

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

An ordinance to establish requirements for Wind Energy Turbines in Freeman Township, Clare County, State of Michigan.

Freeman Township, Clare County, State of Michigan, Ordains:

Section 1. Wind Energy Turbines (WET's):

A. PURPOSE: The purpose of this ordinance is to establish guidelines for siting Wind Energy Turbines (WET's). The goals are as follows:

- 1. To promote the safe, effective, and efficient use of a WET in order to reduce the consumption of fossil fuels in producing electricity.**
- 2. To preserve and protect public health, safety, welfare, and quality of life by minimizing the potential adverse impacts of a WET, and adjoining neighboring property owners will not be jeopardized.**
- 3. To establish standards and procedures by which the siting, design, engineering, installation, operation, and maintenance of a WET shall be governed.**

B. APPLICABILITY: This ordinance shall apply to the following:

- 1. This ordinance applies to all WET's proposed to be constructed after the effective date of this section.**
- 2. All WET's constructed prior to the effective date of this ordinance shall not be required to meet the requirements of this ordinance; however, any physical modification to an existing WET that materially alters the size, type, equipment or location shall require a permit under this ordinance, in compliance with the standards of this ordinance.**

Section 2. Definitions:

- A. WIND ENERGY TURBINE (WET):** Any structure-mounted, small, medium, or large wind energy conversion system that converts wind energy into electricity through the use of a wind generator and includes the nacelle, rotor, tower, and transformer, if any.
- B. SMALL STRUCTURE-MOUNTED WIND ENERGY TURBINE (SSMWET):** Converts wind energy into electricity through the use of equipment which includes any base, blade, foundation, generator, nacelle,

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

tower, transformer, vane, wire, inverter, batteries, or other components used in the system. A SSMWET is attached to a structure's roof, walls, or other elevated surface. The SSMWET has a nameplate capacity that does not exceed ten (10) kilowatts. The total height does not exceed fifteen (15) feet as measured from the highest point of the roof, excluding chimneys, antennae, and other similar protuberances.

- C. SMALL TOWER-MOUNTED WIND ENERGY TURBINE (STMWET):** A tower-mounted wind energy system that converts wind energy into electricity through the use of equipment which includes any base, blade, foundation, generator, nacelle, rotor, tower, transformer, vane, wire, inverter, batteries, or other components used in the system. The STMWET has a nameplate capacity that does not exceed thirty (30) kilowatts. The total height does not exceed one hundred twenty (120) feet.
- D. MEDIUM WIND ENERGY TURBINE (MWET):** A tower-mounted wind energy system that converts wind energy into electricity through the use of equipment which includes any base, blade, foundation, generator, NACELLE, rotor, tower, transformer, vane wire, inverter, batteries, or other components used in the system. The MWET has a nameplate capacity that does not exceed two hundred fifty (250) kilowatts. The TOTAL HEIGHT does not exceed one hundred fifty (150) feet.
- E. LARGE WIND ENERGY TURBINE (LWET):** A tower-mounted wind energy system that converts wind energy into electricity through the use of equipment which includes any base, blade, foundation, generator, NACELLE, rotor, tower, transformer, vane wire, inverter, batteries, or other components used in the system. The LWET has a nameplate capacity that is more than two hundred fifty (250) kilowatts but does not exceed five (5) megawatts. The TOTAL HEIGHT does not exceed one hundred sixty (160) meters or (525) feet.
The LWET is only for direct hook-up to a utility based power grid and not able to convert to residential or industrial use.
- F. ANEMOMETER:** A temporary wind speed indicator constructed for the purpose of analyzing the potential for utilizing a Wind Energy Turbine (WET) at a given site. This includes the tower, base plate, anchors, cables and hardware, wind direction vanes, booms to hold equipment, data logger, instrument wiring and telemetry devices that are used to monitor or transmit wind speed and wind flow characteristics over a period of time for either instantaneous wind information or to characterize the wind resource at a given location.

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- G. ANTI-CLIMBING DEVICE:** A piece of equipment which are either attached to the supporting structure of a WET, or which are free-standing and are designed to prevent people from climbing the structure. These devices may include, but are not limited to, squirrel-cones (i.e., a plastic or metal disc cone around a pole which impedes climbing), the removal of climbing pegs on the pole, or other approved devices, but excluding the use of barbed or razor wire.
- H. CONDOMINIUM DEVELOPMENT:** A form of Real Estate ownership in which the owner(s) hold a fee simple interest and a recordable deed to a specific description of land/space, and shares ownership of the Common Elements of the development with all other owners.
- I. DECIBEL:** A unit of measure used to express the magnitude of sound pressure and sound intensity. Decibels shall be measured on the dB(A) weighted scale as by the National Standards Institute.
- J. DECOMMISSIONING:** The process of terminating operation and completely removing a Wind Energy Turbine and all related Buildings, Structures, Foundations, Access Roads and Equipment.
- K. GENERAL COMMON ELEMENT:** An area designated for use by all owners within the CONDOMINIUM DEVELOPMENT.
- L. NACELLE:** The encasement which houses all of the generating components, gear box, drive tram, and other equipment in a WIND ENERGY TURBINE.
- M. NET-METERING:** A special metering and billing agreement between utility companies and their customers, which facilitates the connection of renewable energy generating systems to the power grid.
- N. OCCUPIED BUILDING:** A residence, school, hospital, church, public library, business, or any other BUILDING used for public gatherings.
- O. OPERATOR, WIND ENERGY TURBINE (WET):** The entity responsible for the day-to-day operation and maintenance of a WIND ENERGY TURBINE.
- P. OWNER, WIND ENERGY TURBINE (WET):** The individual or entity, including their respective successors and assigns, with equity interest in or ownership of a WIND ENERGY TURBINE.

