SUMMIT TOWNSHIP

WIND ENERGY DEFINITIONS: Chapter 150.006(Article 9)

Ambient Noise: Ambient is defined as the background noise in an area or environment, being a composite of sounds from varying sources at varying distances.

Anemometer: A device used to measure wind speed.

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

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

Decommissioning: The process of terminating operation and completely removing a Wind Facility and all related buildings, structures, foundations, access roads, and equipment and restoration of the property to a condition that is reasonably close to the original property prior to construction.

Hub Height: The distance measured from the ground level to the center of the turbine hub.

Meteorological Tower (met tower): Includes the tower, base plate, anchors, guy wires, equipment housing, and hardware, anemometers (wind speed indicators), wind direction vanes, booms to hold equipment for anemometers and vanes, data loggers, instrument wiring, and any 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.

Modification: Any change to a small wind energy system that materially alters the size, type or location of a small wind energy system. Like-kind replacements shall not be considered to be a modification.

Nacelle: The encasement which houses all of the generating components, gear box, drive train, and other equipment .

Net Metering: The difference between the electricity supplied to a customer over the electric distribution system and the electricity generated by the customer's wind energy system that is fed back into the electric distribution system over a billing period and is a special metering and billing agreement between the utility company and the customer.

Occupied Building: Is a residence, school, hospital, church, public library, business, or other building used for public gatherings.

SCADA Tower (supervisory control and data acquisition system): see MET Tower.

Small Tower-Mounted On-Site Wind Energy System: A wind energy conversion system consisting of a wind turbine (horizontal or vertical axis), a tower, and associated control or conversion electronics which has a rated capacity of not more than one hundred (100) kW and is intended to primarily reduce on-site consumption of utility power.

Small Structure-Mounted Wind Energy System: A wind energy conversion system consisting of a wind turbine (horizontal or vertical axis), and associated control or conversion electronics which has a rated capacity of not more than five (5) kW and is intended to primarily reduce on-site consumption of utility power.

Shadow Flicker: Is an alternating change in light intensity which is caused by the moving blades of a wind turbine casting a shadow(s) on the ground and stationary objects such as windows of a dwelling.

Sound Pressure: Average rate at which sound energy is transmitted through a unit area in a specified direction. The pressure of the sound measured at a receiver.

Sound Pressure Level: The sound pressure mapped to a logarithmic scale and reported in decibels (dB).

Utility Grid /Large Wind Energy Facility System: A Utility Grid wind energy system is designed and built to provide electricity to the electric utility grid.

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

Wind Energy Facility: A power generating facility consisting of one or more wind turbines under common ownership or operation control, and includes substations, MET towers, cables/wires, and other buildings accessory to such facility, whose main purpose is to supply electricity to off-site customers.

Wind Turbine Generator: A wind energy conversion system which converts wind energy into electricity. All components for a system shall be designed and built by licensed and regulated engineering and manufacturing firms and facilities to insure that the safety and structural integrity of the towers and generators meet the standards of the International Electrical Commission including a tower, pylon, or other structure, including all accessory facilities, upon which any, all, or some combination of the following are mounted:

1. A wind vane, blade, or series of wind vanes or blades, or other devices mounted on a rotor for the purpose of converting wind into electrical or mechanical energy.

2. A shaft, gear, belt, or coupling device used to connect the rotor to a generator, alternator, or other electrical or energy-producing device.

3. A generator, alternator, or other device used to convert the energy created by the rotation of the rotor into electrical or mechanical energy.

Wind Turbine Generator Total Height:

Horizontal Axis Wind Turbine Rotors: The distance between the ground and the highest point of the wind turbine generator, plus the length by which the rotor wind vanes or blades mounted on a horizontal axis wind turbine rotor exceeds the height of a wind turbine generator.

Vertical Axis Wind Turbine: The distance between the ground and the highest point of the wind turbine generator including the top of the blade in its vertical position.

SMALL ON-SITE WIND ENERGY SYSTEMS: Chapter 150.145 (Article 4 Section 4.7)

1. Small On-Site Wind Energy Systems: A wind energy conversion system which is intended to primarily serve the needs of the property upon which it is located.

