

**TOWNSHIP OF CASNOVIA**

**ORDINANCE TO AMEND ZONING ORDINANCE  
TO PROVIDE FOR PUBLIC UTILITY FACILITIES AND WIND ENERGY  
CONVERSION SYSTEMS**

**ORD. NO. \_\_\_\_\_**

**THE TOWNSHIP OF CASNOVIA ORDAINS:**

**Section 1. Purpose.**

The Township of Casnovia (the "Township") adopts the following revisions to the Township's Zoning Ordinance for the health, safety, and welfare of Township residents.

**Section 2. Amendment of Section 3.24.**

Section 3.24 of the Zoning Ordinance is hereby amended to read as follows:

**Section 3.24. PUBLIC UTILITY FACILITIES AND WIND ENERGY CONVERSION SYSTEMS (WECS)**

*(a) Intent and Purpose*

- (1) Purpose. The most common and prevalent land use in Casnovia Township is agricultural, and its preservation has been an ongoing goal within the community for many years. This Ordinance is intended to protect the health, safety and welfare of the residents of the Township and to encourage the safe, effective, efficient and orderly development and operation of wind energy resources in the Township while preserving and protecting the character and the stability of residential, agricultural, recreational, commercial and other areas within the Township.
- (2) With advances in technology of “wind energy development” in general, specific locations within the Township may support the implementation of Utility Grid Wind Energy Systems. To prepare for potential “wind development projects” within the Township, this Ordinance will require such developments to obtain a Special Land Use Permit to ensure wind development sites are appropriately located so as to protect the character and stability of the Township’s residential, agricultural, recreational, commercial and/or industrial areas and character while simultaneously preserving and protecting the Township’s important and sensitive environmental and ecological assets and areas, open space, viewscales and aesthetics, wetlands, and other ecological and environmentally sensitive areas. Accordingly, regulations are necessary to further the above goals and, equally important, to minimize the potential adverse effects of this emerging land use on adjacent properties.

*(b) Findings*

- (1) This Ordinance has been developed with the intention of obtaining an appropriate balance between the desire for renewable energy resources and the need to protect the public health, safety, and welfare of the community and the character and stability of the Township's residential, agricultural, recreational, commercial and/or industrial areas and preserving and protecting the Township's important and sensitive environmental and ecological assets and areas, open space, viewsapes and aesthetics, wetlands, and other ecological and environmentally sensitive areas.
- (2) Based on evidence presented in this State and others concerning the adverse secondary effects of wind energy systems on communities, including, but not limited to, findings from the Wind Turbine Health Impact Study: Report of Independent Expert Panel, prepared for the Massachusetts Department of Environmental Protection (2012); Strategic Health Impact Assessment on Wind Energy Development in Oregon, prepared for the State of Oregon (2012); Potential impact on the Public's Health from Sound Associated with Wind Turbine Facilities, prepared for the State of Vermont's Department of Health (2010); Analysis of the Research on the Health Effects from Wind Turbines, Including Effects From Noise, prepared for the Maine Department of Health and Human Services (2012); Jeffrey et al, "Adverse Health Effects of Industrial Wind Turbines," 59 Can Fam Physician 473-475 (2013); Salt, A., and Kaltenbach, J, Infrasound From Wind Turbines Could Affect Humans, 31(4) Bulletin Science, Technology and Society, 296-302 (2011), the following are among the potential harmful secondary effects of wind energy systems:
  - (i) Falling ice or "ice throws" is physically harmful and measures should be taken to protect the public from the risk of "ice throws."
  - (ii) Nighttime wind turbine noise can cause sleep disturbance. Generally, sleep disturbance can adversely affect mood, cognitive functioning and one's overall sense of health and well-being. Chronic stress and sleep disturbance could increase the risk for cardiovascular disease, decreased immune function, endocrine disorders, and mental illness. In addition, possible health effects include increased heart rate, insomnia, fatigue, accidents, reduction in performance and depression.
  - (iii) Sound from wind energy facilities could potentially impact people's health and well-being if it increases background sound levels by more than 10 dB(A) or results in long term outdoor community sound levels above 35-40 dB(A).
  - (iv) There is evidence that wind turbine sound is more noticeable, annoying and disturbing than other community industrial sounds at the same level of loudness.
  - (v) People who live near wind turbines are more likely to be impacted by wind turbines than would those far away.
  - (vi) Alternating changes in light intensity caused by the moving blades of wind turbines on the ground and stationary objects, also known as shadow flicker, can cause health issues.
  - (vii) The Township desires to protect ecological and environmentally sensitive areas in the Township, including, but not limited to, habitats for endangered species or

heavily used migration routes for species of waterfowl and other migratory birds (some of which are protected species). Thus, the Township has determined that wind development sites can adversely impact wildlife and their habitats and makes evaluation of proposed wind development sites essential. The Township finds that any wind development sites should have the lowest potential for negative impacts on wildlife resources and avoid locations with higher concentrations of migratory birds. Further, any wind development sites that would fragment sensitive habitat areas, like rivers, streams, and wetlands, should be avoided.

(viii) The general welfare, health, and safety of the citizens of the Township will be promoted by the enactment of this ordinance.