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- Q. ROTOR DIAMETER:** The cross-sectional dimension of the circle swept by the rotating blades of a WIND ENERGY TURBINE.
- R. SHADOW FLICKER:** The moving shadow created by the sun shining through the rotating blades of a WIND ENERGY TURBINE. The amount of shadow flicker created by a WET is calculated by a computer model that takes into consideration turbine location, elevation, tree cover, location of all structures, wind activity and sunlight.
- S. STRUCTURE:** Structure means a walled and roofed building that is principally above ground, including a gas or liquid storage facility, as well as a mobile home. As used with WET's, structure means any building or other fixture, such as a municipal water tower, that is a minimum of twelve (12) feet high at the highest point of it's roof and is secured to frost-footings or a concrete slab. Structure means anything erected on the ground, underground, or attached to something having location on the ground or underground.
- T. TOTAL HEIGHT:** The vertical distance from the ground level at the base of the tower to the uppermost vertical extension of any blade, or the maximum height reached by any part of a WIND ENERGY TURBINE.
- U. TOWER:** A freestanding monopole that supports a WIND ENERGY TURBINE.
- V. TOWNSHIP OR TOWNSHIP BOARD:** Township shall mean Freeman Township, Clare County, State of Michigan. Township Board shall mean Freeman Township Board, Clare County, State of Michigan.
- W. PLANNING COMMISSION:** Planning Commission shall mean Freeman Township Planning Commission, Clare County, State of Michigan.

Section 3. Districts Where Small Tower-Mounted Wind Energy Turbines (STMWET's) and Small Structure-Mounted Wind Energy Turbines (SSMWET's) Are Allowed:

As cited in the Freeman Township Zoning Ordinance under Permitted Principal Uses; Small Tower-Mounted Wind Energy Turbines (STMWET's) and Small Structure-Mounted Wind Energy Turbines (SSMWET's) are allowed in the following zoning districts with a Special Land Use Permit:
Agriculture (AG) District, Section 7.02. W.
Single Family Residential (R) District, Section 8.02. Q.
Multiple Family Residential (RM) District, Section 9.02. H.

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

**Commercial (C) District, Section 10.02. BB.
Recreation Conservation (RC) District, Section 11.02. V.
Mobile Home Park (RMH) District, Section 12.02. C.
Light Industrial (LT) District, Section 13.02. N.**

Section 4. Districts Where Medium Wind Energy Turbines (MWET's) Are Allowed:

As cited in the Freeman Township Zoning Ordinance under Permitted Principal Uses; Medium Wind Energy Turbines (MWET's), as well as Small Tower-Mounted Wind Energy Turbines (STMWET's) and Small Structure-Mounted Wind Energy Turbines (SSMWET's), are allowed in the following zoning districts with a Special Land Use Permit:

**Agriculture (AG) District, Section 7.02. W.
Commercial (C) District, Section 10.02. BB.
Recreation Conservation (RC) District, Section 11.02. V.
Light Industrial (LT) District, Section 13.02. N.**

Section 5. Districts Where Large Wind Energy Turbines (LWET's) Are Allowed:

**As cited in the Freeman Township Zoning Ordinance under Permitted Principal Uses; Large Wind Energy Turbines (LWET's), are only allowed in the following zoning districts with a Special Land Use Permit:
Commercial (C) District, Section 10.02. BB.**

Section 6. SMALL STRUCTURE-MOUNTED WIND ENERGY TURBINES (SSMWET's) and a SMALL TOWER-MOUNTED WIND ENERGY TURBINES (STMWET's):

- A. A SMALL STRUCTURE-MOUNTED WIND ENERGY TURBINE (SSMWET) and a SMALL TOWER-MOUNTED WIND ENERGY TURBINE (STMWET) shall be considered a permitted use in all zoning districts and shall not be erected, constructed, installed, or modified as provided in this ordinance unless appropriate township permits have been issued to the WET owner(s) or operator(s).**
- B. SITING AND DESIGN: All SSMWETs and STMWETs must be sited and designed in accordance with the following:**
 - 1. VISUAL APPEARANCE:**
 - a. A SSMWET or STMWET, including accessory buildings and related structures shall be a solid, non-reflective, non-obtrusive color (e.g. white, gray, black). The appearance of the turbine, tower, and any**

