorize construction of the project until the Permittee has obtained a power purchase agreement or some other enforceable mechanism for sale of the electricity to be generated by the project. In the event the Permittee does not obtain a power purchase agreement or some other enforceable mechanism for sale of the electricity to be generated by the project within two years of the issuance of this permit, the Permittee must advise the Commission of the reason for not having such commitment. In such event, the Commission may determine whether this permit should be amended or revoked. No amendment or revocation of this permit may be undertaken except in accordance with Minn. R. 7854.1300.

8.3 Failure to Commence Construction

If the Permittee has not completed the pre-construction surveys required under this permit and commenced construction of the project within two years of the issuance of this permit, the Permittee must advise the Commission of the reason construction has not commenced. In such event, the Commission shall make a determination as to whether this permit should be amended or revoked. No revocation of this permit may be undertaken except in accordance with applicable statutes and rules, including Minn. R. 7854.1300.

9.0 COMPLAINT PROCEDURES

Prior to the start of construction, the Permittee shall submit to the Commission the procedures that will be used to receive and respond to complaints. The procedures shall be in accordance with the requirements of Minn. R. 7829.1500 or Minn. R. 7829.1700, and as set forth in the

complaint procedures attached to this permit (Attachment A).

10.0 COMPLIANCE REQUIREMENTS

Failure to timely and properly make compliance filings required by this permit is a failure to comply with the conditions of this permit. Compliance filings must be electronically filed with the Commission. Attachment B to this permit contains a summary of compliance filings, which is provided solely for the convenience of the Permittee. If this permit conflicts, or is not consistent with Attachment B, the conditions in this permit will control.

10.1 Pre-Construction Meeting

Prior to the start of any construction, the Permittee shall participate in a pre-construction meeting with the Department of Commerce and Commission staff to review pre-construction filing requirements, scheduling, and to coordinate monitoring of construction and site restoration activities. Within 14 days following the pre-construction meeting, the Permittee shall file with the Commission, a summary of the topics reviewed and discussed and a list of attendees. The Permittee shall indicate in the filing the construction start date.

10.2 Pre-Operation Meeting

At least 14 days prior to commercial operation of the facility, the Permittee shall participate in a pre-operation meeting with the Department of Commerce and Commission staff to coordinate field monitoring of operation activities for the project. Within 14 days following the pre-operation meeting, the Permittee shall file with the Commission, a summary of the topics reviewed and discussed and a list of attendees.

10.3 Site Plan

At least 14 days prior to the pre-construction meeting, the Permittee shall provide the Commission, the Department and the Freeborn County Environmental Services Office with a site plan that includes specifications and drawings for site preparation and grading; specifications and locations of all turbines and other structures to be constructed including all electrical equipment, collector and feeder lines, pollution control equipment, fencing, roads, and other associated facilities; and procedures for cleanup and restoration. The documentation shall include maps depicting the site boundary and layout in relation to that approved by this permit. The Permittee shall document, through GIS mapping, compliance with the setbacks and site layout restrictions required by this permit, including compliance with the noise standards pursuant to Minnesota Rules Chapter 7030. At the same time, the Permittee shall notify affected landowners and city and town clerks that the site plan is on file with the Commission and Freeborn County Environmental Services Office. The Permittee may submit a site plan and engineering drawings for only a portion of the project if the Permittee intends to commence construction on certain parts of the project before completing the site plan and engineering drawings for other parts of

the project.

The Permittee may not commence construction until the 30 days has expired or until the Commission has advised the Permittee in writing that it has completed its review of the documents and determined that the planned construction is consistent with this permit. If the Permittee intends to make any significant changes to its site plan or the specifications and drawings after submission to the Commission, the Permittee shall notify the Commission, the Department, the Freeborn County Environmental Services Office, city and town clerks, and the affected landowners at least five days before implementing the changes. No changes shall be made that would be in violation of any of the terms of this permit.