(c) *Definitions*

- (1) **Participating Landowner:** A landowner who has leased land to the WECS Applicant, received financial remuneration from the WECS Applicant, recorded with the Muskegon County Register of Deeds said agreement, and has a contract with the WECS Applicant. A Participating Landowner may also be called a WECS contract leaseholder. A Participating Landowner may or may not have turbines or infrastructure located on their property.
- (2) **Non-Participating Landowner:** A landowner who has not signed a contract or any legal document with the WECS Applicant and has not given up rights to their owned land to the WECS Applicant.
- (3) **SCADA (supervisory control and data acquisition):** A computer system that monitors and controls WECS units.
- (4) **dBA:** The A-weighted sound level.
- (5) **dBC:** The C-weighted sound level.
- (6) **Pasquill Stability Class:** Reference, wikipedia.org “Outline of air pollution dispersion”.
- (7) **Adverse Sound Character:** Sound that causes building rattle, is impulsive, tonal, or has low-frequency bass rumble.
- (8) **ANSI:** the American National Standards Institute.
- (9) **Audible:** The varying degrees of sound perception as reported by affidavit, including, but not limited to, just perceptible, audible, clearly audible, and objectionable.
- (10) **Decibel (dB):** The practical unit of measurement for sound pressure level; the number of decibels of a measured sound is equal to 20 times the logarithm to the base 10 of the ratio of the sound pressure of the measured sound to the sound pressure of a standard sound (20 microPascals); abbreviated "dB."
- (11) **Emergency work:** Any work or action necessary to deliver essential services in an emergency situation, including, but not limited to, repairing water, gas, electricity, telephone and sewer facilities and public transportation, removing fallen trees on public

rights-of-way, and abating life-threatening conditions.

- (12) Equivalent Sound Level (or Leq): The sound level measured in decibels with an integrating sound level meter and averaged on an energy basis over a specific duration.
- (13) Excessive noise: Sound that is determined by ordinance to be too loud or unnecessary or creates a noise disturbance.
- (14) Ambient: Ambient is defined as the sound pressure level exceeded 90% of the time over a 96-hour measurement period with daytime/nighttime division.
- (15) Noise: A sound, especially one that is loud or unpleasant or that causes disturbance. Any airborne sounds of such level and duration as to be or tend to be injurious to human health or welfare (well-being) or that would unreasonably interfere with activities or the enjoyment of life or property.
- (16) Quiet Rural or Residential property: Any property where there is an inherent expectation of quiet, including, but not limited to, all residential, business, or agricultural-zoned properties, single family homes, and retirement homes.
- (17) Sound level meter: An instrument for the measurement of sound levels that meets the ANSI requirements of S1.4-1983 (or later revision) for Type 1 or 2 instruments. For frequency analysis, octave and 1/3 octave filters shall conform to ANSI S1.11-1986 (or later revision).
- (18) GIS: Geographic Information System and is comparable to GPS (global positioning system) coordinates.
- (19) Survival Wind Speed: The maximum wind speed, as designated by the WECS manufacturer, at which a WECS in unattended operation (not necessarily producing power) is designed to survive without damage to any structural equipment or loss of the ability to function normally.
- (20) Tip Height: The height of the turbine with a blade at the highest vertical point.
- (21) Wind Energy Conversion System (WECS): Any combination of the following:
  - (i) A mill or machine operated by wind acting on oblique vanes or sails that radiate from a horizontal shaft;
  - (ii) A surface area such as a blade, rotor, or similar device, either variable or fixed, for utilizing the wind for electrical or mechanical power;
  - (iii) A shaft, gearing, belt, or coupling utilized to convert the rotation of the surface area into a form suitable for driving a generator, alternator, or other electricity-producing device;
  - (iv) The generator, alternator, or another device to convert the mechanical energy of the surface area into electrical energy;

- (v) The tower, pylon, or other structure upon which any, all, or some combination of the above are mounted.
  - (vi) Any other components not listed above but associated with the normal construction, operation, and maintenance of a wind energy conversion system.
- (22) WECS Applicant: The person, firm, corporation, company, limited liability corporation or other entity, as well as the Applicant's successors, assigns and/or transferees, which applies for Township approval (permit) to construct a WECS and WECS Testing Facility. An Applicant must have the legal authority to represent and bind the Participating Landowner, or lessee, who will construct, own, and operate the WECS or Testing Facility. The duties and obligations regarding a zoning approval for any approved WECS or Testing Facility shall be with the WECS or Testing Facility owner, and jointly and severally with the owner, operator, and lessee of the WECS or Testing Facility if different than the WECS owner.
- (23) Wind Energy Conversion System (WECS) Testing Facility: A structure and equipment such as a meteorological tower for the collection of wind data and other meteorological data and transmission to a collection source, shall not be deemed to be a communication tower.
- (24) L10: Is the noise level exceeded for 10% of the time of the measurement duration. This is often used to give an indication of the upper limit of fluctuating noise, such as that from road traffic.
- (25) L90: Is the noise level exceeded for 90% of the time of the measurement duration and is commonly used to determine ambient or background noise level.
- (d) *Public Utilities.* Transmission lines, sewer lines, water mains, pumping stations, substations, poles, and related equipment owned or provided by public utility companies or by the Township shall be permitted in all zoning districts. Any equipment enclosures, substations, equipment storage buildings or similar structures shall be subject to the site plan review requirements of Article 19. Any office, manufacturing, or sales buildings must be located in the Commercial or Industrial zoning district. All communication towers or commercial wind energy conversion systems operated by public utility companies shall be subject to the requirements of section "Commercial Wind Energy Conversion Systems (WECS)". Unless specifically noted, all WECS permit information and supporting documentation shall be allocated reasonable Township review time based on complexity and outside expertise review. Requirements shall be presented in written form and allow minimum thirty (30) days before Township discussion. Township may at its discretion review provided documents sooner than thirty (30) days. Providing documents without time for Planning Commission to review shall result in permit denial and require WECS applicant to reapply. Each ordinance section requires approval by the Planning Commission unless otherwise noted. Township shall review all documentation to assure that residents' health, welfare, and safety are not negatively impinged.
- (e) *Exempt Towers and Wind Energy Conversion Systems (WECS).* Communication towers, antennas, wind energy conversion systems (windmills, turbines) and related facilities located

on the premises of a farm, home, or business and which do not primarily involve the sale of electricity or communication services off the premises shall be exempt from the requirements of section “Commercial Wind Energy Conversion Systems (WECS)”. However, exempt towers and WECS are subject to the following noise regulations of the Casnovia Township Zoning Ordinance: Article 2, Section 2.42 and Article 3, Section 3.12. Such units shall be allowed as a permitted accessory use in all zoning districts, providing the electricity or communication services are primarily used on site for a farm, home or business. In the case of a WECS, the total height with the blade fully extended (Tip Height) shall not exceed one hundred thirty (130) feet, and the minimum clearance from ground level to the blade at its lowest point shall be twenty (20) feet. The minimum set-back from property lines and road right of way lines shall be equal to 3 times the Tip Height of the unit (WECS blade at its highest point).

