

**TOWNSHIP OF NORTH BRANCH**  
**ZONING ORDINANCE AMENDMENT**  
**WIND ENERGY CONVERSION SYSTEMS**

**Ordinance No. 109.01**

An Ordinance to amend the North Branch Township Zoning Ordinance, adopted on October 13, 2020, to provide for the regulation of small and commercial Wind Energy Conversion Systems.

**THE TOWNSHIP OF NORTH BRANCH ORDAINS:**

*Section 2.02 Definitions of the North Branch Township Zoning Ordinance is hereby amended to add the following definitions:*

**Section 2.02 Definitions**

**Ambient Noise Level:** The amount of background noise at a given location prior to the installation of a WECS(s) which may include, but not be limited to, traffic, machinery, lawnmowers, human activity, and the interaction of wind with the landscape. The ambient noise level is measured on the dB(A) weighted scale as defined by the American National Standards Institute ("ANSI").

**ANSI:** The American National Standards Institute. The Current revision of each referenced standard shall be used.

**Background Sound:** The all-encompassing sound associated with a given environment without contributions from the source or sources of interest, as defined by ANSI S12.9 Part 3.

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

**Decibel:** *See Sound Pressure Level.*

**Downwind:** a position where the direction of the wind vector is within an angle of  $\pm 45^\circ$  of the direction connecting the center of the sound source and the center of the specified receiver area, as defined by ANSI S12.18.

**Frequency:** The number of oscillations or cycles per unit of time, expressed as Hertz (Hz).

**Hertz:** The frequency of sound expressed by cycles per second.

**Hub Height:** When referring to a Wind Turbine, the distance measured from ground level to the center of the turbine hub.

**IEC:** The International Electrotechnical Commission. The current revision of each referenced standard shall be used.

**INCE:** The Institute of Noise Control Engineering.

**Inhabited Structure:** A dwelling, home, or any building that is used for assembly, education, entertainment, lodging, trade, manufacture, or occupancy by the public.

**ISO:** The International Organization for Standardization. The current revision of each referenced standard shall be used.

**Non-Participating Parcel:** A parcel that is not subject to a wind turbine lease or easement agreement, or other contractual agreement at the time an application is submitted for an application for the purposes of constructing a C-WECS.

**Octave Band:** The frequency interval where the upper frequency is twice the lower frequency

**One-Third Octave Band:** The frequency interval where the upper frequency is the lower frequency times the cube root of two.

**Participating Parcel:** A parcel that participates in a lease or easement agreement, or other contractual agreement, with an entity submitting an application for the purposes of developing a C-WECS.

**Pre-existing equivalent continuous background noise level  $L_{eq}$ :** The background ambient sound level measured prior to construction, expressed as the overall continuous sound level ( $L_{eq}$ ) for the entire period of measurement, where the overall  $L_{eq}$  for each measurement location is arithmetically averaged to calculate a single value for the entire project area.

**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.

**Shadow Flicker:** Alternating changes in light intensity caused by the moving blade of a C-WECS casting shadows on the ground and stationary objects.

**Sound Power:** The rate per unit time at which sound energy is radiated, expressed as watts (W).

**Sound Power Level:** 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).

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

**Sound Pressure Level:** 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 dBZ shall refer to an un-weighted measurement.

**Transient Background Sound:** Background sound associated with one or more sound events which occur infrequently during the basic measurement period, a measurement interval with or without the source operating, as defined by ANSI S12.9 Part 3.

**Wind Turbine:** A wind energy conversion system which converts wind energy into electricity through the use of a wind turbine generator, and includes the turbine, blade, tower, base and pad transformer, if any; provided that such a system shall only be a wind turbine for purposes of this Article if it both has a total height greater than 150 feet and nameplate capacity of greater than 100 kilowatts.

*The following specified Sections of the North Branch Township Zoning Ordinance are hereby amended to provide as follows:*

**Section 5.01 Districts**

The Township is hereby divided into the following Zoning Districts:

- AR Agricultural Residential
- R Single Family Residential
- RM Multiple Family Residential
- C Commercial
- I Industrial
- W Commercial Wind Energy Overlay

**Section 5.06 Table of Uses**

Table 5-1: Table of Uses						AR	R (SFR)	RM	C	I	W
<b>Key:</b> P = Permitted SLU = Special Land Use											
<b>Other Uses</b>											
Commercial Wind Energy Conversion Systems ("C-WECS")											SLU
Small Wind Energy Conversion Systems ("S-WECS")						P	SLU	SLU	P	P	
MET Tower											SLU

**Section 5.07 Table of Use Design Requirements**

The below table is utilized to see based on each use what the definition, parking requirements, and other design requirements. All uses or land or structures shall comply with the area, setback, and height requirements of Article 14, for the Zoning District in which they are located, unless different requirements are specified as a condition for a use permitted after special land use.