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- ancillary facility shall be maintained throughout the life of the SSMWET or STMWET.
- b. A SSMWET or STMWET shall not be artificially lighted, except to the extent required by the FAA or other applicable authority, or unless otherwise approved by the Planning Commission.
 - c. SSMWET or STMWET shall not be used for displaying any advertising (including flags, streamers, or decorative items), except for identification of the turbine manufacturer.
2. **GROUND CLEARANCE:** The lowest extension of any blade or other exposed moving component of a SSMWET or STMWET shall be at least fifteen (15) feet above the ground at the highest point of the natural grade within thirty (30) feet of the base of the tower and, in addition, at least fifteen (15) feet above any outdoor surfaces intended for human use, such as decks, balconies or roof gardens, that are located directly below the SSMWET or STMWET.
 3. **NOISE:** Noise emanating from the operation of a SSMWET or STMWET shall not exceed, at any time, the maximum permissible sound levels outlined in Freeman Township Ordinance No. 24.
 4. **VIBRATION:** Vibrations shall not be produced which are humanly perceptible beyond the property on which a SSMWET or STMWET is located in the opinion of the Freeman Township Board.
 5. **GUY WIRES:** Guy wires shall not be permitted as part of the SSMWET or STMWET.
 6. **HEIGHT:** The total height of a SSMWET shall not exceed fifteen (15) feet as measured from the highest point of the roof, excluding chimneys, antennae, and other similar protuberances. The total height of a STMWET shall not exceed one hundred twenty (120) feet.
 7. **SETBACK:** The Setback for a SSMWET shall be a minimum of fifteen (15) feet from the lot line, public or private street, or overhead utility lines. The setback shall be measured from the furthest outward extension of all moving parts. The Setback for a STMWET shall be one and one half (1 ½) times the total height of the STMWET from any front lot line (or rear lot line in the case of a waterfront lot), and shall be setback a distance equal to or greater than one and one half (1 ½) times the total height of the STMWET, as measured from the base of the tower, from all other lot lines, public or private streets, public easements, or overhead public utility lines.

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- 8. SEPARATION:** If more than one (1) SSMWET is installed on a lot, a distance equal to the total height of the highest SSMWET must be maintained between the base of each SSMWET.
- 9. LOCATION:** The SSMWET shall not be affixed to the wall on the side of a structure facing a public or private street. A STMWET may only be located in a rear yard of a lot that has an occupied building. A STMWET may be located in a side yard or front yard of a lot that has an occupied building, provided that it is set back at least one and one half (1 ½) times the total height of the STMWET from the front lot line (or rear lot line in the case of a waterfront lot), as measured from the base of the tower.
- 10. QUANTITY:** No more than three (3) SSMWETs shall be installed on any lot of residentially zoned or used property and must meet the fall zone and setback requirements as outlined in this ordinance. The Planning Commission may allow more SSMWETs on agriculturally, commercially or industrially zoned properties if appropriate. No more than one (1) STMWET shall be installed on any residentially zoned or used property. The Planning Commission may allow more STMWETs on agriculturally, commercially or industrially zoned or used properties if appropriate. The Planning Commission shall consider the size of the lot, the use of the lot, the location of the proposed WETs, the use of and impact upon adjoining lots, and other relevant factors in determining if additional WETs are appropriate. No more than three (3) SSMWETs, or one (1) STMWET shall be allowed on any single lot of residentially zoned or used property, unless specifically approved by the Planning Commission.
- 11. ELECTRICAL SYSTEM:** All electrical controls, control wiring, grounding wires, power lines, and system components shall be placed underground within the boundary of each lot at a depth designed to accommodate the existing land use to the maximum extent practicable. Wires necessary to connect the WET to the tower wiring are exempt from this requirement.
- 12. ANEMOMETERS:** If an anemometer is to be installed prior to, or in conjunction with a SSMWET or STMWET, it must be done so in accordance with the following provisions:
 - a.** The construction, installation, or modification of an anemometer tower shall require a zoning permit and applicable building, electrical or mechanical permits and shall conform to all applicable local, state, and federal applicable safety, construction, environmental, electrical, communications, and FAA requirements.

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- b. An anemometer shall be subject to the minimum requirements for height, setback, separation, location, safety, and decommissioning of this ordinance that correspond to the size of the SSMWET or STMWET that is proposed to be constructed on the site.**

C. ZONING PERMIT APPLICATION REQUIREMENTS: In addition to the standard information required on a Zoning Permit Application form, applications for SSMWET's and STMWET's shall also include the following information/documentation:

- 1. A site plan (drawn to scale) showing the proposed location of all components and ancillary equipment of the SSMWET(s) or STMWET(s), lot lines, physical dimensions of the lot, existing building(s), setback lines, right-of-way lines, public easements, overhead utility lines, sidewalks, non-motorized pathways, public and public streets, and contours. The site plan must also include adjoining lots as well as the location and use of all structures.**
- 2. The proposed number, type, and total height of SSMWET(s) or STMWET(s) to be constructed; including the manufacturer and model, product specifications including maximum noise output (measured in decibels), total rated generating capacity, dimensions, rotor diameter, and a description of ancillary facilities.**
- 3. Documented compliance with the noise requirements set forth in this ordinance.**
- 4. Documented compliance with applicable township, county, state and federal regulations including, but not limited to, all applicable safety, construction, environmental, electrical, communications, and FAA requirements.**
- 5. Evidence that the utility company has been informed of the customer's intent to install an interconnected, customer-owned generator and that such connection has been approved. Off-grid systems shall be exempt from this requirement.**
- 6. For STMWET applications, a description of the methods that will be used to perform maintenance on the STMWET and the procedures for lowering or removing the STMWET in order to conduct maintenance.**

