WIND ENERGY ORDINANCE 2021-12-3

Brant Township Saginaw County, MI

STATEMENT OF INTENT – Due to the passage of PA 342 of 2016, known as the Clean and Renewable Energy and Energy Waste Reduction Act, which requires Michigan electric providers to supply renewable energy sources, Brant Township felt a need to address wind energy in the Township.

The following regulations have been developed with the intention of obtaining an appropriate balance between the need for clean, renewable energy resources and the need to protect the public health, safety, and welfare of the Brant Township community. Regulation of the siting, installation and operation of wind energy facilities is necessary to ensure compatible land uses. Further, regulation of wind energy facilities meets the Township Master Plan goal that states, "Preserve rural community character." The regulations provide for the designation of property suitable for the location, construction and operation of wind energy facilities in the Township.

a. DEFINITIONS

1) Ambient: Ambient is defined as the sound pressure level exceeded 90% of the time or L90.

2) ANSI: American National Standards Institute.

3) A-weighted sound level shall mean the sound pressure level in decibels as measured on a sound level meter using the A-weighting network, a method for weighting the frequency spectrum to mimic the human ear. Expressed as dB(A) or dBA.

4) Background Sound shall mean the all-encompassing sound associated with a given environment without contribution from the source or sources of interest, as defined by ANSI S12.9 Part 3.

5) Continuous Background Sound shall mean background sound measured during a measurement period, after excluding the contribution of transient background sounds, as defined by ANSI S12.9 Part 3.

6) dB(A): The sound pressure level in decibels. Refers to the "a" weighted scale defined by ANSI. A method for weighting the frequency spectrum to mimic the human ear.

7) Decibel: The unit of measure used to express the magnitude of sound pressure and sound intensity.

8) Decommission: To remove or retire from active service.

9) Equivalent A-weighted Continuous Sound Level shall mean the level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound, denoted as Leq A, and expressed as dBA.

10) Frequency shall mean the number of oscillations or cycles per unit of time, expressed as Hertz (Hz).

11) Hertz means the frequency of sound expressed by cycles per second.

12) Height of Structure: The height of the structure is to the highest point on the tip of a fully vertical rotor blade.

13) Hub Height shall mean the distance from ground level to the center of the turbine hub or horizontal rotor shaft.

14) IEC: International Electrotechnical Commission. The IEC is the leading global organization that prepares and publishes international standards for all electrical, electronic and related technologies.

15) Inhabited Structure: Any existing structure usable for living or non-agricultural commercial purposes, which includes but is not limited to working, sleeping, eating, cooking, recreation, office, office storage, or any combination thereof. An area used only for storage incidental to a residential use, including agricultural barns, is not included in this definition. If it is not clear by this definition, the Zoning Administrator shall make a determination of any structure regarding whether or not if it is inhabited.

16) ISO: International Organization for Standardization. ISO is a network of the national standards institutes of 156 countries.

17) Michigan Tall Structures Act (Act 259 of 1959) shall govern the height of structures in proximity to airport related uses and is included as a standard in this Article by reference.

18) MET Tower, Meteorological Tower, or Anemometer Tower: A temporary tower used to measure wind speed and direction. (Also known as a SCADA tower).

19) Noise Sensitive Facility means an inhabited structure, school, hospital, church, public library, or other areas designated by the Planning Commission.

20) Octave Band shall mean the frequency interval where the upper frequency is twice the lower frequency.

21) One-Third Octave Band shall mean the frequency interval where the upper frequency is the lower frequency times the cube root of two.

22) On Site Use Wind Energy Systems: An On-Site Use wind energy system is intended to primarily serve the needs of the consumer.

23) Participating Parcel: A property within that participates in a lease or easement agreement, or other contractual agreement, with an entity submitting a Special Land Use Permit application for the purposes of developing of a wind energy conversion facility.

24) Rotor: An element of a wind energy system that acts as a multi-bladed airfoil assembly, thereby extracting through rotation, kinetic energy directly from the wind.

25) SCADA Tower: A freestanding tower containing instrumentation such as anemometers that is designed to provide present moment wind data for use by the supervisory control and data acquisition (SCADA) system.

26) Shadow Flicker: Alternating changes in light intensity caused by the moving blade of a wind energy system casting shadows on the ground and stationary objects, such as a window at an inhabited structure.

27) Sound Power shall mean the rate per unit time at which sound energy is radiated, expressed as watts (W).

28) Sound Power Level shall mean ten times the logarithm to the base 10, of the ratio of a given sound power to the reference sound power of 1 picowatt, expressed as decibels (dB).

29) Sound Pressure shall mean the difference at a given point between the pressure produced by sound energy and the atmospheric pressure, expressed as pascals (Pa).

30) Sound Pressure Level shall mean twenty times the logarithm to the base 10, of the ratio of the root-mean-square sound pressure to the reference pressure of twenty micropascals, expressed as decibels (dB). Note that, unless expressed with reference to a specific weighing network (such as dBA), the unit dB shall refer to an un-weighted measurement

31) Utility Grid Wind Energy Systems: A Utility Grid wind energy system is designed and built to provide electricity to the electric utility grid.