(f) Commercial Wind Energy Conversion Systems (WECS). Wind energy conversion systems and WECS testing facilities, other than those exempted under section (e) “Exempt Towers and Wind Energy Conversion Systems (WECS)”, shall only be allowed as special land uses in the A-1 Exclusive Agricultural Zoning District. An application for a special land use permit shall be filed with the Township pursuant to Article 17 as to Special Land Use approvals. Supporting data and documentation must be submitted in their entirety at time of application. Applicant shall provide to the Township updated documents throughout the lifespan of the WECS upon request by the Township Board or Planning Commission. Applicant shall also include the following:

- (1) **Permitting Costs:** An escrow account shall be set up when the Applicant applies for a Special Use Permit for a WECS and WECS Testing Facilities. The monetary amount filed by the Applicant with the Township shall be in an amount in accordance with the Township Escrow Policy to cover all reasonable costs and expenses associated with the special use zoning review and approval process, which costs can include, but are not limited to, fees of the Township Attorney, Township Planner, and Township Engineer, as well as any reports or studies which the Township anticipates it may have done related to the zoning review process for the particular application. Such escrow amount shall include regularly established fees. At any point during the zoning review process, the Township may require that the Applicant place additional monies into the Township escrow should the existing escrow amount filed by the Applicant prove insufficient. If the escrow account needs replenishing and the Applicant refuses to do so within fourteen (14) days after receiving notice, the zoning review and approval process shall cease until and unless the Applicant makes the required escrow deposit. Any escrow amounts which are in excess of actual costs shall be returned to the Applicant within ninety (90) days of permitting process completion. An itemized billing of all expenses shall be provided to the Applicant. The Township shall hire qualified professionals for each and any of the technical fields associated with the Special Use Permit, such as, but not limited to, electrical, acoustics, environment, economics, wildlife, health, and land-use.
- (2) **Environmental Assessment:** The Applicant shall fund an environmental assessment or impact study and other relevant report(s) or studies (including, but not limited to, assessing the potential impact on endangered species, eagles, birds, and/or other wildlife) as required by the Township for review. Studies shall be limited to the area within three (3) miles outside of the Township boundaries.

- (i) The Applicant shall perform pre-construction ground water testing on all wells located within the required setback distance of a proposed turbine location. The operation of the WECS shall not negatively impact any groundwater well or groundwater source in the vicinity of the WECS. Complaints regarding impact of the WECS on groundwater sources shall be promptly forwarded to the Township Board as part of the complaint resolution process. The Township Board will consider proof of a negative impact arising from the installation and/or operation of the WECS on a groundwater well or source in the vicinity of the WECS as a violation of the conditions of the special use approval.
  - (ii) A background (ambient) sound study shall be performed and a report provided which indicates Leq 1 second, L10, and L90 sound levels using A-weighting and C-weighting. Data shall be collected at midpoints along property lines of adjoining Non-Participating and Landowners Participating. Measurement procedures are to follow the most recent versions of ANSI S12.18 and ANSI S12.9, Part 3 guideline (with an observer present). Measurements shall be taken using an ANSI or IEC Type 1 Precision Integrating Sound Level Meter. The study must include a minimum of a four-day (96 hour) testing period, include one Sunday, and divide data by daytime and nighttime. The sound background study shall report for the period of the monitoring topography, temperature, weather patterns, sources of ambient sound, and prevailing wind direction.
- (3) Economic Impact: The Applicant shall fund and provide an economic impact study for the area affected by the WECS project. Such a study shall include probable financial impact regarding jobs, tax revenue, lease payments and property values at a minimum and average set-backs distances. Business and residential growth potential shall be considered.
- (4) Site Plan: The Applicant shall submit a site plan in full compliance with Article 19 of this Ordinance. The Applicant shall also submit a written explanation of the design characteristics and the ability of the structure(s) and attendant facilities to withstand winds, ice and other naturally occurring hazards, as well as information regarding health, welfare and safety in areas including, but not limited to, noise, vibration, shadow flicker, and blade ice deposits. This information shall also address the potential for the WECS to structurally fail or collapse, and what results should be expected in such an event. Additional requirements for a WECS site plan are as follows:
  - (i) Building Siting: GIS locations and height of all proposed buildings, structures, electrical lines, towers, guy wires, guy wire anchors, security fencing, and other above-ground structures associated with the WECS.
  - (ii) Nearby Building Siting: GIS locations and height of all adjacent buildings, structures, and above ground utilities located within three (3) times minimum setback distance for Non-Participating Landowners where the proposed WECS and WECS Testing Facility will be located. The location of all existing and proposed overhead and underground electrical transmission or distribution lines shall be shown, whether to be utilized or not with the WECS or Testing Facility, located on the lot or parcel involved.