2. **Small On-Site Tower Mounted Wind Energy Systems:** Up to eighty (80) feet in total height shall be considered an accessory structure as a Conditional Use in the following districts: ***Agricultural (AG-1), General Commercial (C-2), Highway Commercial (C-3) and Light and Heavy Industrial (I-1&2) with lot sizes of one (1) acre or greater.***

3. **Small On-Site Tower Mounted Wind Energy Systems:** Over eighty (80) feet in total height shall be considered an accessory structure as a Conditional Use in the following districts: ***Agricultural (AG-1), General Commercial (C-2), Highway Commercial (C-3) and Light and Heavy Industrial (I-1&2) with lot sizes two (2) acres or greater.***

4. **All Small On-Site Tower and Structure Mounted Wind Energy Systems:** Shall be considered as a ***Conditional Use in Residential Districts with a lot size of one (1) acre or greater*** and are either tower mounted systems with a total height up to sixty (60) feet or structure mounted systems that are attached to a structure's roof, walls, or other elevated surface and has a total height that does not exceed fifteen (15) feet as measured from the highest point on the roof, excluding chimneys, antennae, and other protuberances.

5. **Site Development Standards:** Shall apply to all small on-site wind energy systems in the Township and shall be subject to all applicable requirements of the Site Plan Article and Sections of this Ordinance including the following: ***Chapter 150.257-J (Article 5 Section-5.5.7 J)***

a. **Blade/Ground Clearance:** The lowest extension of any blade or other exposed moving component 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 a 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 below the Small Tower or Structure Mounted Wind Energy System.

b. **Guy Wires:** If the small on-site wind tower mounted energy system is supported by guy wires, such wires shall be covered with a high visibility material or fenced so as to make them visible at a height of at least six (6) feet above the ground.

c. **Setbacks** T**ower Mounted Wind Energy System:** shall be set back from an adjoining lot line or a public or private road right-of-way a distance equal to the total height of the wind turbine generator plus ten (10) percent, however no part of the wind turbine generator, including guy wire anchors, may extend closer to the property line or waterfront than the required setback for the district in which the unit is located. A small wind energy system shall be located in the rear yard and shall have a setback of twenty (20) feet from all occupied buildings on the applicant's parcel. The Planning Commission may reduce the setback if the neighboring property is under the same ownership or based on other factors such as topography specific to the site.

d. **Setbacks Structure Mounted Wind Energy System:** shall be set back a minimum of fifteen (15) feet from the property line, public or private right-of-way, easement, or overhead utility lines if mounted directly on a roof or other elevated surface of a structure. If affixed by any extension to the side, roof, or other elevated surface then the setback from the property line, public or private right-of-way or easement shall be a minimum of fifteen (15) feet. The setback shall be measured from the furthest outward extension of all moving parts.

e. **Noise:** Small on-site wind energy systems shall not cause a sound pressure level in excess of fifty-five (55) dB (A) as measured at the nearest property line. This level may be exceeded during short-term events such as utility outages and severe wind storms.

f. **Vibration:** Small on-site wind energy systems shall not cause vibrations through the ground which are perceptible beyond the property line of the parcel on which it is located.

g. **Reception/Signal Interference:** Small on-site wind energy systems shall not cause interference with communication systems such as, but not limited to, television, microwave, satellite emergency communications, wireless phone, navigational or radio reception to neighboring areas.

h. **Shadow Flicker:** Small on-site wind energy systems shall not cause shadow flicker upon any structure on a neighboring property. The wind turbine generator owner may obtain written agreements which allow shadow flicker to cross an occupied structure.

i. **Potential Ice Throw: I**ce throw or ice shedding from the wind turbine generator shall not cross the property lines of the site nor impinge on any right-of-way or overhead utility line.

j. **Safety:** Small on-site wind energy systems shall be equipped with an automatic braking, governing or feathering system to prevent uncontrolled rotation, over-speed, and excessive pressure on the tower or building structure, rotor blades and other wind energy components unless the manufacturer certifies that a braking system is not necessary.

k. **Signs:** Small on-site wind energy systems shall not be used for displaying any advertising (including flags, streamers, or decorative items), except for the identification of the turbine manufacture, a clearly visible warning sign regarding voltage shall be placed at the base of a tower or structure mounted system, or any other required information (e.g. Underwriters Libratory (UL) label, emergency contact phone number) such sign shall not exceed three square feet.

l. **Visual Appearance:** Small on-site wind energy systems including accessory structures shall be a non-reflective, non-obtrusive color (e.g. white, gray, black). The appearance of the system and any ancillary facilities shall be maintained throughout the life of the system.

m. **Lighting:** Small on-site wind energy systems shall not be artificially lighted, except to the extent required by law or other applicable authority, or otherwise for the reasonable safety and security thereof.

n. Utility Connection: If the small on-site wind energy system is connected to a public utility (Consumers Energy) 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 utility.

o. **Other Regulations:** On-site wind energy systems shall comply with all applicable State construction and electrical codes, Regulations contained in the Jackson County Airport – Reynolds Field Airport Zoning Manual, Federal Aviation Administration requirements, Michigan Aeronautics Commission requirements, the Michigan Tall Structures Act (P.A. 259 of 1959, as amended), and the Michigan Public Service Commission and Federal Energy Regulatory Commission standards.