In the event that previously unidentified human and environmental conditions are discovered during construction that by law or pursuant to conditions outlined in this permit would preclude the use of that site as a turbine site, the Permittee shall have the right to move or relocate turbine site. Under these circumstances, the Permittee shall notify the Commission, the Department, the Minnesota Pollution Control Agency, the Minnesota Department of Natural Resources, the Freeborn County Environmental Services Office, city and town clerks, and the affected landowners of any turbines that are to be relocated, and provide the previously unidentified environmental conditions and how the movement of the turbine mitigates the human and environmental impact at least five days before implementing the changes. No changes shall be made that would be in violation of any terms of this permit.

10.4 Status Reports

The Permittee shall file status reports with the Commission on progress regarding site construction. The Permittee need not report more frequently than monthly. Reports shall begin with the commencement of site construction and continue until completion of site restoration.

10.5 Notification to the Commission

At least three days before the project is to commence commercial operation, the Permittee shall file with the Commission the date on which the project will commence commercial operation and the date on which construction was completed.

10.6 As-Builts

Within 90 days after completion of construction, the Permittee shall submit copies of all final as-built plans and specifications developed during the project.

10.7 GPS Data

Within 90 days after completion of construction, the Permittee shall submit to the Commission, in the format requested by the Commission, geo-spatial information (e.g., ArcGIS compatible

map files, GPS coordinates, associated database of characteristics) for all structures associated with the large wind energy conversion system.

10.8 Project Energy Production

The Permittee shall, by February 1st following each complete or partial year of project operation, file a report with the Commission on the monthly energy production of the project including:

(a) the installed nameplate capacity of the permitted project;

(b) the total monthly energy generated by the project in MW hours;

(c) the monthly capacity factor of the project;

(d) yearly energy production and capacity factor for the project;

(e) the operational status of the project and any major outages, major repairs, or turbine performance improvements occurring in the previous year; and

(f) any other information reasonably requested by the Commission.

This information shall be considered public and must be filed electronically.

10.9 Wind Resource Use

The Permittee shall, by February 1st following each complete or partial calendar year of operation, file with the Commission the average monthly and average annual wind speed collected at one permanent meteorological tower during the preceding year or partial year of operation. This information shall be considered public and must be filed electronically.

10.10 Emergency Response

The Permittee shall prepare an Emergency Response Plan in consultation with the emergency responders having jurisdiction over the facility prior to project construction. The Permittee shall submit a copy of the plan, along with any comments from emergency responders, to the Commission at least 14 days prior to the pre-construction meeting and a revised plan, if any, at least 14 days prior to the pre-operation meeting. The Permittee shall provide as a compliance filing confirmation that the Emergency Response Plan was provided to the emergency responders and Public Safety Answering Points (PSAP) with jurisdiction over the facility prior to commencement of construction. The Permittee shall obtain and register the facility address or other location indicators acceptable to the emergency responders and PSAP having jurisdiction over the facility.

10.11 Extraordinary Events

Within 24 hours of discovery of an occurrence, the Permittee shall notify the Commission of any extraordinary event. Extraordinary events include but shall not be limited to: fires, tower collapse, thrown blade, acts of sabotage, collector or feeder line failure, and injured worker or private person. The Permittee shall, within 30 days of the occurrence, file a report with the Commission describing the cause of the occurrence and the steps taken to avoid future occurrences.

11.0 DECOMMISSIONING, RESTORATION, AND ABANDONMENT

11.1 Decommissioning Plan

The Permittee shall submit a decommissioning plan to the Commission at least 60 days prior to the pre-operation meeting, and provide updates to the plan every five years thereafter.
The plan shall provide information identifying all surety and financial securities established for decommissioning and site restoration of the project in accordance with the requirements of Minn. R. 7854.0500, subp. 13. The decommissioning plan shall provide an itemized breakdown of costs of decommissioning all project components, which shall include labor and equipment. The plan shall identify cost estimates for the removal of turbines, turbine foundations, underground collection cables, access roads, crane pads, substations, and other project components. The plan may also include anticipated costs for the replacement of turbines or repowering the project by upgrading equipment.

The Permittee shall also submit the decommissioning plan to the local unit of government having direct zoning authority over the area in which the project is located. The Permittee shall demonstrate that it will provide for the resources necessary to fulfill its requirements to properly decommission the project at the appropriate time. The Commission may at any time request the Permittee to file a report with the Commission describing how the Permittee is fulfilling this obligation.