<b>Table 5-2: Table of Uses Design Requirements</b>	<b>Definitions</b>	<b>Parking</b>	<b>Design Standard</b>
<b>Other Uses</b>			
Commercial Wind Energy Conversion Systems ("C-WECS")	Any device that converts wind energy to mechanical or electrical energy that is designed and built to provide electricity to the electric utility grid.	N/A	See Section 5.16
Small Wind Energy Conversion Systems ("S-WECS")	Any device that converts wind energy to mechanical or electrical energy that supplies energy to onsite uses and does not produce electric energy for wholesale or retail sale.	N/A	See Section 5.17
MET Towers	Any temporary tower, more than sixty-five (65') feet in height, used to measure wind speed and direction, includes meteorological towers, SCADA towers, and anemometer towers.	N/A	a) The distance from the center of the MET tower to any non-participating property line, road right-of-way, above ground utility lines, and inhabited structure shall be no less than one-hundred twenty-five (125%) percent of the height of the MET tower.  b) MET towers shall only be permitted for a period of one (1) year; however, the Planning Commission may grant an extension for up to one (1) additional year.

*The following specified Sections of the North Branch Township Zoning Ordinance are hereby added to provide as follows:*

**Section 5.16 Commercial Wind Energy Conversion Systems ("C-WECS")**

- A. Intent Statement: The intention of the North Branch Township Board is to provide an appropriate and suitable location for the construction and operation of C-WECS within the Township. The intent is to meet the needs of the residents of North Branch Township in providing energy and other natural resources, places of safe residence, recreation, industry, and other uses, to facilitate adequate protect the habitats for wildlife, and to promote and protect the health, welfare, safety, and quality of life of the general public, and to ensure compatible land uses in the vicinity of areas affected by wind energy facilities.
- B. Commercial Wind Energy Conversion System Overlay: A zoning overlay district is hereby established in the northeast quadrant of North Branch Township for the location of C-WECS. The C-WECS Overlay District shall include Township sections 1, 2, 3, 10, 11, 12, and the north half of sections 13 and 14, as shown on the amended zoning map.
- C. Applicability of Ordinance Construction
  - 1. The C-WECS shall comply with all applicable state construction codes, as well as Federal Aviation Administration ("FAA") requirements, the Michigan Airport Zoning Act, the Michigan Tall Structures Act, and any other local regulations, is applicable. The tower shaft shall not be illuminated unless required by the FAA. The C-WECS shall comply with applicable utility, Michigan Public Service Commission, and Federal Energy Regulatory Commission interconnection standards.
- D. Standards for and Regulation of C-WECS
  - 1. Electromagnetic Interference ("EMI"): No C-WECS shall be installed in any location where its proximity to existing fixed broadcast, retransmission, or reception antennae for global positioning system correction systems ("RTK"), 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 C-WECS. No C-WECS shall be installed in any location within the line of sight of an existing microwave communications link where operation of the C-WECS is likely to

produce electromagnetic interference in the link's operation unless the interference is insignificant.

2. **Maximum Height:** The maximum height shall be five hundred (500) feet, unless otherwise prohibited by any state or federal statute or regulations.
3. **Tower Height:** A tower's height is the height of the actual tower, plus one-half of the rotor diameter on horizontal axis installation and on vertical axis installation, the distance from the base of the tower to the top of the unit as measured from the established grade.
4. **Setbacks:** The setback area can extend out of the overlay, but the physical location of the C-WECS may not be constructed outside of the overlay. The minimum setbacks for C-WECS shall be as follows:
  - a. one and a half (1.5) times the tower height from any road right-of-way, above ground utility line, and underground gas lines.
  - b. two (2) times the tower height from any inhabited structures on participating parcels. C-WECS may be put on participating parcel property lines.
  - c. two and a half (2.5) times the tower height from all non-participating property lines.
5. **Minimum Blade Height:** The minimum distance between the ground and any protruding blades utilized on a C-WECS shall be seventy-five (75) feet, as measured at the lowest point of the arc of the blades.
6. **Labeling Requirements:** A minimum of one (1) sign shall be clearly posted near ground level on the C-WECS warning of high voltage. In addition, the following information shall be posted on a label or labels on the generator or alternator of the C-WECS.
  - a. The maximum power output of the system and the wind speed at which it is achieved.
  - b. Nominal voltage and maximum current voltage.
  - c. Manufacturer's name and address, serial number, and model number.
  - d. Maximum survival wind speed and the emergency and normal shutdown procedures.

