DICKINSON WRIGHT PLLC

150 E. GAY STREET, 24TH FLOOR
COLUMBUS, OH 43215-3192
TELEPHONE: (614) 591-5461
FACSIMILE: (844) 670-6009
http://www.dickinsonwright.com

CHRISTINE M.T. PIRIK
CPirik@dickinsonwright.com

December 13, 2021

Ms. Tanowa Troupe, Secretary
Ohio Power Siting Board
Docketing Division
180 East Broad Street, 11th Floor
Columbus, Ohio 43215-3797

Re: **Case No. 20-417-EL-BGN -**In the Matter of the Application of Grover Hill Wind, LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Wind-Powered Electric Generation Facility in Paulding County, Ohio.

Response to Eighth Data Request from Staff of the Ohio Power Siting Board

Dear Ms. Troupe:

Attached please find Grover Hill Wind, LLC's ("Applicant") Response to the Eighth Data Request from the staff of the Ohio Power Siting Board ("OPSB Staff"). The Applicant provided this response to OPSB Staff on December 13, 2021.

We are available, at your convenience, to answer any questions you may have.

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
(Counsel of Record)
Terrence O'Donnell (0074213)
William V. Vorys (0093479)
Matthew C. McDonnell (0090164)
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
Columbus, Ohio 43215
Phone: (614) 591-5461
cpirik@dickinsonwright.com
todonnell@dickinsonwright.com
wvorys@dickinsonwright.com
mmcdonnell@dickinsonwright.com
Attorneys for Grover Hill Wind Project, LLC

Cc: Jim O'Dell
Theresa White
Randall Schumacher
Jon Pawley

CERTIFICATE OF SERVICE

The Ohio Power Siting Board's e-filing system will electronically serve notice of the filing of this document on the parties referenced in the service list of the docket card who have electronically subscribed to these cases. In addition, the undersigned certifies that a copy of the foregoing document is also being served upon the persons below this 13th day of December, 2021.

/s/ Christine M.T. Pirik
Christine M.T. Pirik (0029759)

Counsel:

werner.margard@OhioAGO.gov

Administrative Law Judge:

greta.see@puco.ohio.gov
david.hicks@puco.ohio.gov

4883-8892-7750 v1 [73809-23]

BEFORE
THE OHIO POWER SITING BOARD

In the Matter of the Application of Grover Hill Wind, LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Wind-Powered Electric Generation Facility in Paulding County, Ohio.	))))	Case No: 20-417-EL-BGN

GROVER HILL WIND, LLC 'S
RESPONSE TO THE EIGHTH DATA REQUEST
FROM THE STAFF OF THE OHIO POWER SITING BOARD

On May 3, 2021, as supplemented on June 7, 2021, Grover Hill Wind, LLC ("Applicant") filed an application ("Application") with the Ohio Power Siting Board ("OPSB") proposing to construct a wind-powered electric generation facility in Paulding County, Ohio ("Project").

On December 4 and 7, 2021, the Staff of the OPSB ("OPSB Staff") provided the Applicant with OPSB Staff's Eighth Data Request. Now comes the Applicant providing the following response to the Eighth Data Request from the OPSB Staff.

Recreation

1. Please provide an updated Table 21 to reflect current turbine location plans, specifically as it relates to Welcome Park, which is stated to be 0.40 miles southeast of T-25 in the application.

Response: Several of the original recreational areas were measured to the perceived center point of the recreational feature. Current distances are based on distances from turbine to property edge. The alteration in distance is a factor of point of reference for the recreational area, not a movement of the turbine location. The following table is an updated version of the table provided in the Application with an added column ("Change from Previous Table [Mile] (mi)"). This Table 21 replaces and supersedes the table filed with the Application on May 3, 2021. No recreational areas have been added or removed from the original table.

Table 21
Recreational Areas within a 10-Mile Radius of the Facility

Recreation Area	Location	Distance from Nearest Turbine	Change from Previous Table (mi)
Flat Rock Creek Wilderness Area	S of Junction	9.1 miles N of T-11	
Charloe Community Park	Charloe	7.0 miles N-NE of T-16	
Melrose Town Park	Melrose	5.1 miles NW of T-16	
Oakwood Community Park	Oakwood	6.6 miles NE of T-16	
Cascade Wayside Wildlife Area	E of Cloverdale	9.3 miles E of T-36	-0.2
Cascade Park	E of Cloverdale	9.3 miles E of T-36	0.1
Putnam County Wildlife Area 3	W of Cloverdale	6.8 miles E of T-36	
Ottoville Quarry Wilderness Area	N of Ottoville	8.0 miles SE of T-36	-0.1
fountain park	Van Wert	9.5 miles S-SW of T-37	
Wesley park	Van Wert	9.1 miles S-SW of T-37	-0.1
Jubilee Park	Van Wert	8.7 miles S-SW of T-37	-0.2
Bresler Park	Scott	4.2 miles W of T-37	
Flat Rock Creek Nature Preserve	SW of Paulding	8.9 miles NW of T-40	
Latty Town Park	Latty	4.8 miles NW of T-11	
Paulding Reservoir Park	Paulding	6.7 miles NW of T-11	-0.3
Black Swamp Nature Center	Paulding	7.0 miles NW of T-11	-0.1
Paulding County Fairgrounds	Paulding	7.0 miles NW of T-11	
La Fountain Park	Paulding	7.7 miles NW of T-11	0.1
Paulding Athletic Field	Paulding	7.8 miles NW of T-11	0.2
Welcome Park	Grover Hill	0.26 miles SE of T-25	-0.14

2. Are there any planned visual impact mitigation efforts for Welcome Park, such as vegetative screening, or economic mitigation?

Response: The Project did not propose a mitigation as the function of the park will not be adversely impacted by the proximity of Turbine 25.

Geotech/Water

3. Page 8 of the 11/16/21 geotechnical report discusses the results of the rock coring performed which indicated the majority of the rock cores revealed small dissolution features (i.e. vugs) commonly associated with karst bedrock environments. The report indicates "A detailed karst/sinkhole study was beyond the scope of this investigation. Additional on-site testing and analysis may be performed to further

evaluate the potential for karst features if the risk is considered unacceptable to the Owner. Supplemental borings with video logging may be performed at select WTG locations to better assess the risk of subsurface voids." Please describe what is meant by "unacceptable to the owner."

Response: As detailed in the Geotechnical Report filed in response to data requests from the OPSB Staff on November 16, 2021, the potential for development of surficial sinkholes on the proposed Project site is considered low due to the presence of relatively small dissolution features encountered and lack of mapped karst features in the region. The reference to "unacceptable" reflects that, since the risk of substantial voids is considered low, additional karst studies, such as video-logging additional boreholes, is unnecessary.

4. **The 8/24/21 response to Staff's Third data request speaks to disposal of both sewage and wastewater to an onsite septic system. Please list all sources of potential wastewater. The response lists where (laydown yard during construction and O&M building during operation) the wastes will be generated, but does not specify what the wastes or potential waste sources will be.**

Response: The wastewater source will be grey water at the temporary laydown yard during construction and the operations and maintenance ("O&M") building during operation.

5. **Has the Applicant confirmed/ground truthed the precise locations of the water wells discussed in response #2 to the Third data request?**

Response: No. The Applicant has not confirmed the precise locations of the water wells. During the geotechnical investigation, piezometers were placed immediately adjacent to the borehole at each turbine location. The piezometer coordinates were provided on the boring logs in Appendix A of the Geotechnical Report filed on November 16, 2021 and will be used to confirm the location of the water wells prior to construction.

6. **The 9/17/21 supplemental response to Third data request indicates:**

"*During the drilling operations, groundwater was encountered between 21-30 feet bgs in 6 of the 29 borings. Piezometers were placed within each of the bores at each of the*

***23 turbine locations. Readings will be collected at a future data after the piezometers have time to equilibrate. It is important to note that the 6 (of 7) readings acquired during the field investigations indicate a Static Water Level more than 20 feet. This is a greater depth than indicated in wells previously recorded within project footprint. This depth is below the anticipated shallow spread footing depth of 11 feet bgs.*"**

The readings noted above averaged a depth to water at 22.4 feet bgl. Readings (provided by the 11/16 fourth supplement to the Third data request) taken from these same wells 13-25 days later averaged a depth of 10.28 feet bgl. Three sites had water levels ranging from 5.8-6.3 feet bgl. Overall, 22 of 23 (one not checked due to land access issues) turbine sites piezometers show an average depth to water at 10.5 feet bgs. 15 of the sites measured 11 feet or less. Section 4.4.4 of the Geotech report discusses potential buoyancy forces caused by shallow groundwater across the site. The report states: Foundations bearing below groundwater should be designed to resist overturning while accounting for buoyant forces. The foundation designer may consider providing at least two different foundation designs based on varying depths to groundwater. Please discuss specifically, how buoyant forces will be accounted to ensure a stable foundation for the operational life of the proposed turbine sites.

Response: Per Section 4.4.4 of the Geotechnical Report filed on November 16, 2021, the buoyant forces are to be accounted for by the foundation engineering designer. Buoyant foundation design consists of increasing the size (i.e., diameter/weight) of the foundation to counteract the buoyant forces and overturning. Designing turbine foundations to resist buoyant forces is standard practice in the industry.