- (iii) Access Driveways: GIS location of WECS and Testing Facility access driveways together with details regarding dimensions, composition, and maintenance of the proposed driveways. The site plan shall include traffic routes, time of the year use, staging areas, and any other physical sites related to WECS. Construction of the Access Driveway that serves a WECS or Testing Facility is required to protect the public health, safety, and welfare by offering an adequate means by which governmental agencies may readily access the site in the event of an emergency. All such roads shall be constructed to allow access at all times by any emergency service vehicles, such as fire, police, and repair. Access driveways shall be no closer than 300' to adjacent property unless Applicant provides documentation in the form of a signed approval by affected Participating and Non-Participating Landowners. Such approval shall be recorded with Muskegon County Register of Deeds using only the WECS Waiver Form Revision 1 or later.
  - (iv) Facility Security: Security measures shall be sufficient to prevent unauthorized trespass and to protect health, welfare, and safety.
  - (v) Maintenance Program and Resolution Program: The Applicant shall provide to the Township a written description of the problem and failure program to be used to resolve the any WECS and WECS Testing Facility issues, including procedures and schedules for removal when determined to be obsolete or abandoned.
  - (vi) Site Lighting: A lighting plan for each WECS and Testing Facility. Such plan must describe all lighting that will be utilized and documentation that FAA requirements are met. RADAR activated lighting shall be utilized if allowed by FAA. Such a plan shall include but is not limited to, the planned number and location of lights, light color, activation methods, effect on Township residents and whether any lights blink. Due to complexity in describing lighting effects for health, welfare, and safety, Applicant shall, if available, provide example locations with product descriptions, where similar, or proposed, lighting solutions are currently deployed. Lighting shall be fully shielded from ground, be FAA compliant, and be of most current design, to minimize lighting blinking and brightness nuisance.
  - (vii) Proof of any applicable documents recorded at the Muskegon Country Register of Deeds utilizing Article 1522 WECS Waiver Form Revision 1 (or later).
  - (viii) If there are any changes to any site plan for a WECS or Testing Facility, including any changes in road locations, road access, the location of accessory structure, and/or the location of any turbine, a revised site plan shall be submitted and approved prior to construction. Any revised site plan must provide revised calculations to address all of the items required under the original plan submission (i.e. setbacks, shadow flicker, noise, etc.).
  - (ix) Supplemental: Additional detail(s) and information as requested by the Planning Commission.
- (5) Site Insurance: The Applicant shall provide proof of insurance for each WECS at all



times for at least \$10,000,000 for liability, property damage, livestock damage, and future earnings loss. Applicant shall provide yearly proof of insurance to Township that confirms active coverage for the Applicant, Township, Participating Landowners, and Non-Participating Landowners. Aggregate policies are allowed if minimum coverage per WECS is satisfied and coverage is provided for every site where Applicant's equipment is located.

- (6) Removal Insurance (decommissioning): To ensure proper removal of each WECS structure when it is abandoned or non-operational, application shall include a proof of the financial security in effect before permit is approved. The security shall be licensed in the State of Michigan and be in the form of 1) cash deposit or 2) performance (surety) bond selected by the Planning Commission and bonded by a top institution from the Department of the Treasury's Listing of Approved Sureties -Department Circular 570, T-list. The duration of the security shall be termed to the removal of each WECS as stated in this Ordinance. Additionally, security is based on each WECS and is to be backed by owner assets, operator assets, parent company assets, and leaseholder assets approved by the Planning Commission.
- (i) The amount of each WECS security guarantee (surety) shall be the average of at least two independent (of Applicant) demolition (removal) quotes, obtained by the Planning Commission and approved by the Board, plus 10%. If the quantity of quotes obtained is two, the formula shall be  $(\text{quote1} + \text{quote2})/2 * 1.10$ . The security guarantee shall be no less than \$800,000 per WECS. Quotes shall be based on individual WECS removal and shall not group multiple WECS simultaneous removals together. Quotes shall be ordered and obtained by the Township from established demolition companies. The demolition method shall be approved by the Township Board. Quotes shall not include salvage values. Security guarantee shall be updated every five (5) years at the rate of 1.5 times CPI (consumer price index) for each year.
- (ii) Such financial guarantee shall be deposited or filed with the Township Clerk after a special use has been approved but before construction operations begin on the WECS project. 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 shall subject the Applicant to all available remedies to the Township, including enforcement action, fines, revocation of the special use approval and WECS removal.
- (iii) The Applicant shall be responsible for the payment of all attorney fees and other costs incurred by the Township in the event that the structure is not voluntarily removed and the Township has to enforce removal.
- (iv) In the event the WECS owner, operator, parent company, performance bond defaults on any or all of the previously outlined decommissioning requirements, the Participating Landowner upon which each WECS is located shall be responsible and liable for the removal of each WECS. Failure of the Participating Landowner to comply with the removal and decommissioning guidelines shall result in the Township having the WECS removed at the expense of the Participating Landowner. If funding is not available to cover the costs of removal by the

Participating Landowner, legal action to pursue the seizure of Participating Landowner property(ies) will take place to cover such costs.

- (7) Safety Manual: The Applicant shall provide an unredacted copy of the manufacturer's safety manual for each model of turbine without distribution restraints to be kept at the Township Hall and other locations deemed necessary by Planning Commission or local first responders. The Manual should include standard details for an industrial site such as materials, chemicals, fire, access, safe distances during WECS failure, processes in emergencies, etc.
- (8) Repair Policy Documentation: Applicant shall provide a detailed policy and process book for the repair, replacement, and removal of malfunctioning, defective, worn, or non-compliant WECS. Sections of the process book should consider any ordinance requirement or WECS performance deficiency.
- (9) Noise: Applicant shall provide an initial sound modeling report and a 6-month post-construction report for the project with a schedule and documentation which adhere to the following:
  - (i) Chart outlining ordinance requirements and a description of compliance or non-compliance.
  - (ii) Declaration whether submitted data is modeled or measured.
  - (iii) Declaration of values, test methods, data sources, and similar for all modeled or measured data.
  - (iv) Estimated timeline for project including ordinance requirements completed, construction, post construction, and validation testing.
  - (v) Applicant measured data shall be accompanied by SCADA data confirming full power during testing. Unless otherwise requested, minimum SCADA data format shall be grouped in 24hr periods and 1 second intervals including wind vector, wind speed, temperature, humidity, time-of-day, WECS power output, WECS amps, WECS volts, WECS nacelle vector, WECS blade RPM, WECS blade pitch.
  - (vi) Permitting data may be submitted based on WECS manufacturer data. However, measured data from active and similar WECS facilities shall be simultaneously submitted.
  - (vii) It is acknowledged that WECS units sustain wear over time. Applicant is to submit data from existing and similar WECS installations showing aged sound measurements (to demonstrate compliance potential over the life of WECS) in accordance with this ordinance for 5, 10, and 15-year-old units.
  - (viii) Modeling factors shall be set for the worst-case environment, such as high humidity, frozen ground (non-porous), atmospheric variances (atmospheric profile Pasquill Stability Class E or F preferred), elevated noise source and no ground cover. Use of modeling methods (standards) shall have deficiencies (limitations)