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- 7. Verification that the SSMWET or STMWET shall not interfere with communication systems such as, but not limited to, radio, telephone, television, satellite, or emergency communication systems.**
 - 8. Other relevant information as may be reasonably requested by the township.**
- D. SAFETY REQUIREMENTS: All SSMWET's and STMWET's must be designed to meet the following safety requirements:**
- 1. If the SSMWET or STMWET is connected to a public utility system for net-metering purposes, it shall meet the requirements for interconnection and operation as set forth in the public utility's then current service regulations meeting federal, state, and industry standards applicable to wind power generation facilities, and the connection shall be inspected by the appropriate public utility.**
 - 2. The SSMWET or STMWET shall be equipped with an automatic braking, governing or feathering system to prevent uncontrolled rotation, over-speeding, and excessive pressure on the tower, rotor blades and other wind energy components unless the manufacturer certifies that a braking system is not necessary.**
 - 3. A clearly visible warning sign regarding voltage shall be placed at the base of the SSMWET or STMWET.**
 - 4. The structural integrity of the SSMWET or STMWET shall conform to the design standards of the International Electrical Commission, specifically IEC 61400-1, "Wind Turbine Safety and Design" or IEC 61400-2, "Small Wind Turbine Safety," IEC 61400-22, "Wind Turbine Certification," and IEC 61400-23, "Blade Structural Testing," or any similar successor standards.**
- E. DECOMMISSIONING: Any SSMWET or STMWET that is to be decommissioned shall be done so in accordance with the following requirements:**
- 1. The WET owner(s) or operator(s) shall complete decommissioning within six (6) months after the end of the useful life. Upon request of the WET owner(s) or WET operator(s) of the SSMWET or STMWET, and for a good cause, the Township Supervisor, or the Township Supervisor's designee, may grant a reasonable extension of time. The SSMWET or STMWET will be presumed to be at the end of its useful life if no**

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

electricity is generated for a continuous period of six (6) months; the end of its useful life may also be established by other facts and circumstances determined by the Township Supervisor, or the Township Supervisor's designee. All decommissioning expenses are the responsibility of the WET owner(s) or operator(s).

2. If the WET owner(s) or operator(s) fails to complete decommissioning within the period prescribed above, the Township Board may designate a contractor to complete decommissioning with the expense thereof to be charged to the violator and/or to become a lien against the lot. If the SSMWET or STMWET is not owned by the lot owner(s), a bond, security deposit or Bank Letter of Credit must be provided to the township for the cost of decommissioning each SSMWET or STMWET.
3. In addition to the decommissioning requirements listed previously, the STMWET shall also be subject to the following:
 - a. Decommissioning shall include the removal of each STMWET, buildings, electrical components, and any other associated facilities. Any foundation shall be removed to a minimum depth of sixty (60) inches below grade, or to the level of the bedrock if less than sixty (60) inches below grade.
 - b. The site and any disturbed earth shall be stabilized, graded, and cleared of any debris by the WET owner(s) or its assigns. If the site is not to be used for agricultural practices following removal, the site shall be seeded to prevent soil erosion.

Section 7. Medium Wind Energy Turbines (MWET's):

- A. **GENERAL INFORMATION/APPLICATION REQUIREMENTS:** In addition to the detailed information required on the site plan, the following general information shall be included in the application materials:
 1. The contact information for the owner(s) and operator(s) of the MWET as well as contact information for all lot owners on which the MWET is located.
 2. A copy of the lease, or recorded document, with the landowner(s) if the applicant does not own the land for the proposed MWET. A statement from the landowner(s) of the leased site that the landowner(s) will abide by all applicable terms and conditions of the use permit, if approved.

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- 3. In the case of a Condominium Development, a copy of the Condominium Development's Master Deed and By-Laws addressing the legal arrangement for the MWET.**
- 4. The proposed number, representative types and height of each MWET to be constructed: including the manufacturer and model number, product specifications including maximum noise output (measured in decibels), total rated capacity, rotor diameter, and a description of ancillary facilities.**
- 5. Documents shall be submitted by the developer/manufacturer confirming specifications for MWET tower separation.**
- 6. Engineering data concerning construction of the MWET and its base or foundation, which may include, but not limited to, soil boring data.**
- 7. Anticipated construction schedule.**
- 8. A copy of the maintenance and operation plan, including anticipated regular and unscheduled maintenance. Additionally, a description of the procedures that will be used for lowering or removing the MWET to conduct maintenance, if applicable.**
- 9. Documented compliance with applicable local, state and national regulations including, but limited to, all applicable safety, construction, environmental, electrical, and communications. The MWET shall comply with Federal Aviation Administration (FAA) requirements, Michigan Airport Zoning Act, Michigan Tall Structures Act, and any applicable airport overlay zone regulations.**
- 10. Evidence that the utility company has been informed of the customer's intent to install an interconnected, customer owned generator and that such connection has been approved. Off-grid systems shall be exempt from this requirement.**
- 11. Following the completion of construction, the applicant shall certify that all construction is complete pursuant to the Special Land Use Permit.**
- 12. A written description of the anticipated life of each MWET; the estimated cost of decommissioning; the method of ensuring that funds will be available for Decommissioning and site restoration; and removal and restoration procedures and schedules that will be employed if the MWET(s) become inoperative or non-functional.**