32) Wind Energy System: A wind energy conversion system which converts wind energy into electricity through the use of a wind turbine generator and includes the turbine, blades, and tower as well as related electrical equipment. This does not include wiring to connect the wind energy system to the grid.

33) Wind Site Assessment: An assessment to determine the wind speeds at a specific site and the feasibility of using that site for construction of a wind energy system.

b. On site Use or Wind Site Assessment for Wind Energy Systems: Prior to the installation of an On-Site Use wind energy system or a MET Tower with a tower higher than 65 feet, an application for a Special Land Use permit shall be filed with the local government that will include:

- applicant identification,
- a site plan,
- documentation that sound pressure level, construction code, tower, interconnection (if applicable), and safety requirements have been met
- a copy of that portion of the applicant's lease with the landowner granting authority to install the Met tower and requiring the applicant to remove all equipment and restore the site after completion of the wind site assessment, and
- proof of the applicant's public liability insurance. The distance from the center of a Met tower and the property lines between the leased property and the non-leased property shall be at least the height of the Met tower. Leased property can include more than one piece of property and the requirement shall apply to the combined properties.

1) Property Set-back: All setbacks shall be measured from the center of the turbine.

a) The distance between an On-Site Use wind energy system and the owner's property lines shall be at least 1½ times the height of the wind energy system tower including the top of the blade in its vertical position.

b) The distance between an anemometer tower and the owner's property lines shall be at least 1½ times the height of the tower.

c) No part of the wind energy system structure, including guy wire anchors, may extend closer than ten feet to the owner's property lines.

2) Sound Pressure Level: On-Site Use wind energy systems shall not exceed 55 dB(A) at the property line closest to the wind energy system. This sound pressure level may be exceeded during short-term events such as utility outages and/or severe windstorms. If the ambient sound pressure level exceeds 55 dB(A), the standard shall be ambient dB(A) plus 5 dB(A).

3) Construction Codes, Towers, & Interconnection Standards:

a) On-Site Use wind energy systems including towers shall comply with all applicable state construction and electrical codes and local building permit requirements.

b) On-Site Use wind energy systems including towers shall comply with Federal Aviation Administration requirements, the Michigan Airport Zoning Act (Public Act 23 of 1950, MCL 259.431 et seq.), the Michigan Tall Structures Act (Public Act 259 of 1959, MCL 259.481 et seq.), and local jurisdiction airport overlay zone regulations.

c) An interconnected On-Site Use wind energy system shall comply with Michigan Public Service Commission and Federal Energy Regulatory Commission standards. Off-grid systems are exempt from this requirement.

4) Safety:

a) An On-Site Use wind energy system shall have automatic braking, governing, or feathering system to prevent uncontrolled rotation or over speeding.

b) All wind towers shall have lightning protection.

c) If a tower is supported by guy wires, the wires shall be clearly visible to a height of at least six feet above the guy wire anchors.

d) The minimum vertical blade tip clearance from grade shall be 20 feet for a wind energy system employing a horizontal axis rotor.

c. Utility Grid Wind Energy Systems: A Utility Grid wind energy system is designed and built to provide electricity to the electric utility grid. Utility Grid wind energy systems shall be considered a Special Land Use.

1) Procedure: The Planning Commission review of a Special Land Use Permit application for a wind energy conversion facility is a two-step process. The first step is the site plan review process by the Planning Commission as described in Chapter 6. The second step, which may occur at a separate meeting for a utility scale wind energy system, is the public hearing and decision by the Planning Commission, per the procedures for review in Chapter 6. A decision on the Special Land Use Permit application by the Planning Commission is inclusive of all proposed wind turbine components, underground electrical lines, sub-station(s), junction boxes, laydown yard(s), concrete batch plant(s), and any operations/maintenance building(s).

2) Prior to the installation of a Utility Grid wind energy system, an application for a Special Land Use permit shall be filed with the local government and shall include the following:

   a) Applicant Identification: Applicant name, address, and contact information.

   b) Project Description: A general description of the proposed project including a legal description of the property or properties on which the project would be located and an anticipated construction schedule.

   c) Site Plan: The site plan shall include maps showing the physical features and land uses of the project area, both before and after construction of the proposed project. The site plan shall include 1) the project area boundaries, 2) the location, height, and dimensions of all existing and proposed structures and fencing, 3) the location, grades, and dimensions of all temporary and permanent on-site and access roads, including width and surface material, from the nearest county or state maintained road, 4) existing topography, 5) water bodies, waterways, wetlands, and drainage channels, and 6) all new infrastructure above ground related to the project. Additional site plan requirements for site plan review are described in section d. below.

   d) Insurance: Proof of the applicant's public liability insurance.

   e) Sound Pressure Level: Copy of the modeling and analysis report.

   f) Certifications: Certification that applicant has complied or will comply with all applicable state and federal laws and regulations. Copies of all such permits and approvals that have been obtained or applied for at the time of the application.