fully disclosed and shall include known error margins. Non-disclosure of modeling method deficiencies shall require resubmission of SLUP in its entirety with complete modeling deficiencies disclosed.

(g) *Commercial Wind Energy Conversion Systems (WECS) – Standards and Requirements.* The WECS project shall meet the following standards and requirements:

- (1) **Set-Back:** The minimum set-back from any property line of a Non-Participating Landowner or any road right-of-way shall be no less than four (4) times Tip Height of WECS or WECS Testing Facility unless Applicant provides documentation in the form of a signed approval by affected Participating and Non-Participating Landowners waiving these requirements. Documents in full shall be recorded using only the WECS Waiver Form Revision 1 or later, with the Muskegon County Register of Deeds. For WECS, use turbine pole centerline as WECS measuring point.
- (2) **Ground Clearance:** The minimum clearance from ground level to the blade at its lowest point shall be one hundred (100) feet.
- (3) **Applicant Compliance:** The WECS and related equipment shall comply with any and all State, Federal, County and Township requirements.
- (4) **Blade Clearance:** Blade arcs created by a WECS shall have a minimum of one hundred (100') feet of clearance over and from any structure.
- (5) **Braking:** Each WECS shall be equipped with a braking, or equivalent device, capable of stopping the WECS operation in high winds with or without SCADA control. Braking system shall be effective during complete GRID power failure where WECS are unable to communicate with SCADA control or receive power.
- (6) **Signage:** Each WECS and Testing Facility shall have one sign per turbine, or tower, located at the roadside and one sign attached to base of each WECS, easily visible throughout four seasons. Signs shall be at least two square feet in area. Signs shall be the same and shall uniquely identify each WECS. Signage shall comply with Article 3 Section 3.21 Signs and Billboards. Additional signage on and around the tower is recommended. The sign shall contain at least the following:
  - (i) Warning high voltage.
  - (ii) Participating land owner's name, WECS owner's name, and operator's name.
  - (iii) Emergency telephone numbers and web address. (list more than one number).
  - (iv) If WECS uses fencing, place signs on the perimeter fence at fence entrance door.
  - (v) Unique identification such as address of WECS. If more than one WECS on access drive, units shall have further identification such that first responders can positively identify. An identification example is "321 Ruger Rd, Caro, MI Unit A"
- (7) **Communication Interference:** Each WECS and Testing Facilities shall be designed,

constructed and operated so as not to cause radio and television or other communication interference. In the event that verified interference is experienced and confirmed by a licensed engineer, the Applicant must produce confirmation that said interference had been resolved to residents' satisfaction within ninety (90) days of receipt of the complaint. Any such complaints shall follow the process stated in Complaint Resolution section (g)(25).

- (8) **Infrastructure Wiring:** All electrical connection systems and lines from the WECS to the electrical grid connection shall be located and maintained underground. Burial depth shall be at a depth that causes no known environmental, land use, or safety issues. Depth shall be a minimum of 6ft below grade, be deeper than drain tile and be in compliance with NEC 2014 or newer Code standards. All utility lines shall be staked in the field, so as to provide notice to property owners as to the location of utilities, including installing a marker at 4-feet below-grade to identify the utility line location.

The Planning Commission may waive the burial requirement and allow above-ground structures in limited circumstances, such as geography precludes, or a demonstrated benefit to the township. The waiver shall not be granted solely on cost savings to Applicant. Request for variation shall consider aesthetics, future use of land, and effect on nearby landowners.

- (9) **Road Damage:** The Applicant shall post a financial security in the form of a surety bond from a surety company that is listed as an acceptable surety on Federal Surety Bonds in circular 570 of the U.S. Department of Treasury, or letter of credit from, or an escrow account established in, a financial institution licensed in the State of Michigan for the cost of repairs of Muskegon County roads within the Township, in an amount of \$1,250,000. The amount and standards for road repair work shall be determined by a third party road inspector appointed by mutual agreement of the Township, Applicant and Muskegon County Road Commission. The bond shall only be released (in whole or in part) when the Township Board, in consultation with the Muskegon County Road Commission and said third party inspector, determines that all required road work has been completed and approved by the road inspector in consultation with the Muskegon County Road Commission and/or MDOT. The Township may consult with the third party road inspector to verify the proposed bond amount of \$1,250,000. If the third party inspector determines that the amount needed for road repairs and upgrades is higher, the Applicant will post a financial security in the amount determined by the third party inspector. All road repairs must be complete within ninety (90) days of project completion, or maintenance completion, but shall not exceed 365 days from project commencement or maintenance completion.

- (10) **Road Use Agreement:** The Applicant shall provide and execute a Road Use Agreement with the Township and shall file a copy of such Agreement with the Township Clerk before construction of any accessory road and/or road improvements. The Road Use Agreement is subject to review and approval of the Township attorney. The Applicant shall provide a written status report annually to the Township Board as to the ongoing scope of road work and shall also provide written notice to the Township Board when all required road work has been completed. The Township may require the renewal of the bond for road work to cover costs of road work to be completed in the future.