7. Were any water level measurements taken at the proposed substation site or METs?

Response: Water level measurements were taken in the boreholes at the time of drilling and groundwater was not observed within the drilled depths, as noted as "did not encounter" ("DNE") on the boring logs.

8. What will be the water source for dust suppression and concrete? The onsite water wells discussed on page 72 of the application?

Response: Prior to the beginning of construction, the contractor will make arrangements to acquire water for both dust suppression and concrete supply as needed. The contractor

will hire a company that will transport the water to the Project site during construction activities.

9. **In reviewing the RQD and SPT results in Appendix B of the 11/16/21 geotechnical report, the SPT values for the upper 5.5 feet of the Sub-02 boring indicates soft ground. Does the Applicant anticipate this to create any potential foundation issues? Or is over-excavation and placement of engineered fill the primary abatement plan?**

Response: The soft soil noted at Sub-02 is associated with fill, and Section 4.6.1 of the Geotechnical Report filed on November 16, 2021, recommends that any uncontrolled fill encountered at the substation should be removed and replaced with imported structural fill.

Per Section 4.2.4 of the Geotechnical Report, subgrade will be inspected by the construction-phase geotechnical engineer to ensure adequate bearing capacity. Should unsuitable subgrade be encountered, over-excavation and replacement is the primary mitigation method.

10. **Page 10 of the report indicates RQD as low as 0%. Does Appendix B confirm this? No 0% values appear to be shown.**

Response: The rock core sample RC-02 at turbine location T-31 recorded an RQD of 0.

System Impact/Costs

11. **Page 31 of the Application for 20-0417-EL-BGN, referring to the System Impact Study, states that, "The Applicant will obtain all necessary permits for the facilities, and the Applicant will be responsible for construction costs." Page 13/24 of the System Impact Study of December 2020 for PJM queue AE1-245 states that the cost of upgrades to the AEP North Delphos-Rockhill 138-kV transmission line would be $24.5 million, and the cost allocated to AE1-245 would be $0. Please explain the apparent discrepancy, and identify the costs to be allocated to the Applicant, to AE1-245, and to AEP.**

Response: Section 11.6 of the System Impact Study ("SIS") identifies a $24.5 million reinforcement as upgrade number S1563.2. Please refer to the excerpt from the SIS report below:

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AE1-245	Upgrade Number
617264,618592, 618591	1	05NDELPH 138.0 kV - 05E SIDE 138.0 kV Ckt 1	PJM Supplemental Project S1563.2: North Delphos-Rockhill 138 kV: Rebuild 15.4 miles of double circuit 138 kV line utilizing 1033 ACSR conductor. SE Rating after S1563.2 is complete: S/E:251 MVA Projected IS Date is Dec 2024. An interim study will be required for AE1-245 if they want to come into service prior to completion of S1563.2. Note: if the supplemental project is cancelled, AE1-245 may become responsible for upgrading this line.	$24.5 M	$0	S1563.2

In the PJM Transmission Expansion Advisory Committee ("TEAC") April 2020 Report, TEAC identifies the following contingencies:

> AEP Transmission Zone AEP FERC 715 Transmission Owner Planning Criteria violations were identified in the Niles area. Niles-Simplicity 34.5 [kilovolt] kV is overloaded for the N-1 loss of the Niles 69/34 kV transformer, Niles 69 kV bus, or any of the Niles 69 kV breakers. There are multiple identified N-1-1 thermal and voltage issues in the Niles area.

TEAC recommended, and the PJM Board of Directors approved, the following projects to resolve the contingency identified as project S1563.2:

1) North Delphos – Rockhill 138 kV: Rebuild 15.4 miles of double circuit 138 kV line utilizing 1033 ACSR 1033 ACSR conductor (296 mega volt amp ["MVA"] rating).

2) S1563.1: Haviland – North Delphos 138 kV: Rebuild 15.6 miles of double circuit 138 kV line utilizing 1033 ACSR conductor (296 MVA rating) Estimated Project Cost: $24.5 million.

The cost allocations for the two recommended projects were calculated in accordance with Schedule 12 of the Open Access Transmission Tariff ("OATT") and by using a distribution factor methodology that allocates cost to the load zones that contribute to the loading on the new facility. As approved by PJM Board of Managers and the Federal Energy Regulatory Agency ("FERC"), AEP Transmission is responsible for 100% of the costs related to S1563.2.

High Winds

12. The history of thunderstorms, 'strong wind', and tornadoes before 2010 does not satisfy the requirements of Rule 4906-4-08 (A)(6), Wind Velocity. A tabulation of observed wind speeds and their frequencies or probabilities of occurrence obtained from nearby airports or weather stations, would be more suitable. Actual wind speeds are much more useful and desirable than average wind speeds.

Response: Daily wind velocity data was compiled for a ten-year period between January 1, 2011 and December 31, 2020, from the Fort Wayne International Airport Station[1]. A review of on-line resources indicated that the data from the Fort Wayne Station represented the most consistent (daily) data source for the greater region. While data from other resources more proximal to the immediate project area, the Fort Wayne data presented a greater time-depth by which to assess trends and frequencies of wind velocities in the region.

According to the compiled data, the average daily wind velocity for the area is 9.1 miles per hour (mph) / 4.1 meters per second (m/s). The average daily maximum wind velocity

[1] https://www.wunderground.com/history/daily/us/oh/haviland/KFWA

for the area is 16.7 mph / 7.5 m/s. This data was reviewed to determine the number of days per year the average daily wind velocity and the average maximum wind velocity was exceeded. The results of that analysis are provided in the following table.

Year	Days Exceeding Average Daily Wind Velocity (9.1 mph / 4.1 m/s)	Days Exceeding Maximum Average Daily Wind Velocity (16.7 mph / 7.5 m/s)
	(count / percent)	(count / percent)
2011	40 / 10.9%	2 / 0.5%
2012	144 / 39.5%	9 / 2.5%
2013	148 / 40.5%	8 / 2.2%
2014	166 / 45.5%	1 / 0.3%
2015	166 / 45.5%	11 / 3.0%
2016	154 / 42.2%	7 / 1.9%
2017	175 / 47.9%	5 / 1.4%
2018	166 / 45.5%	3 / 0.8%
2019	170 / 46.6%	9 / 2.5%
2020	156 / 42.7%	7 / 1.9%
Total for 10 Year Period	**1,485 / 40.7%**	**62 / 1.7%**

The same data source also provides average monthly values for average maximum wind velocity (greatest documented wind velocity within a calendar month) and average maximum wind gust velocity (greatest documented wind gust velocity within a calendar month). According to the compiled data for the years between 2011 and 2020, the average maximum monthly wind velocity was 33.1 mph / 14.8 m/s and the maximum monthly wind gust velocity was 46.7 mph / 20.8 m/s. This data was reviewed to determine the number of months per year the average maximum wind velocity and the average maximum wind gust velocity was exceeded. The results of that analysis are provided in the following table.

Year	Months Containing Events Exceeding Average Maximum Monthly Wind Velocity (33.1 mph / 14.8 m/s)	Months Containing Events Exceeding Maximum Monthly Average Wind Gust Velocity (46.7 mph / 20.8 m/s)
	(count / percent)	(count / percent)
2011	2 / 16.6%	4 / 33.3%
2012	7 / 58.3%	6 / 50.0%
2013	7 / 58.3%	4 / 33.3%
2014	2 / 16.6%	2 / 16.6%
2015	7 / 58.3%	7 / 58.3%
2016	5 / 41.6%	4 /33.3%
2017	5 / 41.6%	4 / 33.3%
2018	4 / 33.3%	4 / 33.3%
2019	5 / 41.6%	8 / 66/6%
2020	5 / 41.6%	8 / 66.6%
Total for 10 Year Period	**49 / 40.8%**	**51 / 42.5%**

13. Page 80 (100/209) of the Application states that "The wind turbines proposed for the facility are rated to withstand wind speed well in excess of those likely to occur in the Project Area". Please provide any analysis that was done, including wind speeds, tower dimensions, flange connections, and drag coefficients used, and the resulting drag forces, torques, and induced stresses in the tower and blades that were obtained.

Response: The proposed wind turbines rating indicates the ability to withstand high wind speeds. The rating is provided by the manufacturer in the wind turbine manufacturer technical specifications. Details regarding manufacturer testing protocols and mechanical load analyses ("MLA") conducted to establish these ratings are held confidential by the turbine manufacturer and the Applicant does not have access to the specific testing protocols and MLA information.

14. Page 15 (35/209) of the Application describes the Meteorological Towers as self-supporting, non-guyed, free-standing structures. Will these be anchored at the base to any concrete slab or other base mat?

Response: Yes. The meteorological tower foundations will be anchored at the base.

15. Will the Meteorological Towers also measure wind speed?

Response: Yes. The meteorological towers will be fitted with anemometers to measure wind speeds.

16. Will the wind data collected at the Towers be used to support daily operations as well as performance testing?

Response: Yes. The wind data collected by the meteorological towers will be used to support the daily operations of the facility and to conduct performance tests.

17. What is the reference wind speed to be used to define the wind turbine classes at this Facility?

Response: The reference wind speed to define the wind turbine class is 35.8 m/s.