7. All electric line/utility wires shall be buried under ground unless otherwise approved by the Township. The minimum depth of the buried wire shall be four (4) feet.
8. Any mechanical equipment associated with and necessary for operation, including a building for batteries and storage cells shall be enclosed with a six (6) foot view obscuring fence or hedge unless stored within a building. The supporting tower shall also be enclosed with a six (6) foot view obscuring fence or hedge unless the base of the tower is not climbable for a distance of twelve (12) feet.
9. The tower and generating unit shall, at all times be maintained to meet industry standards. The operator shall notify the Township of any non-functioning C-WECS within one (1) year.
10. The C-WECS shall not be used for the purposes of advertising.
11. Collocation of wireless communication facilities on C-WECS towers shall be permitted.
12. C-WECS towers shall be equipped with fire detection and fire suppression. In addition, there shall be a minimum of one sensor to monitor the operating temperature in the C-WECS tower.
13. The C-WECS's tower, blades, and associated equipment must be a neutral color and non-reflective material.
14. It is prohibited to artificially light any component of the C-WECS, except to the extent required by the FAA or other applicable authority, or otherwise necessary for the reasonable safety and security thereof.
15. Utility Provider Notification: The Utility Provider shall be notified in writing of any proposed interface with that company's grid prior to installing such interface and shall conform with all federal, state, and local statutes, ordinances, and regulations. Verification of this shall also be supplied to the Township.
16. Safety: The C-WECS' manufacturers shall document that the C-WECS model has been tested and certified by Underwriter's Laboratory, or other such applicable independent accrediting agency, and that when installed in accordance with recommended specifications shall have a maximum survival wind speed of not less than eighty (80) miles per hour.



## 17. Sound Requirements

- a. For residentially used properties, the audible noise from a C-WECS shall not exceed the maximum noise limit of six (6) dB greater than the pre-existing equivalent continuous background noise level  $L_{eq}$  at 50 feet from any participating residence and at the property line for any non-participating parcels. In no case shall the maximum noise limit exceed 45 dBA  $L_{1h}$  at a participating residence or at the property line of any non-participating parcel, nor shall the maximum noise limit exceed 55 dBA  $L_{1h}$  at properties used commercially or industrially.
- b. In the event audible noise from the operation of the C-WECS contains a prominent discrete tone, the limits 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 equivalent-continuous sound pressure level for both 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 4, Annex C.
- c. In the event the noise levels resulting from the C-WECS exceed the criteria listed above, a waiver to said levels may be approved provided that the following has been accomplished:
  - i. Written consent from the affected property owner(s) has been obtained stating that they are aware of the C-WECS and the noise limitations imposed by this Zoning Ordinance, and that consent is granted to allow noise levels to exceed the maximum limits otherwise allowed; and
  - ii. A noise impact easement shall be recorded in the Lapeer County Register of Deeds office which describes the benefitted and burdened properties and which advises all subsequent owners of the burdened property that noise levels in excess of those otherwise permitted by the ordinance may exist on or at the burdened property.

18. Pre-Construction Noise Survey: The Applicant's special land use application shall include a pre-construction sound survey to establish the ambient noise level across the special land use area.
- a. Methodology:
    - i. Refer to Section 5.16.D.23 for measurement personnel and instrumentation requirements.
    - ii. A calibration check shall be performed and recorded before and after each measurement period.
    - iii. The measurement period shall be 14 days minimum. Sound level data shall be aggregated in daytime (7:00 am to 10:00 pm) and nighttime (10:00 pm to 7:00 am) equivalent continuous averages as the basis for separate compliance limits.
    - vi. The sound level measured in each 10-minute measurement interval above may be corrected for transient background sound and periods outside of sound meter and wind screen specifications according to ANSI S12.9 Part 3. For preconstruction ambient sound level measurements, transient sounds include those that are unusual or anomalous, or are seasonal, and have sufficient magnitude to bias the entire measurement result.
  - b. Measurement Locations:
    - i. The measurement locations shall be chosen by the developers' Measurement Personnel and by the Planning Commission prior to the Pre-Construction Sound Survey.
    - ii. The measurement locations shall be performed at non-participating property lines in close proximity to one or multiple wind turbines and/or locations which have modeled sound levels closest to limits identified in Section 5.16.D.17.a 8:1 ratio (wind turbines to measurement locations) will be used to determine the number of measurement locations, with a minimum of 8 measurement locations.
    - iii. The microphone shall be positioned at a height of 5 feet  $\pm$  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.