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- 13. The applicant shall submit a Decommissioning Plan that will be carried out at the end of the MWET's useful life, and shall describe any agreement with the landowner(s) regarding equipment removal upon termination of the lease.**
- 14. The Township reserves the right to review all maintenance plans and bonds under this ordinance to ensure that all conditions of the permit are being followed.**
- 15. The Township must be notified of a change in ownership of an MWET or a change in ownership of the lot on which the MWET is located.**
- 16. The Township reserves the right to inspect any MWET in order to ensure compliance with the ordinance. Any cost associated with the inspections shall be paid by the WET owner/operator.**
- 17. VIBRATION: Verification that the MWET will not produce vibrations humanly perceptible beyond the lot on which it is located in the opinion of the Township Board.**
- 18. SHADOW FLICKER: The WET owner(s) and/or operator(s) shall conduct an analysis on potential Shadow Flicker at any occupied building with direct line-of-sight to the MWET and at the buildable area of any vacant adjacent lot with direct line-of-sight to the MWET that could accommodate an occupied building. The analysis shall identify the locations of Shadow Flicker that may be caused by the project and the expected durations of the Shadow Flicker at these locations from sun-rise to sun-set over the course of a year. The analysis shall identify situations where Shadow Flicker may affect the occupants of the buildings for more than thirty (30) hours per year, and describe measures that shall be taken to eliminate or mitigate the problems. Shadow Flicker on a building shall not exceed thirty (30) hours per year.**
- 19. GUY WIRES: Guy wires shall not be permitted as part of the MWET.**
- 20. NOISE: Verification that the noise emanating from the operation of an MWET will not exceed, at any time, the maximum permissible sound levels outlined in Freeman Ordinance No. 24.**
- 21. ELECTRICAL SYSTEM: All electrical controls, control wiring, grounding wires, power lines, and all other electrical system components of the MWET shall be buried underground at a depth in accordance with**

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

the applicable electrical code. Wires necessary to connect the WET to the tower wiring are exempt from this requirement.

- 22. SIGNAL INTERFERENCE:** Verification that the MWET will not interfere with communication systems such as, but not limited to, radio, telephone, television, satellite, or emergency communication systems.
 - 23. ANEMOMETERS:** If an anemometer is installed prior to, or in conjunction with an MWET, it must be done so in accordance with the following provisions:
 - a) The construction, installation, or modification of an anemometer tower shall require a zoning permit and applicable building, electrical or mechanical permits and shall conform to all applicable local, state, and federal applicable safety, construction, environmental, electrical, communications, and FAA requirements.
 - b) An Anemometer shall be subject to the minimum requirements for height, setback, separation, location, safety, and decommissioning of this Ordinance that correspond to the size of the MWET that is proposed to be constructed on the site.
 - 24. OTHER INFORMATION:** Additional details and information as required by the Special Land Use requirements of the Zoning Ordinance, or as requested by the Planning Commission.
- B. All MWET's must be sited and designed in accordance with the following:**
- 1. DESIGN:** The design of an MWET shall conform to all applicable industry standards, specifically including without limit the design standards set forth in Section 5.C. below.
 - 2. VISUAL APPEARANCE:**
 - a. Each MWET, including accessory buildings and other related structures shall be mounted on a tubular tower and a non-reflective, non-obtrusive color (e.g. white, gray, black). The appearance of turbines, towers and buildings shall be maintained throughout the life of the MWET.
 - b. No MWET may be artificially lighted, except to the extent required by the FAA or other applicable authority, or unless otherwise approved by the Planning Commission.
 - 3. USE FOR DISPLAY PURPOSES:** No MWET shall be used for displaying any advertising including flags, streamers, or decorative items,

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

except for reasonable identification of the turbine manufacturer or WET operator(s).

4. **LOCATION:** If an MWET is located on a lot with an occupied building, it shall only be located in the rear yard in accordance with this subsection. However, an MWET may be located in a side yard or front yard of a lot that has an occupied building (or rear yard of such a waterfront lot), only if it is set back one and one half (1 ½) times the total height of the MWET from the front lot line or rear lot line in the case of a waterfront lot, as measured from the base of the tower. The MWET shall only be located in a general common element in a Condominium Development, or Open Space in a Planned Unit Development.
5. **SETBACK AND SEPARATION:**
 - a. **OCCUPIED BUILDING SETBACK:** The Setback from all occupied buildings on the applicant's lot shall be a minimum of twenty (20) feet measured from the base of the Tower.
 - b. **PROPERTY LINE SETBACKS:** With the exception of the locations of public or private streets (see below), drain rights-of-way and parcels with occupied buildings (see above), the internal lot line setbacks shall be equal to one and one half (1 ½) times the total height of the MWET as measured from the base of the tower.
 - c. **PRIVATE OR PUBLIC STREET SETBACKS:** Each MWET shall be set back from the nearest private or public street a distance equal to one and one half (1 ½) times the total height of the MWET.
 - d. **COMMUNICATION AND ELECTRICAL LINES:** Each MWET shall be set back from the nearest above-ground public electric power line or telephone line a distance equal to one and one half (1 ½) times the total height of the MWET, as measured from the base of the tower, determined from the existing power line or telephone line.
 - e. **TOWER SEPARATION:** MWET Tower separation shall be equal to one and one half (1 ½) times the total height of the MWET as measured from the base of the tower.
6. **HEIGHT:** The Total Height of an MWET shall not exceed one hundred fifty (150) feet.
7. **GROUND CLEARANCE:** The lowest extension of any blade or other exposed moving component of an MWET shall be at least fifteen (15) feet above the ground at the highest point of the grade level within fifty (50) feet of the base of the tower and, in addition, at least fifteen (15) feet above any outdoor surfaces intended for human occupancy, such as

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

decks, balconies or roof gardens, that are located directly below the MWET.