18. When would the user-defined parameters for the IEC Class S winds be available for the areas of the Project?

Response: The International Electrotechnical Commission ("IEC") Class S winds user-defined parameters will be compiled after final turbine selection.

Blade Shear

19. Page 80 of the Application states that the Vestas V150-4.5 MW is certified for IEC IIIB winds which have annual average wind speed of 7.5 m/sec and an extreme wind speed of 52.5 m/sec. But Table 1, page 30 of the IEC 61400 standard shows the maximum speed (Tropical) to be 57 m/sec. Similarly for the Siemens Gamesa GS 5.0 with IIB extreme speed shown as 59.5 in the Application, but 57 m/sec in Table 1 of the IEC 61400. And a similar situation for the Vestas V162. Please explain the discrepancies between numbers in the Application and the IEC 61400 Table 1.

Response: The summary data provided on page 80 of the Application filed on May 3, 2021, represented the prescribed wind classes for each of the proposed turbine models. Wind classes are defined by the **reference speed** for the region of installation. In the Application, the annual average wind speed for the various turbine classes was provided. The extreme wind speed value provided was not indicative of the reference speed used to define the wind class, but rather an extreme wind velocity of proposed turbine models. In some cases, these extreme tolerance levels are in excess of the maximum value defined for the wind class which accounts for the discrepancy with the cited values in the IEC 61400.

For clarification, the following table is provided to indicate the wind class values for the proposed turbines.

Turbine Model	Wind Class	Annual Average Wind Speed (Vavg)	Reference Wind Speed (Vref)
GE 3.03-140	IEC S	TBD	TBD
Vestas V150-4.5	IEC IIIB	7.5 m/s	37.5 m/s
Siemens Gamesa SD 5.0-145	IEC IIB	8.5 m/s	42.5 m/s
Vestas V162-6.0	IEC S	TBD	TBD

The long-term average wind speed predicted at the site meteorological tower 4581 at 119-m AGL is 7.17 m/s and the Vref is = 35.8 m/s. This classifies the site as IEC III. The wind turbines being considered for this Project are suitable for IEC III conditions. The turbines provided with the wind class of "IEC S" require wind data to be submitted to the turbine manufacturer for specific review.

20. Page 81 of the Application says that the Facility setbacks consist of a minimum of 1391 feet between turbine sites and adjacent non-participating property lines. It further states that the distance from proposed turbine locations to the nearest non-participating property line would range from 700 feet to 3430 feet, which means a

minimum of 700 feet. Please explain this apparent discrepancy of minimum distances between turbines and the non-participating property lines.

Response: The 700-foot minimum distance value was provided by mistake. This value is an artifact from an earlier iteration of the Application text. The value was derived from an earlier data set that included pending lease information that had changed prior to filing the Application. As referenced in Table 14 of the Application filed on May 3, 2021, the closest non-participating parcel is 1,394.2 feet ("ft").

21. At what rotational speed (rpm) would the blades separate from the hub of the turbine?

Response: The rotor blades of wind turbines are driven by the wind energy and transform wind energy to mechanical energy. Because blades often suffer alternating stress and complex environments, they can experience failure due to fatigue, fracture, crack, wear, freezing, and sensor failures. In simple designs for wind turbines, the blades are directly bolted to the hub and are unable to pitch, which leads to aerodynamic stall above certain windspeeds. The hub is fixed to the rotor shaft which drives the generator directly or through a gearbox.

Please refer to answer provided for Question 22.

22. At what rotational speed (rpm) would the blades be expected to shear or fail?

Response: All rotating machines have critical speeds. For wind turbines, critical speed is a RPM at which rotating frequency of turbine rotor coincides with natural frequency of the machine causing it to vibrate violently.

The blades are the most intensively stressed components of the whole wind turbine structure. They are the components most likely to be damaged by the interaction with the ambient environment. They can be exposed to strong storm winds, rain drops, or hail falling with velocities higher than 100 m/s, lightning, repeated wind loads, and shear effects, which can introduce intensive hammer or fatigue loads, potentially causing a number of different types of structural damage.[2]

The rotor operational speed range varies depending on the wind turbine model and manufacturer. Any deviations outside the operational range will cause the turbine to stop. There are many systems that measure the operational "wellbeing" of the rotor. There are rotor sensors that measure speed, there are blade pitch sensors that measure angle of the blade relative to the wind, there are vibration sensors that measure how much is being applied to the tower, and there are controls that ensure the operating parameters of rotor speed, blade pitch, and vibration are being met. If the turbine is not operating as expected, the turbine control will alarm and/or shut down the operation of the turbine, dependent on the severity.

As for the overspeed of the rotor, if a wind turbine rotor speed exceeds the manufacturer's critical speed, the turbine will immediately emergency stop by pitching the blades to the full feather position, the rotor disc brake will be applied to help slow the rotation of the rotor as fast as possible, and the grid connection to the generator will be

[2] Katsaprakakis, D.A.; Papadakis, N.; Ntintakis, I. A Comprehensive Analysis of Wind Turbine Blade Damage. Energies 2021, 14, 5974. https://doi.org/10.3390/ en14185974 https://www.mdpi.com/1996-1073/14/18/5974/pdf

disconnected. Once a turbine has been emergency stopped, it is not possible to remotely restart the turbine. A technician must enter the turbine and evaluate whether or not it is safe to restart.

For the reasons stated in the previous paragraphs, there is no known reason for turbine manufacturers to test a turbine to overspeed range to determine the rotational speed for which the blades separate from the hub of the turbine. Nor is there a known reason for GE to have tested a turbine to overspeed range to determine the rotational speed for which the blades will be expected to shear or fail. Therefore, there is no average RPM calculation available.

Ice Throw

23. What is the material of which the blades are made? What were the variables in the Monte Carlo simulation of Ice Throw?

Response: The blades are carbon fiber and fiberglass. The Monte Carlo ("MC") model calculation consists of parameters that are both variable and static. The MC simulation varies the following parameters over 1 million iterations.

Variable Parameters	Static Parameters
Wind speed Wind Direction Launch Radius Blade Azimuth Angle	Air Density Average Frontal Area of the ice fragment Drag Coefficient Gravitational Acceleration Mass of ice fragment Blade Radius Hub Height Rated RPM of Rotor

24. What range of values of Angular Velocity (RPM) and Tip Speed were used in the simulation?

Response: The range of Angular Velocity is 0 to 12.1 RPM, and the tip speed 0 to 102.6 m/s.

25. Was any air resistance used in the calculation of distance traveled by the ice fragments?

Response: Yes. A drag coefficient of 1 was used in the ice throw simulations.

26. If air resistance was neglected, how is the range or distance traveled for the 1.0 kg fragment different from the 0.5 kg fragment?

Response: Air resistance was included in the simulations and the estimated throw distances for both 1.0 kilograms ("kg") and 0.5 kg ice fragments were provided in the Ice Throw model results.

27. If air resistance was included, what was the value of the Drag Coefficient used?

Response: The drag coefficient used in the Monte Carlo simulation was one (1).

28. If air resistance was included, what was the value of the ice density used?

Response: The air density used was 1.25 kg/m.[3] The area and mass of the ice fragment considered used an average frontal area size of 0.01 m and mass was either 0.5 kg or 1 kg.

29. Please provide the equation that was used to calculate distances traveled by the fragments.

Response: The equation to calculate distances traveled by fragments are:

[3] Equations from page 6 of the "Wind Turbine Icing And Public Safety - A Quantifiable Risk?" https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.558.1329&rep=rep1&type=pdf#:~:text=Initial%20work%20has%20resulted%20in,significant%20risk%20from%20ice%20fragments.

$$m\ddot{x} = -\tfrac{1}{2}\rho AC_D W\dot{x}$$
$$m\ddot{y} = -mg - \tfrac{1}{2}\rho AC_D W\dot{y}$$
$$m\ddot{z} = -\tfrac{1}{2}\rho AC_D W(\dot{z} - V)$$

where, ρ = *air density*

A = *average frontal area of ice fragment*

C_D = *drag coefficient of fragment*

V = *wind speed (assumed uniform)*

$W = \sqrt{\dot{x}^2 + \dot{y}^2 + (\dot{z} - V)^2}$ *(relative wind speed)*

g = *gravitational acceleration*

m = *mass of ice fragment*

30. What is the definition of an "icing day" as used in section 2.0 Wind Turbine Icing?

Response: An Icing Day is a day on which the air temperature does not go above freezing (0 °C or 32 °F).

31. Please explain what is meant by "drop" when addressing the ice throw simulation.

Response: Drop in the ice throw simulation is a condition when ice falls from the turbine blade when it is not spinning. Depending on the angle the blade is positioned when it is stationary and where along the blade length the ice falls from, there is a range of distances where the ice falls away from the turbine base.

32. What is the minimum distance from any turbine to the nearest property boundary? To the nearest public road?

Response: For the largest turbine being considered for the Project (Vestas V162-6.0-119), the distance to the nearest public road is 222 m (727 ft). The nearest public road is Township Highway T18 running east-west, which is south of Turbine T38.

The nearest participating property is the boundary between land parcels 130-P and 143-P, which is 6 m (19.3 ft) north of turbine T25.