11.2 Site Restoration

Upon expiration of this permit, or upon earlier termination of operation of the project, or any turbine within the project, the Permittee shall have the obligation to dismantle and remove from the site all towers, turbine generators, transformers, overhead and underground cables and lines, foundations, buildings, and ancillary equipment to a depth of four feet. Any agreement for removal to a lesser depth or no removal shall be recorded with the county and shall show the locations of all such foundations. To the extent feasible, the Permittee shall restore and reclaim the site to its pre-project topography and topsoil quality. All access roads shall be removed unless written approval is given by the affected landowner requesting that one or more roads, or portions thereof, be retained. All such agreements between the Permittee and the affected

landowner shall be submitted to the Commission prior to completion of restoration activities. The site shall be restored in accordance with the requirements of this condition within 18 months of termination.

11.3 Abandoned Turbines

The Permittee shall advise the Commission of any turbines that are abandoned prior to termination of operation of the project. The project, or any turbine within the project, shall be considered abandoned after one year without energy production and the land restored pursuant to Section 11.2 unless a plan is developed and submitted to the Commission outlining the steps and schedule for returning the project, or any turbine within the project, to service.

12.0 COMMISSION AUTHORITY AFTER PERMIT ISSUANCE

12.1 Final Boundaries

After completion of construction, the Commission shall determine the need to adjust the final boundaries of the site required for this project in accordance with Minn. R. 7854.1300, subp. 1. If done, this permit may be modified, after notice and opportunity for public hearing, to represent the actual site required by the Permittee to operate the Project authorized by this permit.

12.2 Expansion of Site Boundaries

No expansion of the site boundaries described in this permit shall be authorized without the approval of the Commission. The Permittee may submit to the Commission a request for a change in the boundaries of the site for the project. The Commission will respond to the requested change in accordance with applicable statutes and rules.

12.3 Periodic Review

The Commission shall initiate a review of this permit and the applicable conditions at least once every five years. The purpose of the periodic review is to allow the Commission, the Permittee, and other interested persons an opportunity to consider modifications in the conditions of this permit. No modification may be made except in accordance with applicable statutes and rules.

12.4 Modification of Conditions

After notice and opportunity for hearing, this permit may be modified or amended for cause, including but not limited to the following:

(a) violation of any condition in this permit;

(b) endangerment of human health or the environment by operation of the project; or

(c) existence of other grounds established by rule.

12.5 More Stringent Rules

The Commission's issuance of this permit does not prevent the future adoption by the Commission of rules or orders more stringent than those now in existence and does not prevent the enforcement of these more stringent rules and orders against the Permittee.

12.6 Right of Entry

Upon reasonable notice, presentation of credentials, and at all times in compliance with the Permittee's site safety standards, the Permittee shall allow representatives of the Commission to perform the following:

(a) to enter upon the facilities easement of the site property for the purpose of obtaining information, examining records, and conducting surveys or investigations;

(b) to bring such equipment upon the facilities easement of the property as is necessary to conduct such surveys and investigations;

(c) to sample and monitor upon the facilities easement of the property; and

(d) to examine and copy any documents pertaining to compliance with the conditions of this permit.

12.7 Proprietary Information

Certain information required to be filed with the Commission under this permit may constitute trade secret information or other type of proprietary information under the Data Practices Act or other law. The Permittee must satisfy requirements of applicable law to obtain the protection afforded by the law.

13.0 PERMIT AMENDMENT

This permit may be amended at any time by the Commission in accordance with Minn. R. 7854.1300, subp. 2. Any person may request an amendment of the conditions of this permit by submitting a request to the Commission in writing describing the amendment sought and the reasons for the amendment. The Commission will mail notice of receipt of the request to the Permittee. The Commission may amend the conditions after affording the Permittee and interested persons such process as is required.