- iv. 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.
  - v. To the greatest extent possible, measurement locations should be at least 50 feet from any known sound source.
  - vi. Meteorological measurements of the surface wind speed and direction shall be collected using anemometers at microphone height, near each noise measurement location. Care should be taken to avoid noise measurement contamination from the anemometer operation.
- c. Reporting of Measurement Data: Pre-Construction Measurement Reports must be based upon data which is not more than three (3) years old from the date of submission of the Special land Use Application to the Planning Commission and shall include, at a minimum, the following:
- i. A narrative description of the sound measurements collected.
  - ii. A map showing the wind turbine locations, noise measurement locations, and all inhabited structures.
  - iii. The dates, days of the week and hours of the day when measurements were made.
  - iv. The wind direction and speed, temperature, precipitation, and sky condition for each 10-minute measurement interval. Meteorological measurements of the wind speed and direction will be reported at the surface height, based on five second integration intervals. Both the average and maximum wind speeds for each 10-minute measurement interval shall be reported.
  - v. Identification of all measurement equipment by make, model and serial number.

- vi. All meteorological, sound, windscreen and audio instrumentation specifications.
  - vii. All A-weighted equivalent sound levels for each 10-minute measurement interval as well as the overall daytime and nighttime periods.
  - viii. All periods removed from the data due to temperatures above or below manufacturer specifications, wind speeds above ANSI S12.18 limits.
  - ix. All corrections for transient 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 or better format.
  - x. All other information determined necessary by the Planning Commission.
19. Any noise level falling between two whole decibels shall be rounded to the nearest whole number.
20. Sound Modeling Study: The Applicant shall also provide a predictive sound modeling study of all turbine noise for a C-WECS to verify that ordinance requirements can be met. 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 added 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 Inhabited Structures, 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 C-WECS.

21. 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 ( $L_{1h}$ ) set forth in Section 17. 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 C-WECS will be required to obtain compliance through mitigation or other measures.
  - a. Methodology:
    - i. Refer to Section 5.16.D.23 for measurement personnel and instrumentation requirements.
    - ii. A calibration check shall be performed and recorded before and after each measurement period.
    - iii. The nighttime measurement period shall be 2 hours minimum and shall be continuously observed by a trained attendant. 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).
    - iv. The daytime measurement period shall be two (2) hours minimum and shall be continuously observed by a trained attendant. 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.
    - v. Compliance will be demonstrated when the Equivalent A-weighted Continuous Sound Level of every hour is less than or equal to the Equivalent A-weighted Continuous sound level limits as set forth in Section 5.16.D.17.a of this Ordinance. Representative intervals are defined as:

- 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  $\pm 45$  degrees of the annual prevailing wind direction.
  - 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.
  - Periods where ground level gusts are equal to or less than 5 m/s (11.185 mph).
- vi. The sound level measured in each 10-minute measurement interval above may be corrected for transient background sound and continuous background sound, according to ANSI S12.9 Part 3. Continuous background sound may be measured during adjacent turbine shutdown periods of at least 10 minutes in length.
- b. Measurement Locations: See Section 5.16.D.18.b.
- c. Reporting of Measurement Data: Measurement Reports shall include, at a minimum, the following:
- i. A narrative description of the sound from the C-WECS for the compliance measurement period result.
  - ii. A narrative description of the sound measurements collected.
  - iii. A map showing the wind turbine locations, noise measurement locations, and all inhabited structures.
  - iv. The dates, days of the week and hours of the day when measurements were made.
  - v. The wind direction and speed, temperature, precipitation, and sky condition for each 10-minute 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 C-WECS Applicant from the closest wind turbine), based on five second integration intervals. Both the average and maximum wind speeds for each 10-minute measurement interval shall be reported.

- vi. The wind energy output for each 10-minute measurement interval for the closest wind turbine.
- vii. Identification of all measurement equipment by make, model and serial number.
- viii. All meteorological, sound, windscreen and audio instrumentation specifications.
- ix. All A-weighted equivalent sound levels for each one-hour measurement interval.
- x. All 1/3 octave band linear equivalent sound levels for each 10-minute measurement interval and identification of tonal periods.
- xi. All attendant's notes and observations.
- xii. 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.
- xiii. All periods removed from the data due to temperatures above or below manufacturer specifications, wind speeds above ANSI S12.18 limits.
- xiv. 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 or better format.