- (11) **Liability Insurance:** The current WECS owner and operator shall insure for liability for the WECS without interruption until removed and comply with section “Site Insurance” to protect the current WECS owner and operator, Township and property owner.
- (12) **Coating and Color:** A WECS shall be painted a non-obtrusive (light environmental color such as beige, gray or off-white) color that is non-reflective. The wind turbine base and blades shall be of a color consistent with all other turbines in the area. No striping of color or advertisement shall be visible on the blades or tower.
- (13) **Strobe Effect:** Under no circumstances, shall a WECS or Testing Facility produce shadow flicker, or strobe-effect, on properties without a signed release from affected Participating and Non-Participating Landowners. Documents in full shall be recorded using only the WECS Waiver Form Revision 1 or later, with the Muskegon County Register of Deeds. Each wind turbine shall also use a shadow flicker mitigation system, including but not limited to the Vestas Shadow Detection System, or other similar system.
- (14) **Ice Detection:** The Applicant shall install an ice mitigation system on each turbine, including but not limited to the system developed by Vestas, or other similar system, to monitor ice formation on each wind turbine (WECS) and to facilitate immediate shutdown of any wind turbine if ice is detected on the turbine.
- (15) **Fire Suppression:** The Applicant shall provide and install on an WECS a fire suppression system, including but not limited to Fire Trace or other similar system, and insure that such system is operable at all times.
- (16) **Voltage:** The Applicant shall demonstrate WECS prohibits stray voltage, surge voltage, and power from entering ground, and shall correct any voltage issued that is caused by the WECS.
- (17) **Protection of Adjoining Property:** In addition to the other requirements and standards contained in this section, the Planning Commission shall not approve any WECS or Testing Facility unless it finds that the WECS or Testing Facility will not pose a safety hazard or unreasonable risk of harm to the occupants of any adjoining properties or area wildlife.
- (18) **Removal and Site Renovation:** A condition of every approval shall be adequate provision for the removal of the structure in its entirety whenever it ceases to actively produce power for one hundred eighty (180) days or more. The Planning Commission can grant an extension of an additional one hundred eighty (180) days upon the WECS owner demonstrating that the structure will be put back into use. Removal shall include the proper receipt of a demolition permit from the Building Official and proper restoration of the site to original condition. Removal of the structure, wiring, and its accessory use facilities shall include removing the caisson and all other components in their entirety. Restoration must be completed within 365 days of non-operation. The Planning Commission can grant an extension of one hundred eighty (180) days upon the WECS owner demonstrating that an extension is necessary.

- (i) Participating Landowners may waive complete underground wiring removal if they can demonstrate that any and all remaining underground wiring will not negatively affect environment, such as, but not limited to, water quality, natural water flow, or area wildlife. Participating Landowner shall execute a waiver and record same in full with Muskegon County Register of Deeds waiving these requirements.
- (19) WECS Height: The maximum Tip Height of any WECS or WECS Testing Facility shall not exceed 500 ft.
- (20) Avian Protection: Each wind turbine shall have a bird/bat sensor installed and utilized upon it.
- (21) Post-Construction Studies: The applicant shall prepare a post-construction avian and wildlife study 1-year post-construction, as well as 5-years post-construction of the completion of a WECS, which shall comply with the requirements of the U.S. Fish and Wildlife Service and the Michigan Department of Natural Resources. A copy of the study shall be provided to the Township Board.
- (22) Post-Construction Documents: The Applicant shall provide a complete set of as built drawings for electrical structures, collection lines and surface markings to the Township Clerk within 6 months of completing work on the WECS.
- (23) Operations Training: The Applicant shall provide training for the Casnovia Township Fire Department and all fire departments that provide mutual aid to Casnovia Township before beginning operations of the Utility Grid Wind Energy System and shall likewise provide regular training at least annually thereafter. The Applicant shall report annually to the Township Board as to the status of the training of the Township Fire Department, in addition to reporting annually to the Township Board of any incidents that required response by the Fire Department (or any Fire Departments responding via mutual aid) to the WECS.
- (24) Operational, Maintenance, and Issue Resolution: Each WECS and Testing Facility must be kept and maintained in good repair and condition at all times. If a WECS is not maintained in operational and reasonable condition or poses a potential safety hazard, the Applicant shall take expeditious action to correct the situation, including WECS removal. The Applicant shall keep a maintenance log on each WECS and must provide complete log to the Township within thirty (30) days of request.
- (25) Complaint Resolution: A complaint resolution process shall be established by the township. The form shall be, but not limited to:
  - (i) Receiving and Forwarding of Complaints: A third party answering switchboard, website or equivalent, paid for by the Applicant or WECS or Testing Facility owner. The cost to maintain and support shall be funded in the amount of \$10,000.00 and be replenished at least every five (5) years by the Applicant or WECS owner. The Planning Commission shall select a complaint resolution process that is independent of the facility operator or owner and that reports to the Township first and operator second. Upon receiving a complaint, the Township shall forward said

complaint to the WECS owner.