   g) Visual Impact: Visual simulations of how the completed project will look from four viewable angles.

   h) Environmental Impact: Copy of the Environmental Impact analysis.

   i) Avian and Wildlife Impact: Copy of the Avian and Wildlife Impact analysis.

   j) Shadow Flicker: Copy of the Shadow Flicker analysis.

   k) Manufacturers' Safety Data Sheet(s): Documentation shall include the type and quantity of all materials used in the operation of all equipment including, but not limited to, all lubricants and coolants.

   l) Decommissioning: Copy of the decommissioning plan.

   m) Complaint Resolution: Description of the complaint resolution process.

   n) Fire suppression plan

   o) Maintenance Schedule: Description of operations, including anticipated regular and unscheduled maintenance.

3) Application Fee, Township Costs and Escrow. With its application, an applicant shall remit an application fee. The applicant shall further be responsible for the Township's cost and expenses in review and action on the application, including the retention of engineers and other professionals engaged by the Township. An estimate of those cost

shall be paid to the Township with the application fee and thereafter held in escrow as security for payment of the Township's cost and expenses. The amount of the deposit to be paid with the application shall be specified by the Planning Commission in a schedule it establishes. This schedule shall be based on the cost of the application review and may be adjusted from time to time.

d. A detailed site plan shall be provided for the site plan review. The site plan shall include maps showing the physical features and land uses of the project area, both before and after construction of the proposed project. The site plan shall include:

1) The project area boundaries, including all lot lines and dimensions.

2) Names and parcel identification number of each parcel within the utility grid wind energy system.

3) The location, elevation, height, and dimensions of all existing and proposed structures, and fencing, utility easements, land use, zoning district, and ownership of property

4) The location, grades, composition, dimensions, and proposed maintenance of all temporary and permanent on-site and access roads from the nearest county or state-maintained road,

5) Existing topography,

6) Water bodies, waterways, wetlands, and drainage channels, and

7) All new infrastructure above and below ground related to the project, including proposed turbine towers, underground and overhead wiring (including the depth of underground wiring), new drainage facilities (if any), access drives (including width), substations and accessory structures

8) Lighting plan

9) A description of the routes to be used by construction and delivery vehicles and of any road improvements that will be necessary in the Township to accommodate construction vehicles, equipment or other deliveries, and an agreement or bond which guarantees the repair of damage to public roads and other areas caused by construction of the Utility Grid Wind Energy System;

10) Engineering data concerning construction of the tower and its base or foundation, which must be engineered and constructed in such a manner that upon removal of said tower, the soil will be restored to its original condition to a depth of six feet.

11) Anticipated construction schedule

12) Description of operations, including anticipated regular and unscheduled maintenance

e. The Utility Grid wind energy system project shall meet the following standards and requirements:

1) Property Set-Back: Please note that all setbacks shall be measured from the center of the turbine.

a) The distance between a Utility grid wind energy system and an inhabited structure shall be at least 1,500'.

b) The distance between a Utility Grid wind energy system and the property lines of adjacent non-leased properties shall be at least 2,300'

c) The distance between a Utility Grid wind energy system and the centerline of a public roadway shall be at least 1.5 times the overall height of the turbine.

d) Each Utility Grid wind energy system shall be set back from active public utility corridors such as natural gas lines, oil lines, telecommunication towers, any overhead lines including electric, telephone, internet, or cable tv at a distance no less than 1.5 times its overall height, determined from the boundary line of the corridor.

e) Each Utility Grid wind energy system shall be set back from the centerline of a stream, or river by at least 1.0 times the overall height of the turbine. Each utility Grid wind energy system shall be set back from a drain easement at least 1.0 times the overall height of the turbine and in no case shall it be set back by less than 1.0 times the overall height of the turbine from the top of the bank of the drain that is closest to the turbine location.

g) An Operations and Maintenance Office building, a sub-station, or ancillary equipment shall comply with any property set-back requirement that may be applicable to that type of building or equipment. h) Overhead transmission lines and power poles that are part of the Utility Grid Wind Energy System shall be on leased land and shall comply with the set-back requirements applicable to public utilities.

2) Utility Grid Wind energy systems are limited to a height of 499' above the existing grade.

3) Underground power lines within the Utility Grid Wind energy system shall be placed a minimum of five feet below grade and below any drainage tile on the property.

4) Sound Pressure Level:

c) For participating parcels, the audible sound from a Utility Grid Wind Energy System at a Noise Sensitive Facility may not exceed the Equivalent A-weighted Continuous Sound Level (Leq) limits set forth in Table 1, measured in accordance with the methodology described in Sections e) and f).

Table 1 –Equivalent A-weighted Continuous Sound Level (L_{eq}) Limits Participating Parcels

Zone	Time	Equivalent A-weighted Continuous Sound Level (dBA)
Participating parcel	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45

For non-participating parcels, the audible sound from a Utility Grid Wind Energy System at a parcel line may not exceed the Lmax levels shown in Table 2.