- xv. All other information determined necessary by the Planning Commission.
22. Measurement of the Sound from Routine Operation of the Developments: Measurements of the sound from routine operation of completed C-WECS 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 Continuous sound level limits set forth in Section 5.16.D.17. The measurements and the reporting of the data shall be conducted in accordance with Section 5.16.D.21.a-c. Should the measurements indicate a non-compliant measurement, the owner of the C-WECS will be required to obtain compliance through mitigation or other measures.
- a. Methodology:
    - i. Refer to Section 5.16.D.23 for measurement personnel and instrumentation requirements.
    - ii. A calibration check shall be performed and recorded before and after each measurement period.
    - iii. The nighttime measurement period shall be 2 hours minimum and shall be continuously observed by a trained attendant. Sound level data shall be aggregated in one-hour measurement intervals within the nighttime compliance measurement period (nighttime: 10:00 pm to 7:00 am).
    - iv. The daytime measurement period shall be 2 hours minimum and shall be continuously observed by a trained attendant. Sound level data shall be aggregated in one-hour 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.
    - v. Compliance will be demonstrated when the Equivalent A-weighted Continuous Sound Level of every measurement interval is less than or equal to the



Equivalent A-weighted Continuous sound level limits as set forth in Section 5.16.D.17.a of this Ordinance. Representative intervals are defined as:

- 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  $\pm 45$  degrees of the annual prevailing wind direction.
  - 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.
  - Periods where ground level gusts are equal to or less than 5 m/s (11.185 mph).
- vi. The sound level measured in each 10-minute measurement interval above may be corrected for transient background sound and continuous background sound, according to ANSI S12.9 Part 3. Continuous background sound may be measured during adjacent turbine shutdown periods of at least 10 minutes in length.
- b. Measurement Locations:
- i. 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:
- A minimum of one measurement location at the parcel identified in the complaint. If the complaint is for a non-participating parcel, the measurement location shall be at the property line nearest to the closest wind turbine of the C-WECS. If the complaint is for a participating parcel, the measurement location shall be at the inhabited structure, measured 50 feet from the

façade nearest the closest wind turbine of the C-WECS.

- Any measurement location determined necessary by the Measurement Personnel and Planning Commission.
- ii. The microphone shall be positioned at a height of 5 feet  $\pm$  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.
  - iii. 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.
  - iv. 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.
  - v. To the greatest extent possible, measurement locations should be at least 50 feet from any known sound source.
  - vi. Meteorological measurements of the surface wind speed and direction shall be collected using anemometers at microphone height, near each noise measurement location. Care should be taken to avoid noise measurement contamination from the anemometer operation.
- c. Reporting of Measurement Data: See Section 5.16.D.21.c.i-xv.

23. General Sound Survey Methodology:

- a. Measurement Personnel. Measurements shall be supervised by personnel who are independent of the C-WECS Applicant/Owner, 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).

- b. Measurement Instrumentation. Measurement devices shall comply with the following requirements:
- i. 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.
  - ii. 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.
  - iii. 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.
  - iv. 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.
  - v. A microphone windscreen shall be used of a type that meets or exceeds the recommendations of manufacturer of the sound level meter.
  - vi. 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.
  - vii. The sound level meter shall use a sampling frequency of one sample per second.
  - viii. Anemometer(s) used for surface wind speeds shall have a minimum manufacturer specified accuracy of  $\pm 1$  mph providing data in five second integrations.
  - ix. Compass used for surface wind direction shall have a minimum manufacturer specified accuracy of  $\pm 3^\circ$  providing data in five second integrations.

- x. Thermometer used for surface temperature shall have a minimum manufacturer specified accuracy of  $\pm 2^{\circ}\text{C}$  providing data in five second integrations.
24. Shadow Flicker: The Applicant shall have a third party conduct an analysis of potential shadow flicker created by each proposed wind turbine at all inhabitable structures when within participating parcels and from property lines of nonparticipating parcels with direct line-of-sight to a wind turbine. Such analysis shall be documented in a shadow flicker modeling report to be submitted as part of the Special Approval Permit Application to the Planning Commission. The analysis shall identify the locations of shadow flicker created by each proposed wind turbine 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 thirty (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 and describe measures that shall be taken to eliminate or mitigate the problems. A shadow flicker mitigation plan shall also be submitted with the shadow flicker modeling report. Any shadow flicker complaint shall be addressed by the Applicant and be mitigated.
25. The development shall conduct a development impact statement and traffic impact statement for the construction and operation of all C-WECS.
26. The Applicant shall provide a route for building material for the C-WECS and provide proof of approval from Lapeer County Road Commission for potential improvements that will be required to the roadways.
27. The lighting on the C-WECS shall be compliant of FAA guidelines. If FAA determines that Aircraft Detection Lighting Systems (ADLS) are appropriate, then the system shall be required by the Township.
- E. Complaint Resolution:
- 1. The C-WECS Applicant shall submit a detailed written complaint resolution process developed by the C-WECS Applicant to resolve complaints from the Township Board or the North Branch Township Parcel owners or residents concerning the construction or operation of the C-WECS or Testing Facility. The complaint resolution process

must be approved by the Township Board as a condition of approval of the Special Approval permit application.