The nearest non-participating property boundary is the boundary between land parcels 73-P and 94-NP, which is 425 m (1,394 ft) southwest of turbine T13.

Public Information Meeting

33. Provide a summary of comments/questions received during the August 11 and 12, 2020 public informational meetings.

Response: During the virtual public information meetings hosted on August 11 and 12, 2020, a presentation of the Project was provided, with representatives of the Applicant and the OPSB speaking. Four community members spoke or asked questions during the August 11 and 12, 2020 meetings. A couple individuals raised questions about the effect of wind generation facilities on human health and property values. One individual asked whether the contractors would be permitted to go on her property if she did not give them permission and questioned what the sound level would be from the turbines, and how close the turbines would be from homes and the town of Grover Hill. Another person that lives in the Project area talked about the positive impacts from the facility, including the additional revenues that will support the schools and road repairs, and stated that the community overwhelmingly supports the Project.

Streams

34. Please provide a table summarizing delineated streams, including each stream name, HHEI or QHEI score, area of temporary impact, area of permanent impact, method of temporary impact (i.e. crane path), and method of permanent impact.

Response: Please note that the information presented in the following table may change as final project design, layout and engineering are completed. In the event there are changes to this information, Grover Hill Wind, LLC will provide the OPSB and update summary table.

Feature ID	Crossing Type	Impact Duration	Impact Square Feet	Latitude	Longitude	Watercourse Name	Assessment Type (HHEI or QHEI)	Assessment Score
WC-01a	Collection Line	Temporary	614	41.00992278	-84.48902905	Hoaghlin Creek	QHEI	**51**
WC-01b	Collection Line	Temporary	1159	41.01473698	-84.48643016	Hoaghlin Creek	QHEI	51
WC-01c	Collection Line	Temporary	827	40.999329	-84.48787079	Hoaghlin Creek	QHEI	51
WC-01d	Collection Line	Temporary	1477	41.00366113	-84.48848311	Hoaghlin Creek	QHEI	51
WC-02a	Collection Line	Temporary	272	41.01412756	-84.49021156	Hog Run	QHEI	27
WC-02b	Collection Line	Temporary	250	41.01571428	-84.48774534	Hog Run	QHEI	27
WC-02e	Collection Line	Temporary	170	41.00628324	-84.50861182	Hog Run	QHEI	27
WC-02f	Collection Line	Temporary	412	41.01031	-84.50170123	Hog Run	QHEI	27
WC-02f	Collection Line	Temporary	443	41.01026421	-84.50178863	Hog Run	QHEI	27
WC-02f	Crane Walk	Temporary	983	41.0098401	-84.50219026	Hog Run	QHEI	27
WC-02f	Collection Line	Temporary	395	41.00965935	-84.50235732	Hog Run	QHEI	27
WC-05a	Collection Line	Temporary	135	41.03750876	-84.49935484	Dog Run	QHEI	26
WC-05a	Crane Walk	Temporary	275	41.03695647	-84.50038263	Dog Run	QHEI	26
WC-05a	Collection Line	Temporary	138	41.03695647	-84.50038263	Dog Run	QHEI	26
WC-08	Crane Walk	Temporary	435	41.03026808	-84.50541755	Un-Named Road Ditch	HHEI	31
WC-08	Collection Line	Temporary	218	41.03026785	-84.50541755	Un-Named Road Ditch	HHEI	31

Threatened and Endangered Species

35. The BBCS indicates that a great-blue heron rookery was incidentally observed within the Project Area. Please provide the coordinates of this rookery. Does the applicant anticipate potential impacts to blue herons? What avoidance, minimization, or mitigation would the applicant propose for potential impacts?

Response: The great-blue heron rookery was incidentally observed at Lat 41.052567 / Long -84.463477, which is located within the northeastern portion of the Project area. The

closest planned Project facility to this rookery is Turbine #16 which is located approximately 7,920 ft (1.5 miles) southwest of the rookery. The Applicant has designed the layout of the Project to directly avoid the rookery, minimal to none impacts are expected.

To minimize potential impacts, construction activities in the vicinity of the rookery would be conducted outside of nesting periods while the rookery is in use. Additionally, the Applicant will conduct daily inspections of the rookery area prior to initiation of construction work to ensure the rookery is not in use. During operation, the Applicant will implement the Bird and Bat Conservation Strategy ("BBCS") to minimize and mitigate potential impacts to the rookery. The Applicant continues to coordinate and work with the United States Fish and Wildlife Service ("USFWS"), the Ohio Department of Natural Resources Division of Wildlife ("ODNR-DOW") concerning potential impacts to the rookery. The Applicant will keep OSPB informed as the BBCS plan is implemented.

36. Bald eagles have been observed within the project area. The USFWS letter stated that Companies should evaluate the risk to eagles posed by their facilities and determine whether to apply for an incidental eagle take permit (ETP). The basis of an ETP is the applicant's Eagle Conservation Plan, which is detailed in the Service's 2013 Eagle Conservation Plan Guidance (ECPG). The ECPG describes the process by which wind energy developers, operators, and their consultants can collect and analyze information that can inform a project's risk to eagles and whether application for an ETP is appropriate. Review and adherence to the ECPG should be the foundation of assessing eagle risk at a wind facility. Additional information on evaluating this project's risk to bald eagles can be found in the Attachment, Early Coordination for Assessing Eagle Risk at Wind Energy Installations. What steps has the applicant taken as a result of this recommendation? Has the applicant coordinated with the USFWS regarding this species? What does the applicant propose to avoid impacts to this species? Please provide any correspondence with USFWS on bald eagles.

Response: A habitat assessment, avian point count surveys, and ground-based nest surveys were conducted to help assess eagle use within and immediately surrounding the project area and to inform turbine design layout. No bald eagle nests were observed within the project area. A total of seven individuals were recorded during avian point count surveys. Based on the overall low to moderate risk factor for eagles on the site, based on USFWS guidelines, the Application has not to date pursued an eagle take permit ("ETP"). This permit is voluntary for operators of wind facilities in the United States. The Applicant requested comment from the USFWS, and other agencies, at the onset of the Project. Based on a lack of response to this request, additional bald eagle correspondence with USFWS has not occurred. The Applicant is committed to coordination with USFWS in the event that impacts occur. Turbine siting has been undertaken to place turbines away from potential eagle foraging or roosting habitat wherever possible. These design considerations and the evaluation of habitat and eagle use across the site are the primary factors undertaken by the Applicant to avoid eagle interactions with the facility infrastructure.

37. USFWS recommended the following: The Service has a summer record of one male and two female Indiana bats located within the 5- mile buffer along the eastern portion of the proposed project, which assumes a maternity colony of Indiana bats occurs within the portion of the project site that overlaps the 5-mile buffer area. If Indiana bats were present within the portion of the project site that overlaps the 5-mile buffer they could be detected with additional summer survey effort. Thus, there are two options for addressing summer risk to Indiana bats: 1) assume summer presence within the portion of the project site that overlaps the 5-mile buffer, or 2) conduct enhanced summer surveys to document presence or likely absence of Indiana bats in this area during the summer. If enhanced summer surveys do not detect Indiana bats, we would assume no summer risk of take from operation of turbines. If you elect to conduct enhanced summer surveys, please coordinate with our office to determine the appropriate level of effort. Has the Applicant conducted any enhanced surveys or coordinated with USFWS on operation risks to bats?

Response: The eastern portion of the Project area is considered to be known, occupied Indiana bat habitat. Grover Hill engaged Environmental Solutions & Innovations, Inc. ("ESI") to conduct mist net summer survey of the Project area to collect data within the Project area but outside of the area of known occupancy to be used to address presence/probable absence of Indiana bats (Exhibit P of Application filed on May 3, 2021). The Project occurs within range of the federally endangered Indiana bat (Myotis sodalis) and the federally threatened northern long-eared bat (Myotis septentrionalis). Mist netting was completed under the requirements under ODNR's On-shore Bird and Bat Pre- and Post-construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio (ODNR Wind Energy Guidelines) (ODNR 2009), and recommendations under the USFWS Land-based Wind Energy Guidelines (USFWS Wind Energy Guidelines) (USFWS 2012). Mist netting was completed to: 1) develop an understanding of bat species present on the wind project area; 2) determine locations of colonies of the federally threatened northern long-eared bat and federally endangered Indiana bat within or adjacent the wind project area; and 3) track any northern long-eared or Indiana bats to roosts.

On July 15, 2019, ESI submitted a study plan to USFWS and ODNR requesting approval and site-specific authorization to complete summer mist net surveys for the Project. Approval and site-specific authorization were granted on July 17, 2019. Mist netting was completed from August 1 to 6, 2019, and comprised 27 complete net nights of effort, exceeding the ODNR Wind Energy Guidelines requirements. Netting yielded capture of 66 big brown bats (Eptesicus fuscus) and five eastern red bats Lasiurus borealis). No listed bats were captured.

Based on the results of summer mist net surveys and winter habitat searches, colonies of Indiana bats are likely absent from the Project area, outside the current area of known occupancy. Thus, tree clearing in the western portion of the project area is unlikely to result in take of this species.