Table 2 –Equivalent A-weighted Maximum Sound Level L_{max} Limits Non-Participating Parcels

Zone	Time	Equivalent A-weighted Maximum Sound Level (dBA)
Non-participating parcel	7 a.m. to 10 p.m.	45
	10 p.m. to 7 a.m.	35

d) In the event audible noise from the operation of the Utility Grid Wind Energy System contains a prominent discrete tone, the limits set forth in Table 1 shall be reduced by five (5) dBA. For a prominent discrete tone to be identified as present, the equivalent-continuous sound pressure level in the one-third octave band of interest is required to exceed the arithmetic average of the equivalent-continuous sound pressure level for the two adjacent one-third octave bands by five (5) dB for center frequencies of five hundred (500) Hz and above, by eight (8) dB for center frequencies between one hundred and sixty (160) Hz and four hundred (400) Hz, or by fifteen (15) dB for center frequencies between twenty five (25) and one hundred and twenty-five (125) Hz as specified by ANSI S12.9 Part 3, Annex B.

e) Any noise level falling between two whole decibels shall be rounded to the nearest whole number.

f) Sound Modeling Study – The applicant shall provide a predictive sound modeling study of all turbine noise for a Utility Grid Wind Energy System to verify that ordinance requirements can be met for the Equivalent A-weighted Continuous Sound Level limits in Table 1. The sound modeling must follow International Standard, ISO 9613-2 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation." The sound modeling study shall use the maximum apparent wind turbine sound power levels as determined by measurement according to IEC 61400 – Part 11, or as determined by analytical calculations according to the manufacturer, plus 2 dB to each frequency band. The sound power source shall be modeled at hub height. Modeling shall include topographical information and assume hard ground (G=0) for all large areas of pavement and water, and mixed ground (G=0.5) for all other land. The sound modeling study shall include a map with all proposed wind turbine locations, all Noise Sensitive Facilities, and all participating and non-participating parcels. The sound study map shall be overlaid with sound contour lines extending out to the 30-dBA sound contour line, at 5 dBA intervals from the center of the proposed Utility Grid Wind Energy System.

g) Post Construction Sound Survey – The applicant shall complete a post construction sound survey within 12 months of the commencement of the operation of the project. The applicant shall be able to determine compliance with the Equivalent A-weighted Continuous sound level limits set forth in Sections a) and b) above. The measurements and the reporting of the data shall be conducted as described below. The survey shall address noise complaints on file with the Township and may require additional measurement locations as deemed necessary by the Planning Commission. Should the sound survey indicate a non-compliant measurement, the owner of the Utility Grid Wind Energy System will be required to obtain compliance through mitigation or other measures.

(1) Methodology

(a) Refer to Section g) for measurement personnel and instrumentation requirements.

(b) A calibration check shall be performed and recorded before and after each measurement period.

(c) The nighttime measurement period shall be two hours minimum and shall be continuously observed by a trained attendant. For participating parcels, sound level data shall be aggregated in 10-minute measurement intervals within the nighttime compliance measurement period (nighttime: 10:00 pm to 7:00 am).

(d) The daytime measurement period shall be two hours minimum and shall be continuously observed by a trained attendant. For participating parcels, sound level data shall be aggregated in 10-minute measurement intervals within the daytime compliance measurement period (daytime: 7:00 am to 10:00 pm). Because compliance with nighttime noise limits presumes compliance with the less stringent daytime noise limits, this requirement may be waived by the Planning Commission.

(e) For participating parcels, compliance will be demonstrated when the Equivalent A-weighted Continuous Sound Level of every twelve representative 10-minute measurement interval is less than or equal to the Equivalent A-weighted Continuous sound level limits as set forth in Sections a) and b) of this section. For non-participating parcels, compliance will be demonstrated when the Equivalent A-weighted Continuous Sound Level of each two-hour measurement interval is less than or equal to the Equivalent A-weighted Continuous sound level limits as set forth in Sections a) and b) of this section. Representative intervals are defined as:

(i) Periods complying with the general method for routine measurements of ANSI S12.18. Measurements shall be made either downwind as defined in ANSI S12.18, or if the atmospheric conditions are such that the direction of the wind vector is within an angle of ± 45 degrees of the annual prevailing wind direction.

(ii) Periods where the concurrent turbine hub-elevation wind speeds are sufficient to generate within 1 dB of the maximum continuous rated sound power from the nearest wind turbine to the measurement location.

(iii) Periods where ground level gusts are equal to or less than 7 m/s (15.66 mph).

(f) The sound level measured in each measurement interval above may be corrected for transient background sound and continuous background sound, according to ANSI S12.9 Part 3.

(2) Measurement Locations

(a) The specific measurement locations shall be chosen by the developers' Measurement Personnel and by the Planning Commission prior to the Post Construction Sound Survey.