2. The Township Board shall appoint a three-member Complaint Resolution Committee to oversee and participate in all complaint resolution discussions or meetings between the Township parcel owner or resident and the C-WECS Applicant.
  3. The Complaint Resolution Committee shall consist of one (1) member of the Township Board, one (1) member of the Township Planning Commission, and one (1) qualified elector chosen from the community.
  4. The C-WECS Applicant shall provide not less than forty-eight (48)-hour notice to the Complaint Resolution Committee and shall provide the opportunity for the Committee to attend any and all complaint resolution discussions and meetings.
  5. The Township Board shall be kept apprised of all complaints and shall receive a report outlining the issues, the progress, and the resolution of each such complaint. Such report shall be presented monthly by the Complaint Resolution Committee.
  6. If a decision of the Complaint Resolution Committee cannot be met, then this matter shall go in front of an arbiter.
- F. Decommissioning: The Applicant shall submit a decommissioning plan which 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.
  6. The Applicant shall post financial security to ensure payment of the cost of decommissioning and the proper removal of the C-WECS when it ceases to be used for a period of at least one (1) year. The

financial security shall be in favor of the Township and may be provided jointly as a single instrument for multiple governmental units within a single wind farm; however, any such single instrument shall be in an amount of at least one million dollars and shall contain a replenishment obligation. Any application for a C-WECS shall include a description of this financial security which will be posted at the time of receiving a building permit for the facility-WECS. The security shall be a: 1) cash bond; 2) irrevocable bank letter of credit; or 3) performance bond in a form approved by the Township. The Applicant shall be responsible for the payment of any costs or attorney fees incurred by the Township in securing removal of the C-WECS.

7. The standard for inactivity shall be twelve (12) months.
8. The decommissioning plan shall include removal of associated material or feature into the ground a minimum of four (4) feet, including but not limited to access roads, foundation of the tower, adequate drainage of the site, and connection powerlines, with the exception that the access roads and connection lines may remain by written consent of the landowner.
9. North Branch Township reserves the right to review the decommissioning plan every five (5) years to determine if the estimated decommissioning costs need to be adjusted.

### **Section 5.17 Small Wind Energy Conversion Systems ("S-WECS")**

#### **A. Applicable Zones**

1. S-WECS may be permitted in any zoning district subject to the following Special Approval Requirements. However, the erection of one (1) S-WECS on a single parcel of land at a height equal to or less than eighty (80) feet shall be considered a permitted use in the AR Agricultural Residential, C Commercial and I Industrial Zoning Districts and shall not require Special Approval or Planning Commission approval. The approval of a S-WECS under this requirement shall be subject to administrative approval through the Building Department, as well as all other applicable provisions (subsections B, C, and D) of this Section of the Zoning Ordinance.

S-WECS attached to an existing structure shall not exceed ten (10) feet above the height of the structure upon which it is located and shall meet all other applicable regulations contained herein. The

Building Official may require a structural report to ensure the supporting structure is capable of accommodating an attached unit.

All other S-WECS which do not meet the above requirements shall require Special approval.

B. Applicability of Ordinance

1. The standards that follow shall apply to systems intended for the provision of the electrical or mechanical power needs of the owner/operator of the system; also, such a system shall be for one main building and its accessory buildings only. For systems intended for uses other than the above, Planning Commission and Special approval shall be required. Said approval shall cover the location of the system (shown on a site plan for the parcel) on the site, the noise generated by the system, assurances as to the safety features of the system, and compliance with all applicable state and federal statutes and regulations. Planning Commission approval shall specifically be required for arrays of more than one S-WECS and for systems wherein one S-WECS is intended to provide the electric power for more than one main building.

Further, S-WECS 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. Standards for and Regulations of S-WECS

1. Construction: S-WECS construction shall be in accordance with the latest edition of the Michigan Building Code, and any future amendments and/or revisions to it.
2. Electromagnetic Interference ("EMI"): S-WECS shall be filtered and/or shielded so as to prevent the emission of radio frequency energy which would cause harmful interference with radio and/or television broadcasting or reception, and shall comply with the provisions of Title 47, Chapter 1, Part 15 of the Federal Code of Regulations and subsequent revisions governing said emissions.
3. Maximum Height: The maximum height permitted as a Special Approval shall be eighty (80') feet, unless otherwise prohibited by any state or federal statutes or regulations.