Utility Grid, Large Wind Energy Facilities/Systems shall only be permitted as a Conditional Use in Agricultural and Industrial Districts with ten (10) acres or larger - *Chapter 150.145 (Article 4 Section 4.7)* are subject to the provisions of the following:

Chapter 150.257-K (Article 5 Section 5.5.7-K)

1. **Site Development Standards:** Shall apply to all utility grid large wind energy facilities/systems including any applicable provisions of small on-site wind energy systems in the Township and shall be subject to all applicable requirements of the Site Plan Article and Sections of this Ordinance including the following:

2. **Wind Energy Facilities and Anemometer Towers:** Anemometer Towers and wind energy facilities consisting of one (1) or more wind turbines whose main purpose is to supply electricity to off-site customers may be allowed as a Special Land Use and shall adhere to the following requirements in addition to the requirements contained in this Ordinance:

a. **Principal or Accessory Use:** A wind energy facility or anemometer tower may be considered either a principal or an accessory use. A different existing use or an existing structure on the same parcel shall not preclude the installation of a wind energy facility or a part of such facility on such parcel. Wind energy facilities that are constructed and installed in accordance with the provisions of this Article shall not be deemed to constitute the expansion of a nonconforming use or structure.

b. **Avian Analysis and Wildlife Impact:** An applicant shall submit an avian study to assess the potential impact of a proposed Wind Energy Facility upon bird and bat species. The avian study shall at a minimum report a literature survey for threatened and endangered species, and any information on critical flyways. The analysis shall also include the potential effects on species listed under the federal Endangered Species Act and Michigan's Endangered Species Protection Law. The applicant must identify any plans for post-construction monitoring or studies. The analysis should also include an explanation of potential impacts and propose a mitigation plan, if necessary.

c. **State or Federal Requirements:** Any proposed wind turbine generator anemometer tower shall meet or exceed any standards and regulations of the Federal Aviation Administration (FAA), Michigan Aeronautics Commission (MAC), the Michigan Public Service Commission, National Electric Safety Code, Federal Energy Regulatory Commission, and any other agency of the state or federal government with the authority to regulate wind turbine generators or other tall structures in effect at the time the Special Land Use approval is approved.

d. **Sufficient Wind Resources:** The proposed site shall have documented annual wind resources sufficient for the operation of the proposed wind turbine generator; provided, however, this standard shall not apply to an anemometer tower. No wind turbine generator shall be approved without submission of a wind resource study documenting wind resources on the site. The Township may retain the services of an independent, recognized expert to review the results of the wind resource study prior to acting on the application for special approval. All costs for the study shall be at the applicant expense.

e. **Minimum Site Area:** The minimum site area for a wind turbine generator or an anemometer tower erected prior to a wind turbine generator shall meet required setbacks and any other standards of this Article.

f. **Setbacks:** Each proposed wind turbine generator or anemometer tower shall meet the following applicable setback requirements:

(1) **Setback from Property Line:** Each wind turbine generator shall be set back from any adjoining lot line a distance equal to the total height of the wind turbine generator including the top of the blade in its vertical position. The Planning Commission may reduce this setback to no less than one hundred (100) feet; provided the adjoining property is owned or leased by the applicant or an easement is obtained. If the adjoining property that is owned or leased by the applicant includes more than one (1) parcel, the properties may be considered in combination in determining setback relief. The amount of setback relief approved by the Planning Commission will be based on data provided by the applicant and prepared by a qualified professional. Such data shall satisfy the Planning Commission that any potential blade and ice throw will not cross the property line and that sound levels will not exceed fifty (55) decibels on the dB (A) scale at the property line from the proposed setback. Data provided shall be specific to the proposed tower in the proposed location taking into consideration prevailing winds, topography, existing vegetation, and other relevant factors.

(2) **Setback from Road:** In addition to the above, a wind turbine generator shall, in all cases, be set back from a public or private road right-of-way a minimum distance equal to the height of the wind turbine generator total height plus 10% as defined in the Ordinance.

(3) **Setback from Structures:** Each wind turbine generator shall be setback from the nearest inhabited structure a distance not less than one and one-half (1 ½) times the total height of the wind turbine generator.

(4) **Setback from Communication and Power Lines:** Each wind turbine shall be set back from the nearest above-ground public electric power line or telephone line a distance of no less than four hundred (400) feet or one and one-half (150%) times the total tower height, whichever is greater, determined from the existing power or communications lines.