14.0 TRANSFER OF PERMIT

The Permittee may request at any time that the Commission transfer this permit to another person or entity. The Permittee shall provide the name and description of the person or entity to whom the permit is requested to be transferred, the reasons for the transfer, a description of the facilities affected, and the proposed effective date of the transfer. The person to whom the permit is to be transferred shall provide the Commission with such information as the Commission shall require to determine whether the new Permittee can comply with the conditions of the permit. The Commission may authorize transfer of the permit after affording the Permittee, the new Permittee, and interested persons such process as is required. The Commission may impose additional conditions on any new permittee as part of the approval of the transfer.

Within 20 days after the date of the notice provided in Section 10.5, the Permittee shall file a notice describing its ownership structure, identifying, as applicable:

(a) the owner(s) of the financial and governance interests of the Permittee;

(b) the owner(s) of the majority financial and governance interests of the Permittee's owners; and

(c) the Permittee's ultimate parent entity (meaning the entity which is not controlled by any other entity).

The Permittee shall immediately notify the Commission of:

(a) a change in owner(s) of the majority* financial or governance interests in the Permittee;

(b) a change in owner(s) of the majority* financial or governance interests of the Permittee's owners; or

(c) a sale which changes the parent entity of the Permittee.

**When there are only co-equal 50/50 percent interests, any change shall be considered a change in majority interest.*

The Permittee shall notify the Commission of:

(a) the sale of a parent entity or a majority interest in the Permittee;

(b) the sale of a majority interest of the Permittee's owners or majority interest of the

owners; or

(c) a sale which changes the entity with ultimate control over the Permittee.

15.0 REVOCATION OR SUSPENSION OF PERMIT

The Commission may take action to suspend or revoke this permit upon the grounds that:

(a) a false statement was knowingly made in the application or in accompanying statements or studies required of the Permittee, and a true statement would have warranted a change in the Commission's findings;

(b) there has been a failure to comply with material conditions of this permit, or there has been a failure to maintain health and safety standards;

(c) there has been a material violation of a provision of an applicable statute, rule, or an order of the Commission; or

(d) the Permittee has filed a petition with the Commission requesting that the permit be revoked or terminated.

In the event the Commission determines that it is appropriate to consider revocation or suspension of this permit, the Commission shall proceed in accordance with the requirements of Minn. R. 7854.1300 to determine the appropriate action. Upon a finding of any of the above, the Commission may require the Permittee to undertake corrective measures in lieu of having this permit suspended or revoked.

16.0 EXPIRATION DATE

This permit shall expire 30 years after the date this permit was approved and adopted.