4. Tower Height: A tower's height is the height of the actual tower, plus one-half of the rotor diameter on horizontal axis installation and on vertical axis installation, the distance from the base of the tower to the top of the unit as measured from the established grade.
5. Setbacks: The structural design shall be signed and sealed by a professional engineer, registered in the State of Michigan, certifying that the structural design complies with all of the standards set forth for safety and stability in all applicable codes then in effect in the State of Michigan and all sections referred to herein above. The minimum setbacks for S-WECS from all abutting streets or adjacent parcel shall be a distance equal to two point four (2.4) times the height of the S-WECS. Setbacks shall be measured from the parcel line to the center point of the S-WECS.

The S-WECS shall be located a sufficient distance from any overhead utility lines, excluding service drops, such that a structural failure of any portion of the S-WECS or its supporting structure will not cause any portion of it to fall within five (5') feet of utility lines.6.

6. Minimum Blade Height: The minimum distance between the ground and any protruding blades utilized on a S-WECS shall be thirty-five (35') feet, as measured at the lowest point of the arc of the blades.
7. Labeling Requirements: A minimum of one (1) sign shall be clearly posted near ground level on the tower structure warning of high voltage. In addition, the following information shall be posted on a label or labels on the generator or alternator of the S-WECS.
  - a. The maximum power output of the system and the wind speed at which it is achieved.
  - b. Nominal voltage and maximum current.
  - c. Manufacturer's name and address, serial number and model number.
  - d. Maximum survival wind speed and the emergency and normal shutdown procedures.
8. Utility Provider Notification: The Utility Provider shall be notified in writing of any proposed interface with that company's grid prior to installing such interface and shall conform with all federal, state, and local statutes, ordinances, and regulations. Verification of this shall also be supplied to the Township.



9. Safety: The S-WECS manufacturer shall document that the S-WECS model has been tested and certified by Underwriter's Laboratory, or other such applicable independent accrediting agency, and that when installed in accordance with recommended specifications shall have a maximum survival wind speed of not less than eighty (80) miles per hour.
  10. Noise: The maximum level of noise to be generated by a S-WECS shall be forty-five (45) decibels, as measured on the dBA scale, measured using Equivalent A-weighted Continuous Sound Level at each parcel line. Proof of the S-WECS meeting this standard shall be supplied to the Township once the S-WECS has been constructed.
- D. Decommissioning: The Applicant shall submit a decommissioning plan which 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.
  6. The Applicant shall post financial security to ensure payment of the cost of decommissioning and the proper removal of the S-WECS when it ceases to be used for a period of one (1) year or more. The financial security shall be in favor of the Township. Any application for a S-WECS shall include a description of this financial security which will be posted at the time of receiving a building permit for the S-WECS. The security shall be a: 1) cash bond; 2) irrevocable bank letter of credit; or 3) performance bond in a form approved by the Township. The Applicant shall be responsible for the payment of any costs or attorney fees incurred by the Township in securing removal of the S-WECS.
  7. The standard for inactivity shall be twelve (12) months.

E. Miscellaneous

1. All electric line/utility wires shall be buried under ground unless otherwise approved by the Township.
2. Any mechanical equipment associated with and necessary for operation, including a building for batteries and storage cells shall be enclosed with a six (6') foot view obscuring fence or hedge unless stored within a building. The supporting tower shall also be enclosed with a six (6') foot view obscuring fence or hedge unless the base of the tower is not climbable for a distance of twelve (12') feet.
3. When a building is necessary for storage of cells or related mechanical equipment, the building may not exceed one hundred forty (140) square feet in area nor eight (8') feet in height, and must be located at least the number of feet equal to the height of the tower from any parcel line. Such building shall not be considered an accessory building in terms of the total number or total size of accessory buildings permitted onsite.
4. The S-WECS shall be kept in good repair and sound condition. Upon abandonment of use, the tower and related structure shall be dismantled and removed from the parcel within sixty (60) days.
5. Every S-WECS shall be insured with minimum liability insurance of five hundred thousand dollars (\$500,000) for each occurrence. Proof of insurance shall be furnished to the Township.
6. The S-WECS shall not be used for the purposes of advertising.
7. The S-WECS, blades, and associated equipment must be a neutral color or non-reflective material.
8. It is prohibited to artificially light any component of the S-WECS, except to the extent required by the FAA or other applicable authority, or otherwise necessary for the reasonable safety and security thereof.

*(certification and signatures on next page)*


The undersigned Supervisor and Clerk of the Township of North Branch hereby certify that this Zoning Ordinance Amendment was duly adopted by the Township Board at a meeting held on the 13<sup>th</sup> day of October 2020, and was published in the \_\_\_\_\_ on the \_\_\_\_\_ day of October 2020. This Zoning Ordinance Amendment shall take effect seven (7) days after said date of publication.