(5) **Building Setbacks:** Setbacks for buildings accessory to a wind turbine generator shall conform to the setbacks of the district.

g. **Height:** Regarding wind turbine height, the applicant shall demonstrate compliance with the Michigan Tall Structures Act (P.A. 259 of 1959, as amended), FAA guidelines, and Michigan Aeronautics Commission guidelines as part of the approval process.

h. **Tower Separation:** Wind turbine separation distance shall be based on 1) industry standards, 2) manufacturer recommendation, and 3) the characteristics such as prevailing wind and topography, of the particular site location. At a minimum, there shall be a separation between the towers of not less than three (3) times the turbine rotor diameter. Documents shall be submitted by the developer/manufacturer confirming specifications for tower separation.

i. **Minimum Ground Clearance:** The lowest point of the arc created by rotating wind vanes or blades on a wind turbine generator shall be no less than twenty (20) feet.

j. **Maximum Noise Levels:** The sound pressure level generated by the wind energy system shall not exceed fifty-five (55) dB (A) measured at neighboring property lines. This level may be exceeded during short-term events such as utility outages and severe wind storms.

k. **Maximum Vibrations:** Any proposed wind turbine generator shall not produce vibrations through the ground humanly perceptible beyond the parcel on which it is located.

l. **Potential Ice Throw:** Ice throw or ice shedding for a wind turbine generator shall not cross the property lines of the site nor impinge on any right-of-way or overhead utility line.

m. **Signal Interference**. No wind turbine generator shall be installed in any location where proximity to existing fixed broadcast, retransmission, or reception antennas for radio, television, navigation, emergency communication systems, wireless phone or other personal communication systems would produce electromagnetic interference with signal transmission or reception. No wind turbine generator shall be installed in any location along the major axis of an existing microwave communications link where its operation is likely to produce electromagnetic interference with the link's operation.

n. **Visual Impact, Lighting, Power Lines:**

(I) Wind turbines shall be mounted on tubular or lattice towers, painted a non-reflective, non obtrusive neutral color. The appearance of turbines, towers, and buildings shall be maintained throughout the life of the wind energy facility pursuant to industry standards (i.e. condition of exterior paint, signs, landscaping). A certified registered Michigan licensed engineer and authorized factory representative shall certify that the construction and installation of the wind energy facility meets or exceeds the manufacturer's construction and installation standards.

(2) The design of the wind energy facility's buildings and related structures shall, to the extent reasonably possible, use materials, colors, textures, screening, and landscaping that will blend facility components with the natural setting and the environment existing at the time of installation. The Landscaping Requirements section of the Zoning Ordinance shall be complied with and addressed in the Site Plan.

(3) Wind turbine generators shall not be artificially lighted, except to the extent required by the FAA or the MAC or other applicable authority, or otherwise necessary for the reasonable safety and security thereof. If lighting is required, the lighting alternatives and design chosen:

(a) Shall be the intensity required under State or federal regulations.

(b) Shall not be strobe lighting or other intermittent white lighting fixtures, unless expressly required by State or federal regulations. Such intermittent lighting shall be alternated with steady red lights at night if acceptable to State or federal regulations.

(c) May be a red top light that does not pulsate or blink.

(d) All tower lighting required by State or federal regulations shall be shielded to the extent possible to reduce glare and visibility from the ground.

(4) Wind turbines shall not be used to display any advertising (including flags, streamers, or decorative items), except the reasonable identification of the manufacturer or operator of the wind energy facility.

(5) The electrical collection system shall be placed underground within the interior of each parcel at a depth designed to accommodate the existing agricultural land to the maximum extent practicable. The collection system may be placed overhead adjacent to State and County roadways, near substations or points of interconnection to the electric grid or in other areas as necessary.

o. **Shadow Flicker:**

(1) The wind turbine generator shall be designed in such a manner as to minimize shadow flicker on a roadway. The wind turbine generator shall be designed in such a manner as to prevent shadow flicker on any existing structures located off the property on which the wind turbine generator is located. If necessary to prevent shadow flicker from crossing occupied structures, the wind turbine generator may be programmed to stop rotating during times when the wind turbine generator shadow crosses these structures. The wind turbine generator operator may obtain written agreements which allow shadow flicker to cross an occupied structure.

(2) The Planning Commission may require the applicant to conduct an analysis of potential shadow flicker at occupied structures if it deems such an analysis necessary. The analysis shall identify the locations of shadow flicker that may be caused by the project and the expected durations of the flicker at these locations from sunrise to sunset over the course of a year. The analysis shall identify problem areas where shadow flicker may affect the occupants of the structures and describe measures that shall be taken to eliminate or mitigate the problems. All costs for the analysis shall be at the applicant expense.

p**. Safety:**

(1) All collection system wiring shall comply with all applicable safety and stray voltage standards.