(b) The measurement locations shall be performed at Noise Sensitive Facilities for participating parcels and at parcel boundary lines for non-participating parcels. The locations shall be in close proximity to one or multiple wind turbines and/or locations which have modeled sound levels closest to limits identified in Table 1. A 3:1 ratio (wind turbines to measurement locations) will be used to determine the number of measurement locations, with a minimum of eight measurement locations. The measurement locations shall include, but are not limited to, the following:

(i) A minimum of four measurements of different non-participating parcels. The measurement location shall be at the parcel boundary line nearest the closest wind turbine of the Utility Grid Wind Energy System.

(ii) A minimum of two measurements of different participating parcels. The measurement location shall be at the Noise Sensitive Facility, measured 50 feet from the façade nearest the closest wind turbine of the Utility Grid Wind Energy System.

(iii) Any measurement location determined necessary by the Measurement Personnel and Planning Commission. If both parties agree, a measurement location deemed unnecessary may be omitted from the required locations.

(c) The microphone shall be positioned at a height of 5 feet ± 1 foot above the ground, and oriented in accordance with the characteristics of the microphone so that the frequency response is as flat as possible.

(d) To the greatest extent possible, measurement locations should be located away from potential contaminating sources of noise such as major highways, industrial facilities and urban areas.

(e) To the greatest extent possible, measurement locations shall be at the center of unobstructed areas that are maintained free of vegetation and other structures or material that is greater than 2 feet in height for a 50-foot radius around the sound monitoring equipment.

(f) To the greatest extent possible, measurement locations should be at least 50 feet from any known sound source.

(g) Meteorological measurements of the surface wind speed and direction shall be collected using anemometers at a height of 6.6 foot ± 0.7 foot above the ground, near each noise measurement location. Care should be taken to avoid noise measurement contamination from the anemometer operation.

(3) Reporting of Measurement Data - Reports shall be submitted to the Planning Commission within 45 days of completion of the post-construction sound survey and shall include, at a minimum, the following:

(a) A narrative description of the sound from the Utility Grid Wind Energy System for the compliance measurement period result.

(b) A narrative description of the sound measurements collected.

(c) A map showing the wind turbine locations, noise measurement locations, and all Noise Sensitive Facilities.

(d) The dates, days of the week and hours of the day when measurements were made.

(e) The wind direction and speed, temperature, precipitation, and sky condition for each measurement interval. Meteorological measurements of the wind speed and direction will be reported at both the surface height, and at hub level (to be provided by the Utility Grid Wind Energy System from the closest wind turbine), based on five second integration intervals. Both the average and maximum wind speeds for each interval shall be reported.

(f) The wind energy output for each measurement interval for the closest wind turbine.

(g) Identification of all measurement equipment by make, model and serial number.

(h) All meteorological, sound, windscreen and audio instrumentation specifications and calibrations.

(i) All A-weighted equivalent sound levels for each measurement interval.

(j) All 1/3 octave band linear equivalent sound levels for each measurement interval and identification of tonal periods.

(k) All attendant's notes and observations.

(l) All concurrent time stamped turbine operational data including the date, time and duration of any noise reduction operation or other interruptions in operations if present.

(m) All periods removed from the data due to temperatures above or below manufacturer specifications, wind speeds above ANSI S12.18 limits.

(n) All corrections for transient background and continuous background sound according to ANSI S12.9 Part 3. All methodology, data, field notes, and calculations shall be included. Audio recordings may be submitted for identification of intrusive noise events. Audio collection shall occur through the same microphone/sound meter as the measurement data. Audio recordings shall be time stamped (hh:mm:ss), at an adequate quality for identifying events, and in mp3 format.

(o) All other information determined necessary by the Planning Commission.

h) Measurement of the Sound from Routine Operation of the Developments – Measurements of the sound from routine operation of completed Utility Grid Wind Energy Systems are generally necessary only for specific compliance testing

purposes in the event that community complaints result from operation of the development, for validation of an applicant's calculated sound levels when requested by the Planning Commission, or for enforcement by the Department. The applicant shall be able to determine compliance with the Equivalent A-weighted sound level limits set forth in Sections a) and b). The measurements and the reporting of the data shall be conducted as described below. Should the measurements indicate a non-compliant measurement, the owner of the Utility Grid Wind Energy System will be required to obtain compliance through mitigation or other measures.

(1) Methodology - Refer to Section g)

(2) Measurement Locations

(a) Measurement locations shall be conducted at the property of the complainant and chosen by the Measurement Personnel and by the Planning Commission beforehand. The measurement locations shall include, but are not limited to, the following representative locations:

(i) For participating parcels, a minimum of one measurement location at the Noise Sensitive Facility of the complainant, measured 50 feet from the façade nearest the closest wind turbine of the Utility Grid Wind Energy System.

(ii) For non-participating parcels, a minimum of one measurement location at the parcel boundary line of the complainant nearest the closes wind turbine of the Utility Grid Wind Energy System.

(iii) Any measurement location determined necessary by the Measurement Personnel and Planning Commission.

(b) The microphone shall be positioned at a height of 5 feet ± 1 foot above the ground, and oriented in accordance with the characteristics of the microphone so that the frequency response is as flat as possible.