38. The DOW recommended "that a desktop habitat assessment, followed by a field assessment if needed, is conducted to determine if there are potential hibernaculum(a) present within the project area. Information about how to conduct habitat assessments can be found in the current USFWS Range-wide Indiana Bat Survey Guidelines." – Has the applicant determined the presence or absence of hibernacula within the project vicinity in accordance with this recommendation?

Response: Portal searches for winter habitat were completed in the vicinity of mist netting net sites in concert with 2019 mist netting efforts. No portals were observed, and no potentially suitable winter habitat for bats was identified. Additionally, a geology review indicated that no hibernacula are likely to be present.

Follow-up to Grover Hill Wind, LLC's Response to the Fifth Data Request Set

39. In follow-up to the Applicant's response to the fifth data request set, (question/answer #2 and #3), Grover Hill Wind, LLC seems to overstate the capacity of the wind farm.

a. Is the maximum capacity of the proposed wind farm 138 MW (comprised of 23 turbines at 6.0 MW each)?

b. Reviewing page 2 of the Application, is it more accurate that the anticipated annual generation from the proposed wind farm would be (comprised of 23 turbines at 3.0 to 6.0 MW each and annual average capacity factor from 30 to 35%) from 181,300, to 423,100 megawatt-hours?

c. Reviewing page 38 of the Application, is it more accurate that the anticipated increase in local tax revenues from the proposed wind farm would be from $414,000, to $1,242,000 (based on 23 turbines at 3.0 to 6.0 MW each and PILOT of $6,000 to $9,0000 per megawatt)?

Response:

a. The Grover Hill Wind Project has been proposed with a nameplate rating of **up to** 150 MWs. The Application has been filed with 23 turbine locations and five turbine models ranging from 3.0 to 6.0 MWs. This turbine nameplate range was used to analyze the Project impacts. However, the Applicant has not made the final turbine selection. At the time of final equipment selection, the Applicant will consider suitable turbines to maximize the total output of the Project closer to the proposed 150 MWs.

b. Similar to response (a.) above, depending on the final turbine selection with an average annual capacity factor of 30% to 35%, the maximum total generation for 150 MWs will be between 394,000 to 460,000 MW hours ("MWh").

c. As stated in response to Question 39(a) above, at the time of final equipment selection, the Applicant will consider turbines with a nameplate capacity rating over 6.0 MWs in order to maximize the total output of the Project closer to 150 MWs. Therefore, the statement on page 38 of the Application is accurate, because the anticipated maximum annual increase in local tax revenues for the facility is between $0.9 million and $1.35 million.

40. In follow-up to the Applicant's response to the fifth data request set, (question/answer #3), Grover Hill Wind, LLC and other wind farm developers have indicated that if a wind farm capacity is under one hundred megawatts the economics are poor. Please confirm that the Grover Hill Wind Farm is economically viable if the GE 3.03-140 turbine model is selected/recommended.

Response: The first part of this question can be answered on the basis of utility-size wind project economies of scale. In general, economies of scale of renewable energy take two main forms:

1. Larger wind projects will produce less costly power than smaller ones, given a similar level of wind. The cost of developing, building, and operating a utility-sized wind farm in $ per kw installed, is higher for small projects. This is a consequence that some direct cost related to all sized projects are relatively constant, e.g., cost of permitting; cost of interconnection.

2. Electricity generated by wind is best produced in areas of the highest resource quality. Wind resources differs depending mainly on geographical factors. For instance, a 140-m wind turbine in the state of Iowa can produce twice as much electricity than the same turbine in the state of Ohio.

Regarding the Grover Hill Project, the Project economics were based on pricing information provided by turbine manufacturers such as General Electric for the GE 3.03-140 turbine model. At the time the Application was submitted, and as of today, we believe the Project is economically viable with respect to all turbine options. However, because the Project is continually evaluated with new turbine model technical specifications, up-to-date turbine supply and service pricing, energy production estimates, and supply chain availability, the Applicant may ultimately prefer one turbine option over the other options that were submitted.

41. In follow-up to the Applicant's response to the fifth data request set, (question/answer #4), has Grover Hill Wind, LLC submitted a Notice of Termination (NOT) form to Ohio EPA to terminate coverage under the Construction Storm Water General Permit for the remaining 3 excavated sites and/or their associate access roads that are not included in this Application? If so, please provide a copy.

Response: In 2017, White Construction, Inc. ("White") began the construction of the Northwest Ohio ("NWOW") Wind Project in Paulding County, Ohio. NWOW consists of 60 turbine locations in 21,000 acres. After the NWOW achieved its commercial operations, certain portions of the land not being used by NWOW was sold to the Grover Hill Wind Project.

Some of the activities conducted by White related to the 3 excavated sites were performed under the entire project site National Pollutant Discharge Elimination System ("NPDES") permit issued by the Ohio Environmental Protection Agency ("Ohio EPA") to NWOW. In 2018, White was issued an NPDES permit by Ohio EPA for specific construction activities for the Grover Hill Wind Project Site. In both occasions, all of the construction permits, such as the NPDES, were issued to White.

Grover Hill has contacted White and has requested a copy of the Notice of Termination ("NOT"). The NOT will be provided to OPSB as soon as it is provided to the Applicant by White.

42. In follow-up to the Applicant's response to the fifth data request set, (question/answer #31), Grover Hill Wind, LLC indicated that it had reviewed manufacturer's literature setback recommendations. In accordance with Ohio Adm.Code 4906-4-08(A)(1)(c), please provide that referenced literature.

Response: The manufacturer's literature reviewed by the Applicant is attached hereto as Attachment 1.

43. In follow-up to the Applicant's response to the fifth data request set, (question/answer #31), Grover Hill Wind, LLC indicated that it had review manufacturer's literature pertaining to setbacks. In accordance with Ohio Adm.Code 4906-4-08(A)(1)(c), if that literature has already been filed in this docket, please indicate the page number(s) from the appropriate exhibit that outline any manufacturer's setback.

Response: The manufacturer's literature reviewed by the Applicant is attached hereto as Attachment 1.

Grover Hill Wind, LLC has requested setback recommendations from several wind turbine manufacturers. Their response has been consistently that wind turbine manufacturers do not have recommended setbacks and that this responsibility is usually handled by the because of differing standards/regulations between jurisdictions.

Project Schedule

44. Page 19 of the application indicates that the proposed wind farm is to begin construction first quarter 2022 and commercial operation in fourth quarter 2022. Please provide an updated and more precise estimate (if available the month and year) for the start of construction and in-service dates.

Response: Based on several factors affecting the proposed schedule, the Project has been delayed by approximately one year and is anticipated to begin construction during the First Quarter of 2023 and achieve commercial operation in the Fourth Quarter of 2023. The primary cause of the delay is the PJM Facility Study report, the Generator Interconnection

Agreement, and the coordination/construction of the necessary transmission upgrades with the Transmission Owner.

Aviation

45. In reference to the attached letter from the ODOT Office of Aviation (Attachment 1), please explain what the adverse effects are from the Grover Hill Wind Farm.

Response: Pursuant to Chapter 7 of the U.S. Department of Transportation Federal Aviation Administration ("FAA") regulations, any applications for wind turbines that exceeds 500 ft received an automated "Notice of Presumed Hazard" ("NPH") letter. The FAA does not automatically initiate further study (including circularization) without a request to do so by the Applicant. The intent of the NPH is to inform the Applicant of the initial findings and to attempt resolution. If the Applicant fails to contact the FAA after receiving the notice, terminate the case. No further action by the FAA is required unless the Applicant re-files. If negotiation is successful, and resolution is achieved, or further study is completed, an appropriate subsequent determination should be issued.

On January 29, 2021, the Applicant submitted 27 turbine locations to the FAA for review under the project name "STARW-000613577-21". On June 2, 2021, the FAA issued a "Notice of Preliminary Findings," which identified the structures submitted for review, "…exceed(s) obstruction standards and/or would have an adverse physical or electromagnetic interference effect upon navigable airspace or air navigation facilities. Pending resolution of the issues described below, the structure is presumed to be a hazard to air navigation". To provide a final determination the FAA would require the Project to be circularized for public comment, referred to as "Further Study". If no such further study was initiated, the structures are presumed to be a hazard to air navigation.

Upon the receipt to the Notice of Preliminary Finding, the Applicant requested the FAA initiate the further study and circularize the Project for public comment. The presumed hazard to air navigation was based on the fact that the proposed structures exceeded 500 feet in height.

46. Please explain how each of those adverse effects have been mitigated or minimized such that the FAA was then able to determine no hazard to air navigation.

Response: Please refer to answer for question 45. The presumed hazard to air navigation due to structure heights in excess of 500 feet was submitted for further study by the FAA. On August 19, 2021, the FAA issued "Determination of No Hazard to Air Navigation" ("DNH") notices for each of the 27 structures submitted for review. As a condition to these DNHs, the structures are to be painted white and affixed with synchronized red lights.

47. FAA determinations were received for 2021-WTE-133-OE, 2021-WTE-139-OE, 2021-WTE-154-OE, 2021-WTE-157-OE, and 2021-WTE-158-OE, but these wind turbine locations are not included in the Application please explain.

Response: These locations were included in earlier iterations of Project design but have since been eliminated. At the time of the most recent FAA filing, these turbine locations were included as optional and have since been removed as potential turbine locations.