- (ii) Investigation of Complaints: Township shall initiate an investigation into a complaint within sixty (60) days utilizing escrow funds to hire the appropriate expert(s).
  - (iii) Hearing of Complaints: Township Board shall set a public hearing date within sixty (60) days of completion of Investigation of Complaints where experts, residents and/or Applicant may present information before the Township Board. Notice of hearing shall be via certified mail.
  - (iv) Decision of Complaints: Township Board shall issue a decision and corrective actions within forty-five (45) days from Hearing of Complaints.
- (26) Applicant shall be required as a condition of approval to fund an escrow account for investigation of complaints for, but not limited to, shadow flicker, stray voltage, noise, and signal interference to the amount of \$15,000.00 to be used at the discretion of the Casnovia Township Board. When escrow account balance is below \$5,000.00, Township shall notify Applicant and Applicant shall replenish account in the amount of \$15,000.00 within 45 days.
- (27) Regulation of WECS Commercial and Industrial Noise: To preserve quality of life, peace, and tranquility, and protect the natural quiet of the environment. This ordinance establishes the acoustic baseline, background sound levels for project design purposes, and limits the maximum noise level emissions for commercial and industrial developments. Residents shall be protected from exposure to noise emitted from commercial and industrial development by regulating said noise.
- (28) The Township Board reserves the right to require WECS Applicant to shut down any WECS unit that does not meet ordinance requirements until such WECS unit meets ordinance requirements or is removed.
- (29) Complaints: If the Township Board confirms and issues a corrective action, SCADA data from WECS within 2 miles of issue shall be required and delivered to Township within twenty (20) days of notification. SCADA data format shall be determined by Township, Township licensed engineers, or Township professional acousticians. Unless otherwise requested, minimum SCADA data format shall be grouped in 24hr periods and 1 second intervals including wind vector, wind speed, temperature, humidity, time-of-day, WECS power output, WECS amps, WECS volts, WECS nacelle vector, WECS blade RPM, WECS blade pitch. Fees for providing SCADA data are not to exceed \$100/request. Residents shall have the right to also request SCADA data in at least the minimum format at the cost of \$200/WECS per time period requested. Common SCADA formats shall include meteorological and performance data such as, but not limited to, temperature, humidity, power output, RPM, wind velocity, wind direction, and nacelle vector. Data format shall be determined by Township, such as “csv” or “xlsx”.
- (30) Noise:

- (i) No WECS shall generate or permit to be generated audible noise from commercial or industrial permitted facilities that exceeds 39 dBA or 49 dBC (dBC to dBA ratio of 10 dB per ANSI standard S12.9 Part 4 Annex D) during the night 9 pm to 8 am for any duration, at a property line or any point within a Non-Participating property, unless Applicant provides documentation in the form of a signed agreement by the Participating and Non-Participating Landowner waiving these requirements. Said documents in full shall be recorded with the Muskegon County Register of Deeds waiving these requirements. Documents in full shall be recorded using only the WECS Waiver Form Revision 1, or later, with the Muskegon County Register of Deeds.
- (ii) No WECS shall generate or permit to be generated plainly audible noise from commercial or industrial permitted facilities that exceeds 45 dBA or 55 dBC during the day 8 am to 9 pm for any duration, at a property line or at any point within a Non- Participating property, unless Applicant provides documentation in the form of a signed agreement by the Participating and Non-Participating Landowner waiving these requirements. Said documents in full shall be recorded with the Muskegon County Register of Deeds waiving these requirements. Documents in full shall be recorded using only the WECS Waiver Form Revision 1, or later, with the Muskegon County Register of Deeds.
- (iii) No WECS shall generate or permit to be generated from commercial or industrial permitted facilities any acoustic, vibratory, or barometric oscillations in the frequency range of 0.1 to 1 Hz that is detectable at any time and for any duration by confirmed human sensation or exceeds a sound pressure level from 0.1 to 20 Hz of 50 dB(unweighted) re 20uPA or exceeds an RMS acceleration level of 50 dB(unweighted) re 1 micro-g by instrumentation at a Non-Participating Landowner's property line or at any point within a Non-Participating Landowner's property.
- (iv) No WECS shall generate or permit to be generated from commercial or industrial permitted facilities any vibration in the low-frequency range of 0.1 to 20 Hz, including the 1, 2, 4, 8, and 16 Hertz octave bands that is perceivable by human sensation or exceeds an rms acceleration level of 50 dB(unweighted) re 1 micro-g at any time and for any duration either due to impulsive or periodic excitation of structure or any other mechanism at a Non-Participating Landowner's property line or at any point within a Non-Participating Landowner's property.
- (v) A tonal noise condition generated from commercial or industrial permitted facilities shall be assessed an upward noise penalty of 5 dBA (example 42 increased to 47 dBA) for assessment to the nighttime and daytime noise limits.
- (vi) A noise level measurement made in accordance with methods in section "NOISE MEASUREMENT AND COMPLIANCE" that is higher than 39 dBA or 49 dBC during the nighttime hours or 45 dBA or 55 dBC during the daytime hours, adjusted for the penalty assessed for a tonal noise condition, shall constitute prima facie evidence of a nuisance.
- (vii) An acoustic, vibratory or barometric measurement documenting oscillations



associated to commercial or industrial permitted facilities with levels exceeding the limits in 23 shall constitute prima facie evidence of a nuisance.

(viii) All commercial and industrial activity shall comply with limits and restrictions anywhere at any time on another property unless Applicant provides documentation in the form of a signed approval by affected Participating and Non-Participating Landowners. Documents in full shall be recorded with the Muskegon County Register of Deeds waiving these requirements. Documents in full shall be recorded using only the WECS Waiver Form Revision 1 or later, with the Muskegon County Register of Deeds.

(ix) Leq 1-sec shall be used for all measurements and modeling.

(31) Casnovia Township and its representatives shall have the authority to inspect the WECS (any of the wind turbines, the roads and/or accessory structures) upon reasonable notice of at least 24 hours to the Applicant. The Applicant may require that a representative of the Applicant accompany the Township and/or its representatives on any inspection.

(32) The Applicant shall enter a Host Agreement with Casnovia Township regarding taxation.

*(h) Noise Measurement and Compliance*

(1) Post construction validation and compliance testing shall include a variety of ground and hub height wind speeds, at low (between 6-9mph) medium (between 9-22mph) and high (greater than 22mph). SCADA data shall be provided in the format determined by Township, Township licensed engineers, or Township professional acousticians. Compliance noise measurements are the financial responsibility of the WECS owner of the facility and shall be independently performed by a qualified professional acoustician approved by the Planning Commission when directed by the Casnovia Charter Township Board or their designated agent. Compliance noise measurements shall not exceed the stipulated noise limits and shall assess for and apply tonal noise penalties when warranted.