(c) To the greatest extent possible, measurement locations should be located away from potential contaminating sources of noise such as major highways, industrial facilities and urban areas.

(d) To the greatest extent possible, measurement locations shall be at the center of unobstructed areas that are maintained free of vegetation and other structures or material that is greater than 2 feet in height for a 50-foot radius around the sound monitoring equipment.

(e) To the greatest extent possible, measurement locations should be at least 50 feet from any known sound source.

(f) Meteorological measurements of the surface wind speed and direction shall be collected using anemometers at a height of 6.6 foot ± 0.7 foot above the ground, near each noise measurement location. Care should be taken to avoid noise measurement contamination from the anemometer operation.

(3) Reporting of Measurement Data Measurement Reports shall be submitted to the Planning Commission within 45 days of completion and shall include as indicated in e) 3.

i) General Sound Survey Methodology

(1) All sound studies will be completed by an independent third party that is hired by the township. Fees for such studies shall be paid for from the escrow fund described in Section c. 3 above.

(2) Measurement Personnel. Measurements shall be supervised by personnel who are independent of the Utility Grid Wind Energy System, well qualified by training and experience in measurement and evaluation of environmental sound and are Board Certified members of the Institute of Noise Control Engineering (INCE).

(3) Measurement Instrumentation. Measurement devices shall comply with the following requirements:

(a) A sound level meter or alternative sound level measurement system used shall meet all of the Type 1 performance requirements of American National Standard Specifications for Sound Level Meters, ANSI S1.4.

(b) An integrating sound level meter (or measurement system) shall also meet the Class 1 performance requirements for integrating/averaging in the International Electrotechnical Commission Sound Level Meters, IEC Publication 61672-1.

(c) A filter for determining the existence of tonal sounds shall meet all of the Class 1 performance requirements of American National Standard Specification for Octave- Band and Fractional Octave-Band Analog and Digital Filters, ANSI S1.11.

(d) An acoustical calibrator shall be used of a type recommended by the manufacturer of the sound level meter and that meets the Type 1 performance requirements of American National Standard Specification for Acoustical Calibrators, ANSI S1.40.

(e) A microphone windscreen shall be used of a type that meets or exceeds the recommendations of manufacturer of the sound level meter.

(f) The sound level meter shall have been calibrated by a laboratory within 24 months of the measurement, and the microphone's response shall be traceable to the National Bureau of Standards.

(g) The sound level meter shall be used with the fast meter response and sampling frequency of one sample per second.

(h) Anemometer(s) used for surface wind speeds shall have a minimum manufacturer specified accuracy of ±1 mph providing data in five second integrations.

(i) Compass used for surface wind direction shall have a minimum manufacturer specified accuracy of ±3° providing data in five second integrations.

(j) Thermometer used for surface temperature shall have a minimum manufacturer specified accuracy of ±2°C providing data in five second integrations.

(k) A digital recording device used to store the time waveform of the sound pressure levels shall comply with the requirements of ANSI/ASA S1.13.

5) Construction Codes, Towers, and Interconnection Standards:

c) Utility Grid wind energy systems including towers shall comply with all applicable state construction and electrical codes and local building permit requirements.

d) Utility Grid wind energy systems including towers shall comply with Federal Aviation Administration requirements, the Michigan Airport Zoning Act (Public Act 23 of 1950, MCL 259.431 et seq.), the Michigan Tall Structures Act (Public Act 259 of 1959, MCL 259.481 et seq.), and local jurisdiction airport overlay zone regulations. Utility Grid wind energy systems shall comply with applicable utility, Michigan Public Service Commission, and Federal Energy Regulatory Commission interconnection standards.

6) Lighting:

c) Utility Grid wind energy system towers shall not be illuminated unless required by the FAA.

d) When illumination is required by the FAA, Utility Grid wind energy system are required to use Aircraft Detection Lighting Systems (ADLS). No other illumination or tower lighting will be approved by Brant Township.

e) All tower lighting required by the FAA shall be shielded to the maximum extent possible to reduce glare and visibility from the ground. Continuous nighttime lighting systems are not allowed.

7) Safety:

c) All Utility Grid wind energy systems shall be designed to prevent unauthorized access to electrical and mechanical components and shall have access doors that are kept securely locked at all times when service personnel are not present.

d) All spent lubricants and cooling fluids shall be properly and safely removed in a timely manner from the site of the wind energy system.

e) A sign shall be posted near the tower or Operations and Maintenance Office building that will contain emergency contact information.

f) Signage placed at the road access shall be used to warn visitors about the potential danger of falling ice.

g) The minimum vertical blade tip clearance from grade shall be 50 feet for a wind energy system employing a horizontal axis rotor.

h) The applicant shall be responsible for maintenance of the access roads. At the landowner's discretion, the entrance of each access road from the public right of way shall be gated, with wings as appropriate, to discourage trespassers.