48. Please provide the FAA determination for T43.

Response: The DNH notice issued by the FAA for Turbine 43, dated August 19, 2021, is attached hereto as Attachment 2.

Respectfully submitted,

/s/ *Christine M.T. Pirik*

Christine M.T. Pirik (0029759)
(Counsel of Record)
Terrence O'Donnell (0074213)
William V. Vorys (0093479)
Matthew C. McDonnell (0090164)
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
Columbus, Ohio 43215
Phone: (614) 591-5461
Email: cpirik@dickinsonwright.com
todonnell@dickinsonwright.com
wvorys@dickinsonwright.com
mmcdonnell@dickinsonwright.com

Attorneys for Grover Hill Wind, LLC

4874-8918-7846 v1 [73809-23]

Attachment 1

GE Renewable Energy Technical Document

GE Renewable Energy

– Original –

Technical Documentation
Wind Turbine Generator Systems
All Onshore Turbine Types

General Description

Setback Considerations for Wind Turbine Siting

imagination at work

GE Renewable Energy

Visit us at
www.gerenewableenergy.com

All technical data is subject to change in line with ongoing technical development!

Copyright and patent rights

imagination at work

Table of Contents

1 Introduction

This document provides setback guidance for the siting of wind turbines. This guidance considers potential safety risks associated with wind turbines such as objects (maintenance tools, ice, etc.) directly falling from the wind turbine, unlikely occurrences such as tower collapse and blade failure, and environmental / operational risks such as ice throw. The guidance is general in nature, and is based on the published advice of recognized industry associations. Local codes and other factors may dictate setbacks greater than the guidance in this document. The owner and the developer bear ultimate responsibility to determine whether a wind turbine should be installed at a particular location, and they are encouraged to seek the advice of qualified professionals for siting decisions. It is strongly suggested that wind developers site turbines so that they do not endanger the public.

2 Falling Objects

There is the potential for objects to directly fall from the turbine. The objects may be parts dislodged from the turbine, or dropped objects such as tools. Falling objects create a potential safety risk for anyone who is within close proximity to the turbine, i.e., within approximately a blade length from the turbine.

3 Tower Collapse

In very rare circumstances a tower may collapse due to unstable ground, a violent storm, an extreme earthquake, unpredictable structural fatigue, or other catastrophic events. Tower collapse presents a possible risk to anyone who is within the distance equal to the turbine tip height (hub height plus ½ rotor diameter) from the turbine.

4 Ice Shedding and Ice Throw

As with any structure, wind turbines can accumulate ice under certain atmospheric conditions. A wind turbine may shed accumulated ice due to gravity, and mechanical forces of the rotating blades. Accumulated ice on stationary components such as the tower and nacelle will typically fall directly below the turbine. Ice that has accumulated on the blades will likewise typically fall directly below the turbine, especially during start-up. However, during turbine operation under icing conditions, the mechanical forces of the blades have the potential to throw the ice beyond the immediate area of the turbine.

5 Blade Failure

During operation, there is the remote possibility of turbine blade failure due to fatigue, severe weather, or other events not related to the turbine itself. If one of these events should occur, pieces of the blade may be thrown from the turbine. The pieces may or may not break up in flight, and are expected to behave similarly to ice thrown from the blade. Blade failure presents a possible risk for anyone beyond the immediate area of the turbine.

6 Industry Best Practices

Recognized industry practices suggest the following actions be considered when siting turbines in order to mitigate risk resulting from the hazards listed above:

- Place physical and visual warnings such as fences and warning signs as appropriate for the protection of site personnel and the public.
- Remotely stop the turbine when ice accumulation is detected by site personnel or other means. Additionally, the wind turbine controller may have the capability to shut down or curtail an individual turbine based on the detection of certain atmospheric conditions or turbine operating characteristics.
- Restrict site personnel access to a wind turbine if ice is present on any turbine surface such as the tower, nacelle or blades. If site personnel absolutely must access a turbine with ice accumulation, safety precautions should include but are not limited to remotely shutting down the turbine, yawing the turbine to position the rotor on the side opposite from the tower door, parking vehicles at a safe distance from the turbine, and restarting the turbine remotely when the site is clear. As always, appropriate personnel protective gear must be worn.

7 Setback Considerations

Setback considerations include adjoining population density, usage frequency of adjoining roads, land availability, and proximity to other publicly accessed areas and buildings. Table 1 provides setback guidance for wind turbines given these considerations. GE recommends using the generally accepted guidelines listed in Table 1, in addition to any requirements from local codes or specific direction of the local authorities, when siting wind turbines.

Setback Distance from center of turbine tower	Objects of concern within the setback distance

All turbine sites (blade failure/ice throw):
1.1 x tip height[1], with a minimum setback distance of 170 meters
	- Public use areas
	- Residences
	- Office buildings
	- Public buildings
	- Parking lots
	- Public roads
	  - Moderately or heavily traveled roads if icing is likely
	  - Heavily traveled multi-lane freeways and motorways if icing is not likely
	- Passenger railroads

All turbine sites (tower collapse): 1.1 x tip height[1]	- Public use areas - Residences - Office buildings - Public buildings - Parking lots - Heavily traveled multi-lane freeways and motorways - Sensitive above ground services[2]
All turbine sites (rotor sweep/falling objects): 1.1 x blade length[3]	- Property not owned by wind farm participants[4] - Buildings - Non-building structures - Public and private roads - Railroads - Sensitive above ground services

Table 1: Setback recommendations

The wind turbine buyer should perform a safety review of the proposed turbine location(s). Note that there may be objects of concern within the recommended setback distances that may not create a significant safety risk, but may warrant further analysis. If the location of a particular wind turbine does not meet the Table 1 recommended guidelines, contact GE for guidance, and include the information listed in Table 2 as applicable.

1 The maximum height of any blade tip when the blade is straight up (hub height + ½ rotor diameter).

2 Services that if damaged could result in significant hazard to people or the environment or extended loss of services to a significant population. Examples include pipelines or electrical transmission lines.

3 Use ½ rotor diameter to approximate blade length for this calculation.

4 Property boundaries to vacant areas where there is a remote chance of future development or inhabitancy during the life of the wind farm.

Condition/object within setback circle	Data Required
If icing is likely at the wind turbine site	- Annual number of icing days
Residences	- Number of residences within recommended setback distance - Any abandoned residences within setback distance
For industrial buildings (warehouse/shop)	- Average number of persons-hours in area during shift - Number of work shifts per week - Any abandoned buildings within setback distance
For open industrial areas (storage/parking lot)	- Average number of persons-hours in area during shift - Number of shifts per week. - Any abandoned buildings within setback distance
For sports/assembly areas	- Average number of persons in area per day - Average number of hours occupied per day - Number of days area occupied per week - If area covered, what type of cover
For roads/waterways	- Plot of road/waterway vs. turbine(s) - Average number of vehicles per day - Type of road and speed limit (residential, country, # of lanes, etc.)
For paths/trails (walk, hike, run, bike, ski)	- Plot of paths/trails vs. turbine(s) - Average number # of persons per day by type of presence (walk, hike, etc.) - Flat or uneven/hilly terrain

Table 2: Setback recommendations

Attachment 2

Federal Aviation Administration
Determination of No Hazard

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-WTE-158-OE

Issued Date: 08/19/2021

Matthias Weigel
Starwood Energy Group, LLC.
5 Greenwich Office Park
2nd Floor
Greenwich, CT 06831

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine 20210129-43
Location:	Grover Hill, OH
Latitude:	40-59-57.76N NAD 83
Longitude:	84-28-53.84W
Heights:	731 feet site elevation (SE)
	656 feet above ground level (AGL)
	1387 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M, Obstruction Marking and Lighting, white paint/sychronized red lights-Chapters 4,13(Turbines),&15.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

__X__ At least 60 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

This determination expires on 02/19/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is subject to review if an interested party files a petition that is received by the FAA on or before September 18, 2021. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted to the Manager of the Rules and Regulations Group. Petitions can be submitted via mail to Federal Aviation Administration, 800 Independence Ave, SW, Washington, DC 20591, via email at OEPetitions@faa.gov, or via facsimile (202) 267-9328.

This determination becomes final on September 28, 2021 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Rules and Regulations Group via telephone – 202-267-8783.

This determination is based, in part, on the foregoing description which includes specific coordinates and heights. This determination is valid for coordinates within one (1) second latitude/longitude and up to the approved AMSL height listed above. If a certified 1A or 2C accuracy survey was required to mitigate an adverse effect, any change in coordinates or increase in height will require a new certified accuracy survey and may require a new aeronautical study.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

Additional wind turbines or met towers proposed in the future may cause a cumulative effect on the national airspace system. All information from submission of Supplemental Notice (7460-2 Part 2) will be considered the final data (including heights) for this structure. Any future construction or alteration, including but not limited to changes in heights, requires separate notice to the FAA.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be

used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

If we can be of further assistance, please contact Bill Ratts, at (816) 329-2544, or William.M.Ratts@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-WTE-158-OE.