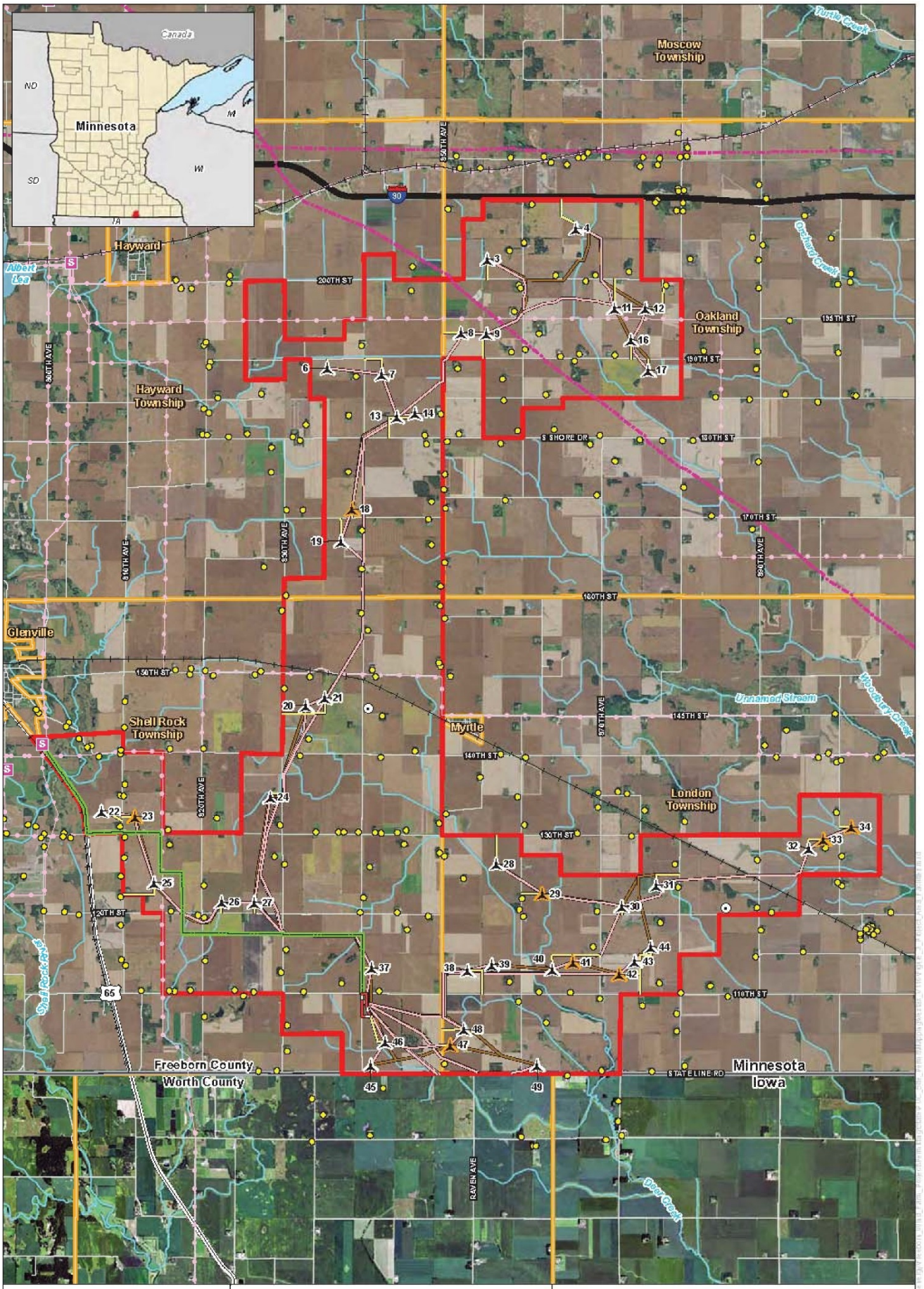


Figure 3
Project Area and Facilities

Freeborn Wind Fann
Freeborn County, MN

0.5
Miles
1 inch= 1 miles

Vestas V110-2.0
Vestas V116-2.0
Residential Structure
Permanent Met Tawer
Project Boundary
0 &M and Project Substation
River/Stream
Lake, Pond or Reservoir
Existing Substation
Existing Pipeline
Existing Transmission Une
Access Road
Collection Une
Crane Path
Proposed Transmission Line

MINNESOTA PUBLIC UTILITIES COMMISSION
COMPLAINT HANDLING PROCEDURES FOR
PERMITTED ENERGY FACILITIES

A. Purpose

To establish a uniform and timely method of reporting and resolving complaints received by the permittee concerning permit conditions for site preparation, construction, cleanup, restoration, operation, and maintenance.

B. Scope

This document describes complaint reporting procedures and frequency.

C. Applicability

The procedures shall be used for all complaints received by the permittee and all complaints received by the Minnesota Public Utilities Commission (Commission) under Minn. R. 7829.1500 or Minn. R. 7829.1700 relevant to this permit.

D. Definitions

Complaint: A verbal or written statement presented to the permittee by a person expressing dissatisfaction or concern regarding site preparation, cleanup or restoration or, television or communication signals, or other site and associated facilities permit conditions. Complaints do not include requests, inquiries, questions or general comments.

Substantial Complaint: A written complaint alleging a violation of a specific permit condition that, if substantiated, could result in permit modification or suspension pursuant to the applicable regulations.

Unresolved Complaint: A complaint which, despite the good faith efforts of the permittee and a person, remains unresolved or unsatisfactorily resolved to one or both of the parties.

Person: An individual, partnership, joint venture, private or public corporation, association, firm, public service company, cooperative, political subdivision, municipal corporation, government agency, public utility district, or any other entity, public or private, however organized.

