## 6.7 LARGE WIND ENERGY SYSTEMS

#### 6.7.1 Purpose.

The purpose of this bylaw is to encourage the responsible development of the town's wind energy resources by providing standards for the design, placement, construction, monitoring, modification and removal of large wind energy systems that address public safety, preserves the character and appearance of the town, preserves property values, minimizes impacts on scenic, natural and historic resources of the town and provides adequate financial assurances for decommissioning.

#### 6.7.2 Applicability.

This bylaw applies to all large wind energy systems to be constructed after the effective date of this bylaw. This bylaw also applies to physical modifications to large wind energy systems that are materially altered by type, number, location, height or configuration.

#### 6.7.3 Definitions.

**Fall Zone -** The area on the ground from the base of the tower that forms a circle with a radius equal to 1.5 times the height of the large wind energy system. The fall zone is the area within which there is a potential hazard from falling debris (such as ice) or collapsing material.

**Height** - The height from the existing grade of the fixed portion of the tower to the blade tip of the turbine at the highest point of its rotation or the highest point of the wind energy system.

**Large Wind Energy System -** A wind energy system with a height equal to or greater than two-hundred feet (200').

**Meteorological Tower** - A tower used for supporting anemometers, wind vanes and other equipment to assess wind resources at a predetermined height above ground.

**Nacelle -** The frame and housing at the top of the tower that encloses the gearbox and generator to protect them from weather.

**Rotor** - The blades and hub of the wind turbine that rotate during turbine operation.

**Small Wind Energy System -**A wind energy system with a height of less than two-hundred (200') feet. Small wind energy systems are regulated by § 6.5.

**Wind Energy System -** All equipment, machinery and structures utilized in connection with the conversion of wind to electricity. This includes but is not limited to transmission, storage, collection and supply equipment, substations, transformers, towers, wind turbines, foundations, stormwater control measures, access roads and other appurtenant structures, facilities and equipment.

**Wind Turbine -** A device that converts kinetic wind energy into rotational energy that drives an electrical generator. A wind turbine typically consists of a nacelle body and a rotor with two or more blades.

# 6.7.4 Use Regulations.

- a. No large wind energy system shall be erected, constructed, or installed without first obtaining a special permit from the Special Permit Granting Authority, or "SPGA", as defined in this Zoning By-law. Physical modifications to an existing large wind energy system that materially alter its type, number, location, height or configuration shall also require a special permit from the SPGA.
- b. Meteorological towers shall be permitted subject to the issuance of a building permit for a temporary structure not to exceed two years.

# 6.7.5 General Requirements.

- c. **Compliance**. The construction, operation, modification and removal of a large wind energy system shall comply with all local, state and federal laws.
- d. **Site Control.** The applicant shall demonstrate actual control over and legal access to the proposed site sufficient to allow for the construction and operation of a large wind energy system.
- e. Utility Notification. The applicant shall demonstrate that ISO New England or the utility company that controls the electric grid in the area of the proposed site has been informed of and has or will approve the applicant's intent to install an interconnected large wind energy system. Off-grid large wind energy systems shall be exempt from this requirement.

- f. **Operation & Maintenance.** The operator(s)/owner(s) of a large wind energy system shall maintain the large wind energy system in good condition. As part of a special permit application, an applicant shall submit an operation and maintenance plan for the anticipated life expectancy of the large wind energy system, showing how the operator(s)/owner(s) will inspect and maintain the large wind energy system in good condition.
- g. **Inspection Reports.** The operator(s)/owner(s) of a large wind energy system shall submit inspection reports to the Building Inspector every five (5) years. The inspection report must be completed by a licensed professional engineer.
- h. Unsafe Structure. Should the inspection of any large wind energy system reveal structural defects or safety concerns that in the opinion of the licensed professional engineer render the large wind energy system unsafe, the following actions must be taken. At the discretion of the Building Inspector, the operation of the large wind energy system shall be suspended until the structural defects and/or safety concerns have been addressed. Within thirty (30) business days of notification of an unsafe structure and/or safety defect, the operator(s)/owner(s) of the large wind energy system shall submit a plan to remediate the structural or safety defects to the Building Inspector. Failure to remediate the structural or safety defects within six (6) months from the date of initial notice shall be a violation of the special permit. The Building Inspector shall allow the operator(s)/owner(s) to restart the large wind energy system only after receipt of written certification by a licensed professional engineer that the structural defects and/or safety concerns have been remedied.
- i. **Contingency Plan.** The applicant shall submit a contingency plan that outlines the protocols to be followed to mitigate unacceptable adverse impacts to the town, its residents and the environment. At a minimum, the plan shall include mitigation steps to address the possibility of excessive noise, excessive shadow & flicker and excessive wildlife injuries or mortalities as determined by the state or federal agency with jurisdiction over the impacted species.
- j. Liability Insurance. The operator(s)/owner(s) of the large wind energy system shall obtain and keep current an insurance policy, against loss or damage to persons or property, including personal injury or death resulting from the construction, operation and decommissioning of the large wind energy system. The SPGA shall determine the minimum amount of liability insurance required. The operator(s)/owner(s) of the large wind energy system shall submit proof of liability insurance, in the amount determined by the SPGA, prior to the issuance of a building permit and on an annual basis thereafter.