8) Visual Impact:

c) Utility Grid wind energy system projects shall use tubular towers and all Utility Grid wind energy systems in a project shall be finished in a single, non-reflective matte finished color.

d) A project shall be constructed using wind energy systems of similar design, size, operation, and appearance throughout the project.

e) No lettering, company insignia, advertising, or graphics shall be on any part of the tower, hub, or blades. Nacelles may have lettering that exhibits the manufacturer's and/or owner's identification.

f) The applicant shall avoid state or federal scenic areas and significant visual resources listed in the local unit of government's comprehensive plan.

9) Environmental Impact:

c) The applicant shall have a third party, qualified professional conduct an analysis to identify and assess any potential impacts on the natural environment including, but not limited to wetlands and other fragile ecosystems, historical and cultural sites, and antiquities. The applicant shall take appropriate measures to minimize, eliminate or mitigate adverse impacts identified in the analysis.

d) The applicant shall identify and evaluate the significance of any net effects or concerns that will remain after mitigation efforts. The applicant shall comply with applicable parts of the Michigan Natural Resources and Environmental Protection Act (Act 451 of 1994, MCL 324.101 et seq.) including but not limited to Part 31 Water Resources Protection (MCL 324.3101 et seq.), Part 91 Soil Erosion and Sedimentation Control (MCL 324.9101 et seq.) , Part 301 Inland Lakes and Streams (MCL 324.30101 et seq.), Part 303 Wetlands (MCL 324.30301 et seq.), Part 323 Shoreland Protection and Management (MCL 324.32301 et seq.), Part 325 Great Lakes Submerged Lands (MCL 324.32501 et seq.), and Part 353 Sand Dunes Protection and Management (MCL 324.35301 et seq.).

e) The applicant shall be responsible for making repairs to any public roads damaged by the construction of the Utility Grid wind energy system.

10) Avian and Wildlife Impact:

c) The applicant shall have a third party, qualified professional conduct an analysis to identify and assess any potential impacts on wildlife and endangered species. The applicant shall take appropriate measures to minimize, eliminate or mitigate adverse impacts identified in the analysis. The applicant shall identify and evaluate the significance of any net effects or concerns that will remain after mitigation efforts.

d) Sites requiring special scrutiny include wildlife refuges, other areas where birds are highly concentrated, bat hibernacula, wooded ridge tops that attract wildlife, sites that are frequented by federally and/or state listed endangered species of birds and bats, significant bird migration pathways, and areas that have landscape features known to attract large numbers of raptors.

e) At a minimum, the analysis shall include a thorough review of existing information regarding species and potential habitats in the vicinity of the project area. Where appropriate, surveys for bats, raptors, and general avian use should be conducted. The analysis shall include the potential effects on species listed under the federal Endangered Species Act and Michigan's Endangered Species Protection Law.

f) The analysis shall indicate whether a post construction wildlife mortality study will be conducted and, if not, the reasons why such a study does not need to be conducted. Power lines should be placed underground, when feasible, to prevent avian collisions and electrocutions. All above-ground lines, transformers, or conductors should comply with the Avian Power Line Interaction Committee ( ) published standards to prevent avian mortality.

11) Electromagnetic Interference:

c) No Utility Grid wind energy system shall be installed in any location where its proximity to existing fixed broadcast, retransmission, or reception antennae for radio, television, or wireless phone or other personal communication systems would produce electromagnetic interference with signal transmission or reception unless the applicant provides a replacement signal to the affected party that will restore reception to at least the level present before operation of the wind energy system.

d) No Utility Grid wind energy system shall be installed in any location within the line of sight of an existing microwave communications link where operation of the wind energy system is likely to produce electromagnetic interference in the link's operation unless the interference is insignificant.

12) Shadow Flicker:

c) Shadow Flicker Analysis: The applicant shall conduct an analysis on potential shadow flicker at inhabited structures. The analysis shall identify the locations of shadow flicker that may be caused by the project and the expected durations of the flicker at these locations from sunrise to sunset over the course of a year. Site plans shall depict a contour around each proposed wind turbine that represents the predicted 30 hours per year shadow flicker generated by the modeling software used in the report. The analysis shall identify all areas where shadow flicker may affect the occupants of the inhabitable structures.

d) The shadow flicker analysis shall include a shadow flicker mitigation plan, which describes measures that shall be taken to eliminate shadow flicker that occurs beyond the levels set herein. Mitigation measures may be allowed on participating parcels.

e) All turbines that may cause shadow flicker on inhabited structures in non-participating parcels shall be outfitted with curtailment software.

f) Any shadow flicker complaint shall be addressed by the applicant and be mitigated or eliminated based upon the standards herein.

g) Shadow flicker will be measured at the nearest external wall or walls of inhabited structures.

h) Shadow flicker at participating parcels shall be limited to a maximum of 30 hours per year.

i) Shadow flicker at non-participating parcels is not allowed.

13) Decommissioning:

c) The applicant shall submit a decommissioning plan. The plan shall include:

(1) the anticipated life of the project,

(2) the estimated decommissioning costs net of salvage value in current dollars,

(3) the method of ensuring that funds will be available for decommissioning and restoration,

(4) the anticipated manner in which the project will be decommissioned, and the site restored.