E. Complaint Documentation and Processing

1. The permittee shall designate an individual to summarize complaints for the Commission. This person's name, phone number and email address shall accompany all complaint submittals.

2. A person presenting the complaint should to the extent possible, include the following information in their communications:

    a. name, address, phone number, and email address;
    b. date of complaint;
    c. tract or parcel number; and
    d. whether the complaint relates to a permit matter or a compliance issue.

3. The permittee shall document all complaints by maintaining a record of all applicable information concerning the complaint, including the following:

    a. docket number and project name;
    b. name of complainant, address, phone number and email address;
    c. precise description of property or parcel number;
    d. name of permittee representative receiving complaint and date of receipt;
    e. nature of complaint and the applicable permit condition(s);
    f. activities undertaken to resolve the complaint; and
    g. final disposition of the complaint.

F. Reporting Requirements

The permittee shall commence complaint reporting at the beginning of project construction and continue through the term of the permit. The permittee shall report all complaints to the Commission according to the following schedule:

Immediate Reports: All substantial complaints shall be reported to the Commission the same day received, or on the following working day for complaints received after working hours. Such reports are to be directed to the Commission's Consumer Affairs Office at 1-800-657-3782 (voice messages are acceptable) or consumer.puc@state.mn.us. For e-mail reporting, the email subject line should read "PUC EFP Complaint" and include the appropriate project docket number.

Monthly Reports: During project construction and restoration, a summary of all complaints, including substantial complaints received or resolved during the preceding month, shall be filed by the 15th of each month to Daniel P. Wolf, Executive Secretary, Public Utilities Commission, using the eDockets system. The eDockets system is located at: https://www.edockets.state.mn.us/EFiling/home.jsp

If no complaints were received during the preceding month, the permittee shall file a summary indicating that no complaints were received.

G. Complaints Received by the Commission

Complaints received directly by the Commission from aggrieved persons regarding site preparation, construction, cleanup, restoration, operation and maintenance shall be promptly sent to the permittee.

H. Commission Process for Unresolved Complaints

Commission staff shall perform an initial evaluation of unresolved complaints submitted to the Commission. Complaints raising substantial permit issues shall be processed and resolved by the Commission. Staff shall notify the permittee and appropriate persons if it determines that the complaint is a substantial complaint. With respect to such complaints, each party shall submit a written summary of its position to the Commission no later than ten days after receipt of the staff notification. The complaint will be presented to the Commission for a decision as soon as practicable.

I. Permittee Contacts for Complaints and Complaint Reporting

Complaints may filed by mail or email to:

Dan Litchfield, Project Developer
120 East Main Street
Glenville, MN 55036
(312) 582-1057
freebornwind@invenergyllc.com

This information shall be maintained current by informing the Commission of any changes as they become effective.

MINNESOTA PUBLIC UTILITIES COMMISSION
COMPLIANCE FILING PROCEDURE FOR
PERMITTED ENERGY FACILITIES

A. Purpose

To establish a uniform and timely method of submitting information required by Commission energy facility permits.

B. Scope and Applicability

This procedure encompasses all known compliance filings required by permit.

C. Definitions

Compliance Filing: A filing of information to the Commission, where the information is required by a Commission site or route permit.

D. Responsibilities

1. The permittee shall file all compliance filings with Daniel P. Wolf, Executive Secretary, Public Utilities Commission, through the eDockets system. The eDockets system is located at: https://www.edockets.state.mn.us/EFiling/home.jsp

General instructions are provided on the eDockets website. Permittees must register on the website to file documents.

2. All filings must have a cover sheet that includes:

    a. Date
    b. Name of submitter/permittee
    c. Type of permit (site or route)
    d. Project location
    e. Project docket number
    f. Permit section under which the filing is made
    g. Short description of the filing

3. Filings that are graphic intensive (e.g., maps, engineered drawings) must, in addition to being electronically filed, be submitted as paper copies and on CD. Paper copies and CDs should be sent to: 1) Daniel P. Wolf, Executive Secretary, Minnesota Public Utilities Commission, 121 7th Place East, Suite 350, St. Paul, MN 55101-2147, and 2) Department of Commerce, Energy Environmental Review and Analysis, 85 7th Place East, Suite 500, St. Paul, MN 55101-2198.