- 8. QUANTITY:** No more than one (1) MWET shall be installed for every two and one-half (2.5) acres of land included in the lot. The Freeman Township Planning Commission may allow more MWETS in a condominium development or planned unit development if appropriate. The Freeman Township Planning Commission shall consider the size of the lot, the size of the condominium development or planned unit development, the use of the lot, the location of the proposed MWETS, the use of, and impact upon adjoining lots, and other relevant factors in determining if additional WETs are appropriate.

C. All MWETs must be designed to meet the following safety requirements:

- 1. NET-METERING:** If the MWET is connected to a public utility system for Net-Metering purposes, it shall meet the requirements for interconnection and operation as set forth in the public utility's then-current service regulations applicable to wind power generation facilities, and the connection shall be inspected by the appropriate public utility.
- 2. AUTOMATIC BRAKING SYSTEM:** The MWET shall be equipped with an automatic braking or governing system to prevent uncontrolled rotation, over-speeding, and excessive pressure on the tower, rotor blades and other wind energy components unless the manufacturer certifies that a braking system is not necessary.
- 3. PREVENTION OF UNAUTHORIZED ACCESS:** Security measures must be in place to prevent unauthorized trespass and access. Each MWET shall be enclosed by security fencing not less than six (6) feet in height and shall also be equipped with an appropriate anti-climbing device; provided however, that the Planning Commission may waive such requirements, as it deems appropriate. All access doors to MWETs and electrical equipment shall be locked as appropriate, to prevent entry by non-authorized persons.
- 4. REMOVAL OF HAZARDOUS MATERIALS:** All spent lubricants, cooling fluids, and any other hazardous materials shall be properly and safely removed in a timely manner.
- 5. SIGNAGE:** Each MWET shall have one (1) sign, not to exceed two (2) square feet in area, posted at the base of the tower and on the security fence if applicable. The sign shall contain at least the following:

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- a. **Warning High Voltage;**
 - b. **Manufacturer's and WET owner/operator's name;**
 - c. **Emergency contact numbers; list more than one (1) number.**
 6. **STRUCTURAL INTEGRITY: The structural integrity of the MWET shall conform to the design standards of the International Electrical Commission, specifically IEC 61400-1, "Wind Turbine Safety and Design," IEC 61400-22, "Wind Turbine Certification," and IEC 61400-23, "Blade Structural Testing," or any similar successor standards.**
- D. Any MWET that is to be decommissioned shall be done so in accordance with the following requirements:**
1. **Any WET owner(s) or operator(s) shall complete decommissioning within six (6) months after the end of the useful life. Upon request of the WET owner(s) or operator(s), and for a good cause, the Township Supervisor, or the Township Supervisor's designee, may grant a reasonable extension of time. Each MWET will be presumed to be at the end of its useful life if no electricity is generated for a continuous period of six (6) months; the end of its useful life may also be established by other facts and circumstances determined by the Township Supervisor or the Township Supervisor's designee. All decommissioning expenses are the responsibility of the WET owner(s) or operator(s).**
 2. **Decommissioning shall include the removal of each MWET, buildings, electrical components, and private streets to a depth of sixty (60) inches, as well as any other associated facilities. Any foundation shall be removed to a minimum depth of sixty (60) inches below grade, or to the level of the bedrock if less than sixty (60) inches below grade. Following removal, the location of any remaining WET foundation shall be identified on a map as such and recorded with the deed to the lot with the County Register of Deeds.**
 3. **All private streets of access to the MWET shall be removed, cleared, and graded by the WET owner(s), unless the property owner(s) requests, in writing, a desire to maintain the private street.**
 4. **The site and any disturbed earth shall be stabilized, graded, and cleared of any debris by the WET owner(s) or the assigns of the WET owner(s). If the site is not to be used for agricultural practices following removal, the site shall be seeded to prevent soil erosion.**

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- 5. If the WET owner(s) or operator(s) fails to complete decommissioning within the period prescribed above, the township may designate a contractor to complete decommissioning with the expense thereof to be charged to the violator and/or to become a lien against the lot. If the MWET is not owned by the lot owner(s), a bond, security deposit, or Bank Letter of Credit must be provided to the township for the cost of decommissioning each MWET.**

Section 8. Large Wind Energy Turbines (LWET's):

- A. GENERAL INFORMATION/APPLICATION REQUIREMENTS: In addition to the detailed information required on the site plan, the following general information shall be included in the application materials:**
 - 1. The contact information for the owner(s) and operator(s) of the LWET as well as contact information for all lot owners on which the LWET is located.**
 - 2. A copy of the lease, or recorded document, with the landowner(s) if the applicant does not own the land for the proposed LWET. A statement from the landowner(s) of the leased site that the landowner(s) will abide by all applicable terms and conditions of the use permit, if approved.**
 - 3. The proposed number, representative types and height of each LWET to be constructed: including the manufacturer and model number, product specifications including maximum noise output (measured in decibels), total rated capacity, rotor diameter, and a description of ancillary facilities.**
 - 4. Documents shall be submitted by the developer/manufacturer confirming specifications for LWET tower separation.**
 - 5. Engineering data concerning construction of the LWET and its base or foundation, which may include, but not limited to, soil boring data.**
 - 6. Anticipated construction schedule.**
 - 7. A copy of the maintenance and operation plan, including anticipated regular and unscheduled maintenance. Additionally, a description of the procedures that will be used for lowering or removing the LWET to conduct maintenance, if applicable.**