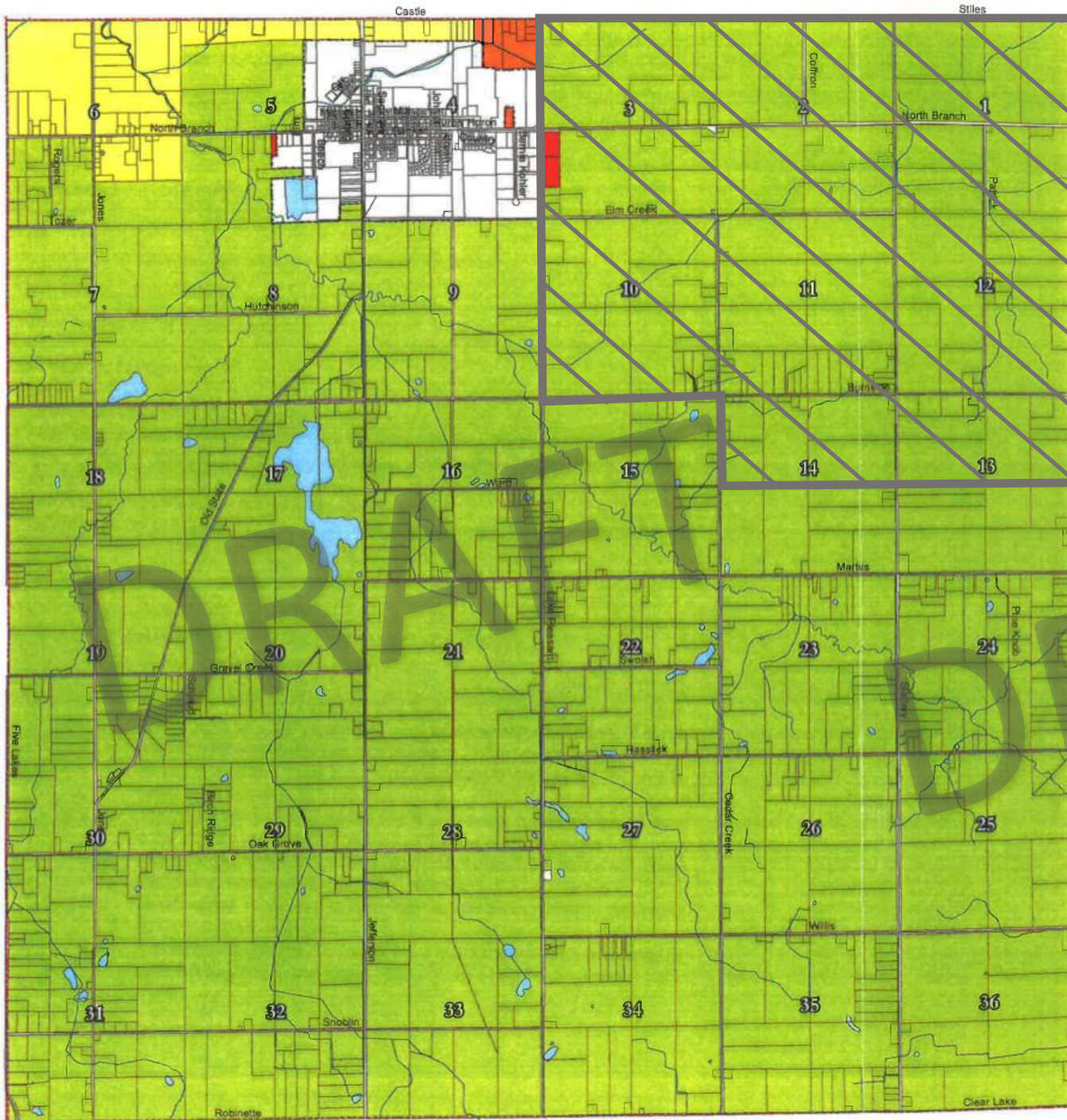
\_\_\_\_\_  
Gary Swoish, Township Supervisor

\_\_\_\_\_  
Amy Bridger-Snoblen, Township Clerk

# North Branch Township Lapeer County, Michigan

## Zoning Map

-  Agricultural Residential
-  Single Family Residential
-  Multiple Family Residential
-  Commercial
-  Industrial
-  Commercial Wind Energy Overlay



**Prepared by:**  
The North Branch Township Planning Commission

**Adopted by:**  
The North Branch Township Board of Trustees  
August 8, 2019

Updated by ROWE Professional Services Company



Original Map Developed by:



**Base Map Provided by:** Lapeer County