Signature Control No: 466829397-491981906 (DNH -WT)
Steve Phillips
Manager, Obstruction Evaluation Group

Attachment(s)
Additional Information
Map(s)

All FAA determinations and circularized cases are public record and available at the FAA's public website; https://oeaaa.faa.gov. The distribution for proposals circularized for public comments includes all "known" aviation interested persons and those who do not have an aeronautical interest but may become involved with specific aeronautical studies. Notification includes both postcard mailers and email notifications to those with registered FAA accounts. The FAA does not have a database for all persons with an aeronautical and non-aeronautical interest. Therefore, the public is encouraged to re-distribute and forward notices of circularized cases to the maximum extent possible. Additionally, it is incumbent upon local state, county and city officials to share notice of circularized cases with their concerned citizens.

Abbreviations

AGL - above ground level
AMSL - above mean sea level
RWY - runway
VFR - visual flight rules
IFR - instrument flight rules
NM - nautical mile
ASN- Aeronautical Study Number
CAT - category aircraft
RNAV- area navigation
MDA - minimum descent altitude
Part 77 - Title 14 Code of Federal Regulations (CFR) Part 77, Safe, Efficient Use and Preservation of the Navigable Airspace

The proposed Grover Hill wind turbine project near Grover Hill, OH consists of 27 wind turbines and has been reviewed by the FAA under ASNs 2021-WTE-132-OE sequentially through 2021-WTE-158-OE. The proposed wind turbine project lies approximately between 2.2 NM north northwest counterclockwise to 2.1 NM southwest from the town of Grover Hill, OH.

For the sake of efficiency, the 27 proposed wind turbines in this project that have similar impacts to 14 CFR Part 77 standards are included in this narrative.

1. PROPOSAL DESCRIPTION

The Aeronautical Study Number (ASNs), Structure Names, Above Ground Level (AGL) heights, Above Mean Sea Level (AMSL) heights and coordinates for each proposed structure are listed as follows:

ASN	Structure Name	AGL	AMSL	LAT	LONG
2021-WTE-132-OE	20210129-11	656	1381	41-02-39.16N	84-30-35.30W
2021-WTE-133-OE	20210129-12	656	1380	41-02-34.48N	84-30-15.14W
2021-WTE-134-OE	20210129-13	656	1376	41-02-24.96N	84-30-07.54W
2021-WTE-135-OE	20210129-14	656	1377	41-02-12.42N	84-30-01.05W
2021-WTE-136-OE	20210129-15	656	1380	41-02-12.09N	84-29-25.08W
2021-WTE-137-OE	20210129-16	656	1379	41-02-09.99N	84-28-57.10W
2021-WTE-138-OE	20210129-17	656	1383	41-01-47.59N	84-30-28.07W
2021-WTE-139-OE	20210129-22	656	1381	41-01-47.39N	84-29-10.01W
2021-WTE-140-OE	20210129-25	656	1381	41-01-35.08N	84-29-00.37W
2021-WTE-141-OE	20210129-26	656	1381	41-01-50.39N	84-28-56.14W
2021-WTE-142-OE	20210129-27	656	1386	41-00-53.14N	84-30-34.67W
2021-WTE-143-OE	20210129-28	656	1384	41-00-53.49N	84-30-06.23W

2021-WTE-144-OE / 20210129-29 / 656 / 1386 / 41-00-35.59N / 84-30-30.57W
2021-WTE-145-OE / 20210129-30 / 656 / 1384 / 41-00-34.70N / 84-30-06.47W
2021-WTE-146-OE / 20210129-31 / 656 / 1386 / 41-00-35.52N / 84-29-22.91W
2021-WTE-147-OE / 20210129-32 / 656 / 1383 / 41-00-37.96N / 84-28-54.19W
2021-WTE-148-OE / 20210129-33 / 656 / 1382 / 41-00-54.25N / 84-28-07.10W
2021-WTE-149-OE / 20210129-34 / 656 / 1381 / 41-00-44.49N / 84-28-08.43W
2021-WTE-150-OE / 20210129-35 / 656 / 1383 / 41-00-32.56N / 84-28-12.16W
2021-WTE-151-OE / 20210129-36 / 656 / 1382 / 41-00-30.53N / 84-27-51.17W

2021-WTE-152-OE / 20210129-37 / 656 / 1389 / 40-59-38.09N / 84-30-28.20W
2021-WTE-153-OE / 20210129-38 / 656 / 1384 / 40-59-57.53N / 84-29-11.57W
2021-WTE-154-OE / 20210129-39 / 656 / 1384 / 41-02-39.83N / 84-30-05.48W
2021-WTE-155-OE / 20210129-40 / 656 / 1382 / 41-02-28.32N / 84-30-35.47W
2021-WTE-156-OE / 20210129-41 / 656 / 1380 / 41-01-48.86N / 84-29-26.86W
2021-WTE-157-OE / 20210129-42 / 656 / 1384 / 41-00-44.10N / 84-30-05.63W
2021-WTE-158-OE / 20210129-43 / 656 / 1387 / 40-59-57.76N / 84-28-53.84W

2. 14 CFR PART 77 OBSTRUCTION STANDARDS EXCEEDED

The following proposed turbines would exceed 14 CFR Part 77 standards as described below.

a. Section 77.17(a)(1): Exceeds a height of 499 feet AGL at the site of the object. All proposed structures would exceed this surface by 157 feet.

b. Section 77.17(a)(4) -- A height within an en route obstacle clearance area, including turn and termination areas, of a Federal Airway or approved off-airway route, that would increase the IFR en route minimum obstacle clearance altitude.

The following proposed structures would have the following effect: HUUVR ONE ARRIVAL (RNAV) Increase Minimum Obstruction Clearance Altitude (MOCA) from MSKTS to JJUST from 2300 feet to 2400 feet AMSL. (Procedure serves Akron Fulton International Airport (KAKR), Akron-Canton Regional Airport (KCAK), and Kent State University (1G3)).

2021-WTE-140-OE
2021-WTE-142-OE
2021-WTE-143-OE
2021-WTE-144-OE
2021-WTE-145-OE
2021-WTE-146-OE
2021-WTE-147-OE
2021-WTE-148-OE
2021-WTE-149-OE
2021-WTE-150-OE
2021-WTE-151-OE
2021-WTE-152-OE
2021-WTE-153-OE
2021-WTE-157-OE
2021-WTE-158-OE

3. EFFECT ON AERONAUTICAL OPERATIONS

a. Section 77.29 (a)(1): the impact on arrival, departure, and en route procedures for aircraft operating under visual flight rules.

At 656 feet AGL, all structures would extend into airspace normally utilized for VFR en route flight by 157 feet. The structures would be located within 2 statute miles of a VFR Route (Prairie Creek) as defined by FAAO 7400.2, Section 6-3-8 and would have an adverse effect upon VFR air navigation.

b. Section 77.29 (a)(6); potential effect on ATC radar, direction finders, ATC tower line-of-sight visibility, and physical or electromagnetic effects on air navigation, communication facilities, and other surveillance systems.

The FAA found that all 27 proposed wind turbines would have a Radar Line of Sight (RLOS) impact to the Airport Surveillance Radar (ASR) -9 at Fort Wayne, IN (FWA). Since they are visible to the ASR, they could cause unwanted primary-only returns (clutter) and primary-only target drops, all in the immediate area of the turbines. Also, tracked primary-only targets could diverge from the aircraft path and follow wind turbines, when the aircraft is over or near the turbines.
No effect will occur on the Secondary (Beacon) Radar System.

4. CIRCULATION AND COMMENTS RECEIVED

The proposal was circulated for public comment under ASN 2021-WTE-140-OE on 02 June 2021. No comments were received by 09 July 2021. MOCA adverse effects were not circularized to the public for comments because the effect to the MOCAs identified above only requires an internal review from the FAA Air Traffic Control facility.

5. BASIS FOR DECISION

Study for possible VFR effect disclosed that the proposed structures would have no effect on any existing or proposed arrival or departure VFR operations or procedures. The proposed structures would be located beyond the normal traffic pattern airspace for any known public use or military airports. At 656 feet AGL, the structures would be located within the altitudes commonly used for en route VFR flight. In coordination with ATC, an analysis of potential VFR Routes and available traffic data indicated that an average of less than one VFR aircraft per day may be affected by the proposed wind farm. In accordance with FAAO 7400.2, the proposed wind farm would not affect a significant volume of aircraft and therefore, it is determined they will not have a substantial adverse effect on en route VFR flight operations.

The aeronautical study disclosed that the proposed structures would have an effect on a MOCA. MOCAs assure obstacle clearance over the entire route segment to which they apply and assure navigational signal coverage within 22 NM of the associated VHF Omnidirectional Radio Range (VOR) navigational facility. Structures that only affect the MOCA are not considered to have a substantial adverse effect and only require a review by the ATC facility. A review by the controlling facility determined that increasing the MOCA altitudes would ensure the required obstacle clearances are maintained and therefore would not have a substantial adverse effect on air traffic operations. There are no other impacts to existing or proposed arrival, departure, or en route IFR operations or procedures.

The proposed turbine(s) would be charted on VFR sectional aeronautical charts and appropriately obstruction marked/lighted to make them more conspicuous to airmen should circumnavigation be necessary.

The cumulative impact of the proposed structure(s), when combined with other proposed and existing structures, is not considered to be significant. Study did not disclose a substantial adverse effect on existing or proposed public-use or military airports, nor does the proposal(s) affect the capacity of any known existing or planned public-use or military airport. There are no substantial physical or electromagnetic effects on the operation of air navigation and communications facilities and there are no effects on any airspace and routes used by the military.