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- 8. Documented compliance with applicable local, state and national regulations including, but limited to, all applicable safety, construction, environmental, electrical, and communications. The LWET shall comply with Federal Aviation Administration (FAA) requirements, Michigan Airport Zoning Act, Michigan Tall Structures Act, and any applicable airport overlay zone regulations.**
- 9. Evidence that the utility company has been informed of the customer's intent to install an interconnected, customer owned generator and that such connection has been approved.**
- 10. Following the completion of construction, the applicant shall certify that all construction is complete pursuant to the Special Land Use Permit.**
- 11. A written description of the anticipated life of each LWET; the estimated cost of decommissioning; the method of ensuring that funds will be available for Decommissioning and site restoration; and removal and restoration procedures and schedules that will be employed if the LWET(s) become inoperative or non-functional.**
- 12. The applicant shall submit a Decommissioning Plan that will be carried out at the end of the LWET's useful life, and shall describe any agreement with the landowner(s) regarding equipment removal upon termination of the lease.**
- 13. The Township reserves the right to review all maintenance plans and bonds under this ordinance to ensure that all conditions of the permit are being followed.**
- 14. The Township must be notified of a change in ownership of an LWET or a change in ownership of the lot on which the LWET is located.**
- 15. The Township reserves the right to inspect any LWET in order to ensure compliance with the ordinance. Any cost associated with the inspections shall be paid by the WET owner/operator.**
- 16. VIBRATION: Verification that the LWET will not produce vibrations humanly perceptible beyond the lot on which it is located in the opinion of the Township Board.**
- 17. SHADOW FLICKER: The WET owner(s) and/or operator(s) shall conduct an analysis on potential Shadow Flicker at any occupied building with direct line-of-sight to the LWET and at the buildable area of any**

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

vacant adjacent lot with direct line-of-sight to the LWET that could accommodate an occupied building. The analysis shall identify the locations of Shadow Flicker that may be caused by the project and the expected durations of the Shadow Flicker at these locations from sun-rise to sun-set over the course of a year. The analysis shall identify situations where Shadow Flicker may affect the occupants of the buildings for more than thirty (30) hours per year, and describe measures that shall be taken to eliminate or mitigate the problems. Shadow Flicker on a building shall not exceed thirty (30) hours per year.

- 18. GUY WIRES:** Guy wires shall not be permitted as part of the LWET.
- 19. NOISE:** Verification that the noise emanating from the operation of an LWET will not exceed, at any time, the maximum permissible sound levels outlined in Freeman Ordinance No. 24.
- 20. ELECTRICAL SYSTEM:** All electrical controls, control wiring, grounding wires, power lines, and all other electrical system components of the LWET shall be buried underground at a depth in accordance with the applicable electrical code. Wires necessary to connect the WET to the tower wiring are exempt from this requirement.
- 21. SIGNAL INTERFERENCE:** Verification that the LWET will not interfere with communication systems such as, but not limited to, radio, telephone, television, satellite, or emergency communication systems.
- 22. ANEMOMETERS:** If an anemometer is installed prior to, or in conjunction with an LWET, it must be done so in accordance with the following provisions:
 - a) The construction, installation, or modification of an anemometer tower shall require a zoning permit and applicable building, electrical or mechanical permits and shall conform to all applicable local, state, and federal applicable safety, construction, environmental, electrical, communications, and FAA requirements.**
 - b) An Anemometer shall be subject to the minimum requirements for height, setback, separation, location, safety, and decommissioning of this Ordinance that correspond to the size of the MWET that is proposed to be constructed on the site.**
- 23. OTHER INFORMATION:** Additional details and information as required by the Special Land Use requirements of the Zoning Ordinance, or as requested by the Planning Commission.

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

B. All LWET's must be sited and designed in accordance with the following:

- 1. DESIGN:** The design of an LWET shall conform to all applicable industry standards, specifically including without limit the design standards set forth in Section 4.C. below.
- 2. VISUAL APPEARANCE:**
 - a.** Each LWET, including accessory buildings and other related structures shall be mounted on a tubular tower and a non-reflective, non-obtrusive color (e.g. white, gray, black). The appearance of turbines, towers and buildings shall be maintained throughout the life of the LWET.
 - b.** No LWET may be artificially lighted, except to the extent required by the FAA or other applicable authority, or unless otherwise approved by the Planning Commission.
- 3. USE FOR DISPLAY PURPOSES:** No LWET shall be used for displaying any advertising including flags, streamers, or decorative items, except for reasonable identification of the turbine manufacturer or WET operator(s).
- 4. SETBACK AND SEPARATION:**
 - a. OCCUPIED BUILDING SETBACK:** The Setback from all occupied buildings on the applicant's lot shall be a minimum of twenty (20) feet measured from the base of the Tower.
 - b. PROPERTY LINE SETBACKS:** With the exception of the locations of public or private streets (see below), drain rights-of-way and parcels with occupied buildings (see above), the internal lot line setbacks shall be equal to one and one half (1 ½) times the total height of the LWET as measured from the base of the tower.
 - c. PRIVATE OR PUBLIC STREET SETBACKS:** Each LWET shall be set back from the nearest private or public street a distance equal to one and one half (1 ½) times the total height of the LWET.
 - d. COMMUNICATION AND ELECTRICAL LINES:** Each LWET shall be set back from the nearest above-ground public electric power line or telephone line a distance equal to one and one half (1 ½) times the total height of the LWET, as measured from the base of the tower, determined from the existing power line or telephone line.
 - e. TOWER SEPARATION:** LWET Tower separation shall be equal to one and one half (1 ½) times the total height of the LWET as measured from the base of the tower.