(5) A provision to give notice to the Township one year in advance of decommissioning. A surety bond to assure payment of the cost of decommissioning may be required.

(6) The standard for inactivity shall be 12 months. Inactivity means that the utility grid wind energy system has ceased to generate electric power.

d) Removal shall include the proper receipt of a demolition permit from the Building Official and proper restoration of the site to the satisfaction of the Building Official and the Zoning Administrator.

e) Removal of the structure and its accessory use facilities shall include removing the caisson and all other components to a depth of no less than six feet below the original grade (prior to installation of the turbine) as indicated on the approved site plan. This area shall then be appropriately drained. It shall be filled with like soil that was removed, including topsoil, and restored to a state compatible with the surrounding land. Restoration must be completed within 90 days of abandonment.

f) To ensure proper removal of the structure when it is abandoned, any application for approval of a structure shall include a description of the financial security to be posted at the time of receiving a special use permit. The security shall be in the form of 1) cash deposit; 2) irrevocable bank letter of credit or 3) performance bond in a form approved by the Township Attorney, establishing the obligation of the applicant to remove the structure in a timely manner. The amount of such guarantee shall be no less than 110% of the estimated cost of removal. Salvage value shall not be considered in the estimated cost of removal. The estimate shall be prepared by the engineer for the developer and approved by the Township Board. When determining the amount of such required security, the Township may also require future meetings at pre-set intervals, to establish corrected values for decommissioning. The financial security instrument shall be adjusted to each determined corrected value. Such financial guarantee shall be deposited or filed with the Township Clerk after a special use has been approved but before construction commences. Such financial security shall be kept in full force and effect during the entire time that the structure exists. Such financial security shall be irrevocable and non-cancelable (except by the written

consent of both the Township and the then owner of the structure) for at least thirty (30) years from the date of the special land use approval or for the life of the turbine, whichever is longer. Failure to keep such financial security in full force and effect at all times while the structure exists shall constitute a material and significant violation of a special use approval and this ordinance, and will subject the applicant to all available remedies to the Township, including possible enforcement action and revocation of the special use approval. The applicant shall be responsible for the payment of any attorney fees and other costs incurred by the Township in the event that the structure is not voluntarily removed, and the Township must enforce removal.

g) In the event that the Owner/Operator defaults on any or all the previously outlined decommissioning requirements, the landowner upon which any Utility Grid wind energy system facilities are located shall be responsible and liable for the removal of any structures. Failure of the landowner's compliance to the removal and decommissioning guidelines would result in the Township having the structure(s) removed at the expense of the landowner. If funding is not available to cover the costs of removal by the landowner, legal action to pursue the seizure of property(s) will take place to cover such costs.

14) Complaint Resolution

c) The applicant shall develop a process to resolve complaints from nearby residents concerning the construction or operation of the project. All complaints shall be acknowledged within 10 days of receipt of such complaint and the Township supervisor shall also be notified of each complaint. The process may use an independent mediator or arbitrator and shall include a time limit for acting on a complaint. The process shall not preclude the local government from acting on a complaint.

d) The applicant shall maintain and make available to nearby residents a telephone number where a project representative can be reached during normal business hours.

e) A report of all complaints and resolutions to complaints shall be filed with the township on a quarterly basis.

PUBLISHED NOTICE OF PUBLIC HEARING

Notice of Public Hearing for the above Amendment to the Brant Township Zoning Ordinance was published in the Tri-County Citizen on the 3rd day of October, 2021.

POSTED NOTICE OF PUBLIC HEARING

Notice of Public Hearing for the above Amendment to the Brant Township Zoning Ordinance was posted on the Brant Township Bulletin Board and Tri County Citizen the 3rd day of October, 2021.

SUBMISSION TO COUNTY PLANNING COMMISSION FOR REVIEW
The above Amendment to the Brant Township Zoning Ordinance was submitted to the Saginaw County Zoning Department on the 15th day of October, 2021.

SUBMISSION TO TOWNSHIP BOARD FOR CONSIDERATION
The above Zoning Ordinance was submitted to the Brant Township Board on the 14th day of September, 2021.

ADOPTION
The above Amendment to the Brant Township Zoning Ordinance is a true copy made and passed at a regular meeting of the Brant Township Board on the 14th day of December, 2021, the roll call vote being as follows:

YEAS: Rob Fowler, Barb Fowler, Theresa Morris, Ken Smith, Paula Cooper
NAYS: 0
ABSENT/ABSTAIN: None

PUBLICATION OF ORDINANCE
A legally proper summary of the above Ordinance was published in the Tri-County Citizen on the 9th day of January, 2022.

CERTIFICATION
I hereby certify that the foregoing is a true and complete copy of an ordinance adopted by the Brant Township Board at a meeting held on December 14, 2021, pursuant to the procedures required by law.

Robert Smith

BRANT TOWNSHIP