6. DETERMINATION - NO HAZARD TO AIR NAVIGATION

It is determined that the proposed construction would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation provided the conditions set forth in this determination are met.

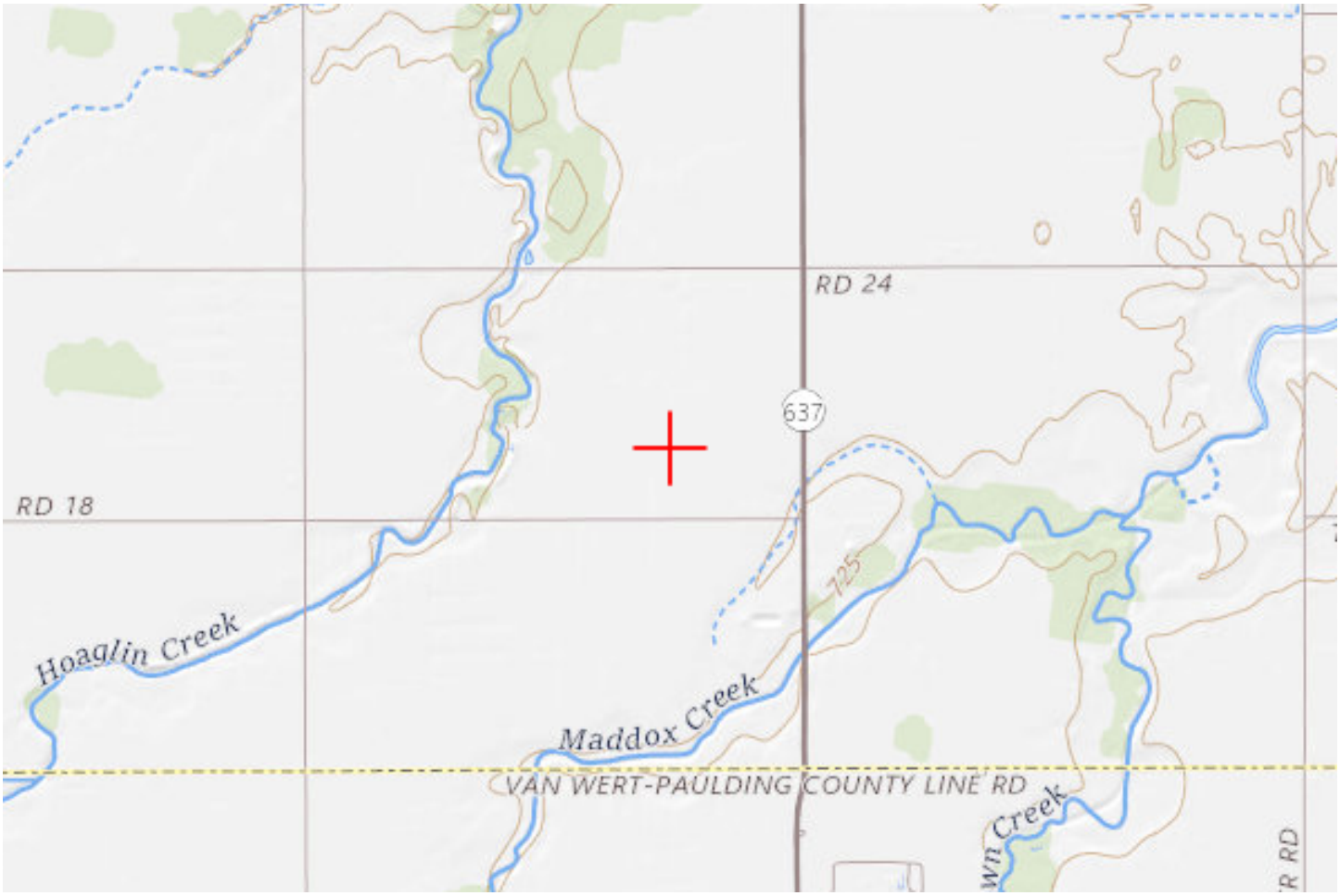
7. CONDITIONS

The proponent is required to file FAA form 7460-2, part 1, Notice of Actual Construction or Alteration, sixty days prior to beginning construction, at the OE/AAA website (http://oeaaa.faa.gov) for the following wind turbines reviewed as ASNs:

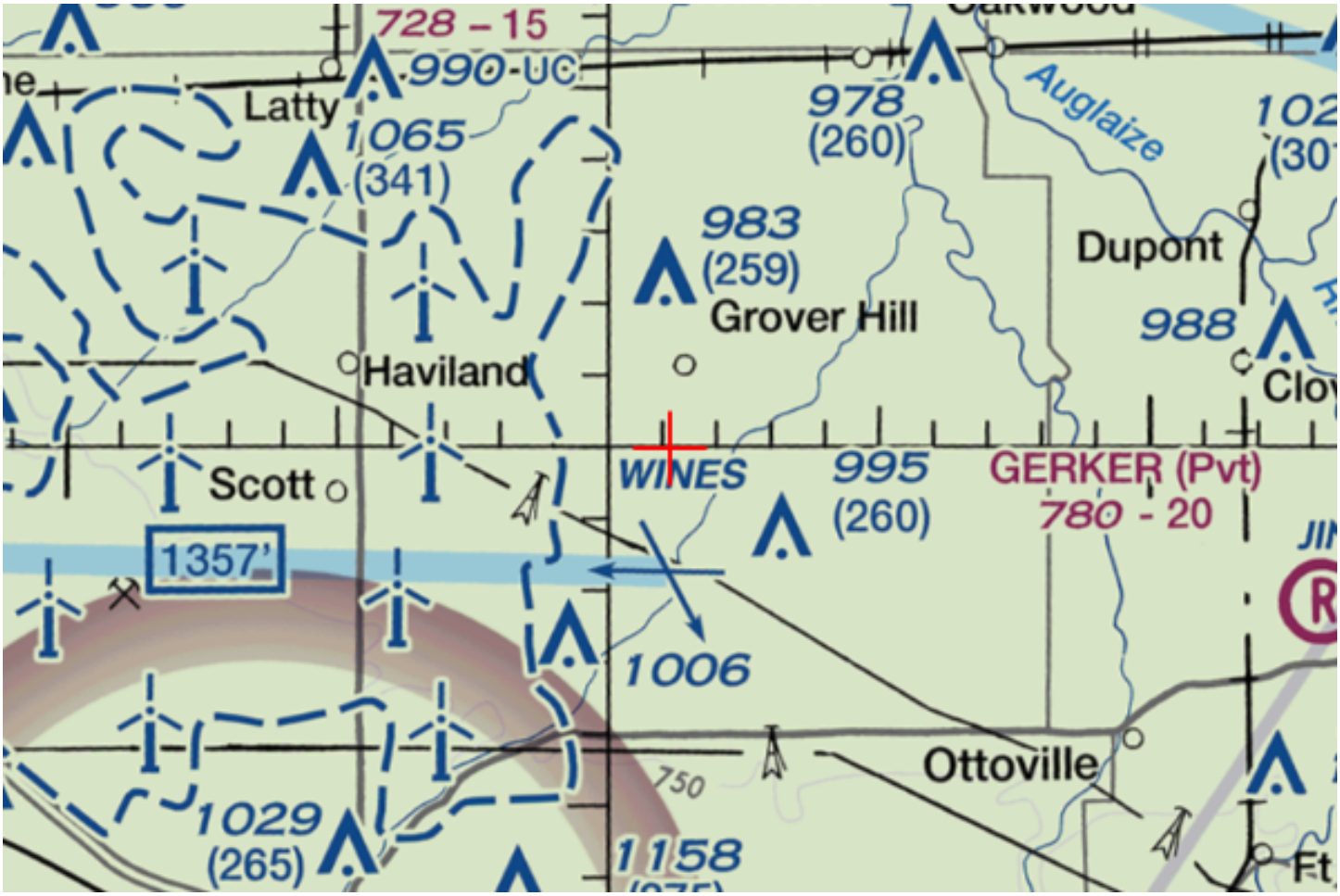
2021-WTE-140-OE
2021-WTE-142-OE
2021-WTE-143-OE
2021-WTE-144-OE
2021-WTE-145-OE
2021-WTE-146-OE
2021-WTE-147-OE
2021-WTE-148-OE
2021-WTE-149-OE
2021-WTE-150-OE
2021-WTE-151-OE
2021-WTE-152-OE
2021-WTE-153-OE
2021-WTE-157-OE
2021-WTE-158-OE

Additionally, within five days after each project structure reaches its greatest height, the proponent is required to file a FAA form 7460-2, Actual Construction notification, at the OE/AAA website (http://oeaaa.faa.gov). This actual construction notification will be the source document detailing the site location, site elevation, structure height, and date structure was built for the FAA to map the structure on aeronautical charts and update the national obstruction database.

TOPO Map for ASN 2021-WTE-158-OE



Sectional Map for ASN 2021-WTE-158-OE



Summary: Response to Eighth Data Request from Staff of the Ohio Power Siting Board electronically filed by Christine M.T. Pirik on behalf of Grover Hill Wind, LLC