PERMIT COMPLIANCE FILINGS[1]

PERMITTEE: Freeborn Wind Energy LLC
PERMIT TYPE: LWECS Site Permit
PROJECT LOCATION: Freeborn County
PUC DOCKET NUMBER: IP6946\WS-17-410

Filing Number	Permit Section	Description of Compliance Filing	Due Date
1	4.7	Prairie Protection and Management Plan	30 days prior to submitting Site Plan, as deemed necessary
2	4.12	Notification to Airports	Prior to project construction
3	5.1	Notification of Permit and Complaint Procedures	30 days of permit issuance
4	5.2.1	Field Representative	14 days prior to commencing construction
5	5.2.2	Site Manager	14 days prior to commercial operation
6	5.2.6	National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater Permit	In accordance with Minnesota Pollution Control Agency
7	5.2.9	Notification of Pesticide Application	14 days prior to application
8	5.2.10	Invasive Species Protection Plan	14 days prior to pre-construction meeting
9	5.2.12	Identification of Roads	14 days prior to pre-construction meeting

[1] This compilation of permit compliance filings is provided for the convenience of the permittee and the Commission. It is not a substitute for the permit; the language of the permit controls.

Filing Number	Permit Section	Description of Compliance Filing	Due Date
10	5.2.16	Assessment of Television and Radio Signal Reception, Microwave Signal Patterns, and Telecommunications	14 days prior to pre-construction meeting
11	5.2.21	Site Restoration	60 days after completion of restoration
12	5.2.25	Public Safety/Education Materials	Upon request
13	5.4	Engineered Drawings of Collector and Feeder Lines	Submit with the Site Plan
14	5.5.2	Filing Regarding Other Required Permits	14 days prior to pre-construction meeting
15	7.1	Biological and Natural Resource Inventories	30 days prior to pre-construction meeting
16	7.2	Shadow Flicker Data	14 days prior to pre-construction meeting
17	7.3	Wake Loss Studies	14 days prior to pre-construction meeting and annual wake loss with annual report
18	7.4	Post-Construction Noise Methodology	14 days prior to pre-construction meeting
19	7.4	Post-Construction Noise Study	14 months of commercial operation
20	7.5.1	First Annual Audit and Revision of Avian and Bat Protection Plan	14 days prior to pre-construction meeting
21	7.5.1	Annual Report - Avian and Bat Protection Plan	15th of March each year or partial year

Filing Number	Permit Section	Description of Compliance Filing	Due Date
22	7.5.2	Quarterly Incident Reports	15th of January, April, July, and October the day following commercial operation
23	7.5.3	Immediate Incident Reports	24 hours of discovery and a report within 7 days
24	8.1	Demonstration of Wind Rights	14 days prior to pre-construction meeting
25	8.2	Power Purchase Agreement	If not obtained within two years issuance of permit
26	8.3	Failure to Construct	If within two years issuance of permit
27	10.0	Complaint Procedures	Prior to start of construction
28	10.1	Pre-Construction Meeting Summary	14 days following meeting
29	10.2	Pre-Operation Meeting Summary	14 days following meeting
30	10.3	Site Plan	14 days prior to pre-construction meeting
31	10.4	Construction Status Reports	Monthly
32	10.5	Commercial Operation	3 days prior to commercial operation
33	10.6	As-Builts	90 days after completion of construction

Filing Number	Permit Section	Description of Compliance Filing	Due Date
34	10.7	GPS Data	90 days after completion of construction
35	10.8	Project Energy Production	February 1st following each complete or partial year of project operation
36	10.9	Wind Resource Use	February 1st following each complete or partial year of project operation
37	10.10	Emergency Response Plan	14 days prior to pre-construction meeting and revisions 14 days prior to pre-operation meeting
38	10.11	Extraordinary Event	Within 24 hours of discovery
39	11.1	Decommissioning Plan	60 days prior to pre-operation meeting
40	14.0	Notice of Ownership	14 days after operation