(2) Quality: Measurements shall be attended. All noise measurements shall (must) exclude contributions from wind on microphone, tree/leaf rustle, flowing water, and natural sounds such as tree frogs and insects. The latter two can be excluded by calculating the dBA noise level by excluding octave band measurements above the 1000 Hz band as in ANSIS12.100 3.11. The ANS-weighted sound level is obtained by eliminating values for octave bands above 1000 Hz, or one-third octave bands above 1250 Hz, and A-weighting and summing the remaining lower frequency bands. The wind velocity at the sound measurement microphone shall not exceed 3 m/s (7 mph, maximum) during measurements. A 7-inch or larger diameter windscreen shall be used. Instrumentation shall have an overall internal noise floor that is at least 5 dB lower than what is being measured. During testing of elevated sources including, but not limited to, wind turbines, the atmospheric profile shall be Pasquill Stability Class E or F preferred, Class D as alternate.

(3) Noise Level: Noise measurements shall be conducted consistent with ANSI S12.18

Procedures for Outdoor Measurement of Sound Pressure Level and ANSI S12.9 Part3 (Quantities and Procedures for Description and Measurement of Environmental Sound – Part 3: Short-term Measurements with an Observer Present), using Type 1 meter, A-weighting, Fast Response.

- (4) Tonal Noise: Tonal noise shall be assessed using unweighted (linear) 1/3 octave band noise measurements with time-series, level-versus-time data acquisition. A measurement shall constitute prima facie evidence of a tonal noise condition if at any time (single sample or time interval) the noise spectrum of the noise source under investigation shows a 1/3 octave band exceeding the average of the two adjacent bands for by 15 dB in low one-third octave bands (10–125 Hz), 8 dB in middle-frequency bands (160–400 Hz), or 5 dB in high-frequency bands (500–10,000 Hz).
- (5) Sample Metric and Rate: Noise level measurements for essentially continuous non-time-varying noise sources shall be acquired using the Leq(Fast) metric at a sample rate of 1-per-second. For fluctuating or modulating noise sources including, but not limited to, wind turbines, a 10-per-second sample rate or faster shall be used. These sample rates shall apply to dBA, dBC and unweighted 1/3 octave band measurements.
- (6) Reporting: Measurements of time-varying dBA and dBC noise levels and 1/3 octave band levels shall be reported with time-series level-versus-time graphs and tables. Graphs shall show the sound levels graphed as level-vs-time over a period of time sufficient to characterize the noise signature of the noise source being measured. For 1-per-second sampling, a 5-minute-or-longer graph shall be produced. For 10-per-second sampling, a 30-second-or-longer graph shall be produced. Reporting shall identify, and graphs shall be clearly notated, identifying what was heard and when the noise source is dominating the measurement. Reporting shall furnish all noise data and information on weather conditions and, Pasquill Class occurring during testing.

(i) *Compliance*

- (1) All applicable requirements of the Zoning Ordinance must be met in their entirety as well as all other applicable laws, ordinances, and rules of the federal, state, county, and township governments. Any subsequent development or change on the property shall comply with all requirements of the Township Zoning Ordinance or other ordinances and regulations in effect at that time. Non-compliance with ordinance requirements during SLUP process shall result in denial or revocation of the permit.
- (2) Non-compliance with post-construction ordinance requirements shall result in fines (minimum \$250/day), permit denial, and WECS decommissioning.
- (3) Nuisance compliance complaints shall be resolved after section “Complaint Resolution” is completed. Applicant shall provide resolution plan within 30 days and resolve complaint within 90 days. WECS may be shut down during resolution time to extend resolution time to 180 days.
- (4) For non-nuisance compliance, and upon formal notice from Township or Resident to WECS permit holder, WECS permit holder shall respond within thirty (30) days with

resolution plan, and up to one hundred eight (180) days to resolve compliance breach. Failure to resolve any compliance breach shall result in permit loss. Unless otherwise stated, Applicant shall provide in advance and comply with ordinance requirements prior to Township granting the permit. Conditional permits shall not be allowed.

- (5) In addition to any other remedies or complaint resolution procedures set forth in this Article, violations of this Article shall also constitute a municipal civil infraction in accordance with Ordinance Number 2012-02. Each day on which any violation of this Article continues shall constitute a separate offense. The Township may bring an action for an injunction to restrain, prevent or abate any violation of this Article.
- (6) Upon change of ownership, operator or parent company, the Township shall receive from the new owner, operator or parent company notification and updated documents within 30 days including, but not limited to, legal proof of change, corporate legal contact, security bond updates, emergency contact, and local contact.

**Section 3. Validity and Severability.**

Should any portion of this Ordinance be found invalid for any reason, such holding shall not be construed as affecting the validity of the remaining portions of this Ordinance.

**Section 4. Repealer.**

All other ordinances inconsistent with the provisions of this Ordinance are hereby repealed but only to the extent necessary to give this Ordinance full force and effect.

**Section 5. Effective Date.**

This Ordinance shall be published and take effect seven days after publication as provided by law.

The undersigned Supervisor and Clerk of the Casnovia Township hereby certify that this Zoning Ordinance Amendment was duly adopted by the Township Board at a meeting held on the \_\_\_\_\_ day of \_\_\_\_\_, 2019, and was published in the Muskegon County Advertiser on the \_\_\_\_\_ day of \_\_\_\_\_, 2019. This Zoning Ordinance Amendment shall take effect seven (7) days after said date of publication.

\_\_\_\_\_  
Kelli Ashbaugh, Township Supervisor

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Jennie Powell, Township Clerk