(2) Wind turbine towers shall not be climbable up to fifteen (15) feet above ground surfaces.

(3) All access doors to wind turbine towers and electrical equipment shall be lockable and/or fenced as appropriate, to prevent entry by non-authorized person(s).

(4) Each wind turbine tower shall have one (1) sign, not to exceed three (3) square feet 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 owner/operators name
   c. Emergency contact numbers (list more than one number)

(5) All wind turbine generators shall be equipped with controls to control the rotational speed of the blades within design limits for the specific wind turbine generator and be equipped with an automatic braking, governing or feathering system to prevent uncontrolled rotation, over-speed, and excessive pressure on the tower or building structure, rotor blades and other wind energy components.

(6) The structural integrity of the tower(s) shall conform to the design standards of the International Electrical Commission, specifically "Wind Turbine Safety and Design," "Wind Turbine Certification," and "Blade Structural Testing," or similar successor standards.

q. **Hazard Planning:** An application for a wind turbine generator shall be accompanied by a hazard prevention plan. Such plan shall contain:

(1) Certification that the electrical wiring between turbines and between turbines and the utility right-of-way does not pose a fire hazard or any life safety hazard.

(2) Location of landscaping is to be designed to avoid spread of fire from any source on the turbine; such preventative measures may address the types and locations of vegetation below the turbine and on the site. The landscaping shall be maintained to prevent the creation of life safety hazards (fire, emergency access, electrical contact). In addition to the above all landscaping shall comply with the provisions of the Landscaping Requirements of the Zoning Ordinance.

(3) A listing of any hazardous fluids that may be used on site shall be provided, including Material Data Safety Sheets (MDSS). All spent lubricants, cooling fluids, and any other hazardous materials shall be properly and safely removed in a timely manner.

(4) Certification that the turbine has been designed to contain any hazardous fluids shall be provided.

(5) A statement certifying that the turbine shall be routinely inspected to ensure that no fluids are released from the turbine.

(6) All towers shall be inspected annually by a certified registered Michigan licensed engineer and authorized factory representative insure the structural integrity of the tower, appurtenances added to the tower, equipment added to the tower, and fixtures added to the tower. A report shall be provided to the Township Building Inspector on or before August 1st of each year.

q. **Approvals:** All required approvals from other local, regional, state or federal agencies must be obtained prior to approval of a site plan. In the case where site plan approval is a requirement for other local, regional, state, or federal agency approval, evidence of such shall be submitted with the site plan.

r. **Decommissioning/Removal of Wind Turbine Generators:**

(1) The applicant shall submit a decommissioning plan. The plan shall include:

(a) The anticipated life of the project.

(b) The estimated decommissioning costs in current dollars. Such costs shall not include credit for salvageable value of any materials.

(c) The method of ensuring that funds will be available for decommissioning and restoration shall be as required by the Planning Commission.

(d) The anticipated manner in which the project will be decommissioned and the site restored.

(2) Any wind turbine generator or anemometer tower that is not operational for a continuous period of twelve (12) months shall be considered abandoned, and the owner of such wind turbine generator or anemometer tower shall remove the same within one hundred eighty (180) days of abandonment. Failure to remove an abandoned wind turbine generator or anemometer tower within the one hundred eighty (180) day period provided in this subsection shall be grounds for the Township to remove the wind turbine generator or anemometer tower at the owner's expense.

(3) In addition to removing the wind turbine generator, or anemometer tower, the owner shall restore the site of the wind turbine generator or anemometer tower to its original condition prior to location of the wind turbine generator or anemometer tower, subject to reasonable wear and tear. Any foundation associated with a wind generator or anemometer tower shall be removed to a minimum depth of five (5) feet below the final grade and site vegetation shall be restored.

(4) The Planning Commission shall require the owner of the wind turbine generator to deposit a performance guarantee in an amount equal to the estimated costs associated with the removal of the wind turbine generator or anemometer tower and all associated equipment and accessory structures and restoration of the site to a reusable condition which shall include the removal of all underground structures to a depth of five (5) feet below the natural ground level at that location. The amount of the performance guarantee shall be reviewed every five (5) years. The performance guarantee shall be in the form of a cash deposit, certified check, irrevocable bank letter of credit, or surety bond acceptable to the Township.

s. **Equipment Replacement:** Major components of the wind turbine generator may be replaced without a modification of the Special Use permit provided all regulations contained herein are adhered to.