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- 5. HEIGHT:** The Total Height of an LWET shall not exceed one hundred sixty (160) meters or five hundred twenty five (525) feet.
- 6. GROUND CLEARANCE:** The lowest extension of any blade or other exposed moving component of an LWET shall be at least fifteen (15) feet above the ground at the highest point of the grade level within fifty (50) feet of the base of the tower and, in addition, at least fifteen (15) feet above any outdoor surfaces intended for human occupancy, such as decks, balconies or roof gardens, that are located directly below the LWET.
- 7. QUANTITY:** No more than one (1) LWET shall be installed for every two and one-half (2.5) acres of land included in the lot.

C. All LWET's must be designed to meet the following safety requirements:

- 1. NET-METERING:** When the LWET is connected to a public utility system for Net-Metering purposes, it shall meet the requirements for interconnection and operation as set forth in the public utility's then-current service regulations applicable to wind power generation facilities, and the connection shall be inspected by the appropriate public utility.
- 2. AUTOMATIC BRAKING SYSTEM:** The LWET shall be equipped with an automatic braking or some type of governing system (i.e. variable twist or blade twist motors) to prevent uncontrolled rotation, over-speeding, and excessive pressure on the tower, rotor blades and other wind energy components unless the manufacturer certifies that a braking system is not necessary.
- 3. PREVENTION OF UNAUTHORIZED ACCESS:** Security measures must be in place to prevent unauthorized trespass and access. Each LWET shall be enclosed by security fencing not less than six (6) feet in height and shall also be equipped with an appropriate anti-climbing device; provided however, that the Planning Commission may waive such requirements, as it deems appropriate. All access doors to LWET's and electrical equipment shall be locked as appropriate, to prevent entry by non-authorized persons.
- 4. REMOVAL OF HAZARDOUS MATERIALS:** All spent lubricants, cooling fluids, and any other hazardous materials shall be properly and safely removed in a timely manner.

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

- 5. SIGNAGE:** Each LWET shall have one (1) sign, not to exceed two (2) square feet in area, posted at the base of the tower and on the security fence if applicable. The sign shall contain at least the following:
 - a. Warning High Voltage;**
 - b. Manufacturer's and WET owner/operator's name;**
 - c. Emergency contact numbers; list more than one (1) number.**
 - 6. STRUCTURAL INTEGRITY:** The structural integrity of the LWET shall conform to the design standards of the International Electrical Commission, specifically IEC 61400-1, "Wind Turbine Safety and Design," IEC 61400-22, "Wind Turbine Certification," and IEC 61400-23, "Blade Structural Testing," or any similar successor standards.
- D. Any LWET that is to be decommissioned shall be done so in accordance with the following requirements:**
- 1. Any WET owner(s) or operator(s) shall complete decommissioning within six (6) months after the end of the useful life. Upon request of the WET owner(s) or operator(s), and for a good cause, the Township Supervisor, or the Township Supervisor's designee, may grant a reasonable extension of time. Each LWET will be presumed to be at the end of its useful life if no electricity is generated for a continuous period of six (6) months; the end of its useful life may also be established by other facts and circumstances determined by the Township Supervisor or the Township Supervisor's designee. All decommissioning expenses are the responsibility of the WET owner(s) or operator(s).**
 - 2. Decommissioning shall include the removal of each LWET, buildings, electrical components, and private streets to a depth of sixty (60) inches, as well as any other associated facilities. Any foundation shall be removed to a minimum depth of sixty (60) inches below grade, or to the level of the bedrock if less than sixty (60) inches below grade. Following removal, the location of any remaining WET foundation shall be identified on a map as such and recorded with the deed to the lot with the County Register of Deeds.**
 - 3. All private streets of access to the LWET shall be removed, cleared, and graded by the WET owner(s), unless the property owner(s) requests, in writing, a desire to maintain the private street.**
 - 4. The site and any disturbed earth shall be stabilized, graded, and cleared of any debris by the WET owner(s) or the assigns of the WET owner(s).**

ODINANCE NO. 29

FREEMAN TOWNSHIP ALTERNATE WIND ENERGY ORDINANCE

If the site is not to be used for agricultural practices following removal, the site shall be seeded to prevent soil erosion.

5. If the WET owner(s) or operator(s) fails to complete decommissioning within the period prescribed above, the township may designate a contractor to complete decommissioning with the expense thereof to be charged to the violator and/or to become a lien against the lot. If the LWET is not owned by the lot owner(s), a bond, security deposit, or Bank Letter of Credit must be provided to the township for the cost of decommissioning each LWET.

Section 9. Severability:

Should any provision or part of the within ordinance be declared by any court of competent jurisdiction to be invalid or unenforceable, the same shall not affect the validity or enforceability of the balance of this ordinance which shall remain in full force and effect.

Section 10. Effective Date:

This ordinance becomes effective thirty (30) days after newspaper publication.

Newspaper publication date: July 10, 2014

Effective Date: Aug 10, 2014

Adopted by the Freeman Township Board: May 8, 2014

Al Housler, Freeman Township Supervisor, Clare County, Michigan

Al Housler, Date July 15, 2014

Patricia Humphrey, Freeman Township Clerk, Clare County, Michigan

Patricia D. Humphrey, Date Patricia D. Humphrey

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