- k. **Removal Plan & Cost Estimate.** The applicant shall submit a detailed plan for the removal of the large wind energy system and restoration of the site to its pre-existing condition upon abandonment or decommissioning. The removal plan shall be certified by a licensed professional engineer and include a detailed estimate of the anticipated removal and site restoration costs that includes a mechanism to account for inflation.
- 1. **Financial Surety.** The operator(s)/owner(s) of the large wind energy system shall provide the SPGA with financial surety, of such type and form as the SPGA shall require in its reasonable discretion, for the following purposes prior to the issuance of a building permit. The SPGA may engage a qualified consultant, to be paid for by the applicant, to estimate the amount of surety needed. All surety\_shall be approved as to form and manner of execution by Town Counsel.
  - i) Surety to ensure that the large wind energy system project site is properly stabilized to protect downslope properties and public ways. The amount and form of surety shall be determined by the SPGA.
  - ii) Surety to cover possible damage caused during the transportation and construction of the large wind energy system. The amount and form of surety shall be determined by the SPGA.
  - iii) Surety to cover the cost of removal of the large wind energy system and the restoration of the site in the event the town must remove the large wind energy system and restore the site. The amount and form of surety shall be determined by the SPGA.
  - iv) No less than ninety (90) days prior to the expiration of any financial surety required by this bylaw, the current operator(s)/owner(s) of the large wind energy system shall provide the SPGA with renewed, extended or replacement financial surety.
- m. **NHESP Letter.** The applicant shall petition the Massachusetts Natural Heritage & Endangered Species Program "NHESP" for a letter of determination as to the possible existence of rare or endangered species and species of special concern at the proposed site and submit the letter to the SPGA as part of any permit application.

# 6.7.6 Design Standards.

**a.** Meteorological Towers. All meteorological towers shall be set\_back at least 1.5 times its height from all public and private ways, excluding a dedicated site access road, and off-site buildings. No meteorological tower shall exceed four-hundred twenty (420') feet in height.

**b.** Height. No large wind energy system shall exceed four-hundred twenty (420') feet in height.

- **c. Appearance.** All large wind energy systems shall be finished in a neutral (white or gray) non-reflective color to minimize visual impacts.
- **d.** Signage. Signs listing the 24-hour contact information of the large wind energy system operator(s)/owner(s) shall be installed in an easily accessible and noticeable location at the large wind energy system site. All signs shall comply with the further requirements of this Zoning By-law, as currently set forth in Section 5.0. Sign locations may be determined by the SPGA.
- e. Lighting. Large wind energy systems shall contain a beacon light or lights as required by the Federal Aviation Administration "FAA". Where allowed by the FAA, the beacon light shall be white. A large wind energy system may include lights necessary for the safe operation of the large wind energy system. All operational lighting shall be directed downwards and screened from roadways and abutting properties with native vegetation.
- f. Shadow/Flicker. No large wind energy system shall cause more than thirty (30) shadow/flicker hours per year on any off-site inhabited building or undeveloped lot. In calculating the number of shadow/flicker hours per year, the applicant may incorporate sunshine probabilities and meteorological data when calculating the shadow/flicker hours per year. The SPGA may allow more than thirty (30) shadow/flicker hours per year on an off-site inhabited building or an undeveloped lot only if written permission is granted and maintained by all individuals or entities with control over the affected real properties.
- **g.** Appurtenant Structures & Equipment. All structures and equipment that are part of a large wind energy system shall, unless otherwise expressly set forth herein, comply with the dimensional requirements of the underlying zoning district, including but not limited to setbacks and height.
- **h.** Noise Regulations. The operation of all large wind energy systems and appurtenant equipment shall not increase the background ambient noise level by greater than five (5) dBA measured at the property lines of the large wind energy system site. The SPGA may allow the construction of a large wind energy system that increases the ambient background noise level, at the property lines of the site, by more than five (5) dBA, if written permission is granted and maintained by all individuals or entities with control over the affected real properties.

# i. Setbacks.

i) A large wind energy system shall be set\_back at least one-half mile, measured from the base of the nearest wind turbine, from any off-site inhabited buildings or undeveloped lots in existence on the date the application to construct a large wind energy system is received by the SPGA. The SPGA may reduce the setback requirement from off-site inhabited buildings and undeveloped lots, if written permission is granted and maintained by all individuals or entities with control over the affected real properties.

- ii) A large wind energy system shall be set\_back a distance equal to one and one-half (1.5) times the height of the large wind energy system from property lines, on-site inhabited buildings, public and private rights of way and recreational trails "fall zone". The SPGA may reduce the setback requirement from property lines and on-site inhabited buildings, if written permission is granted and maintained by all individuals or entities with control over the affected real properties.
- **j.** Unauthorized Access. All large wind energy systems shall be constructed to prevent unauthorized persons from gaining access to the large wind energy system.
- **k. Emergency Response Access.** The large wind energy system and access roads shall be constructed and maintained to allow for safe access at all times by local emergency vehicles. Local public safety officials shall be provided with the ability to access the system as needed to respond to emergencies.
- **1. Habitat Fragmentation.** To the extent possible, large wind energy systems, associated roadways and transmission lines shall be located in or adjacent to areas where land is already cleared to avoid habitat fragmentation.
- **m. Vegetation Clearing.** The clearing of natural vegetation shall be limited to that which is necessary for the construction, operation, and maintenance of the large wind energy system, associated roadways and transmission lines and is otherwise prescribed by applicable laws. Revegetation plans shall be provided for restoration areas required for construction, but not necessary for ongoing maintenance and operations. Only native species typically found in the system's environment may be used for restoration.
- **n. Wetlands.** All large wind energy systems, associated roadways and transmission lines shall be constructed in compliance with all applicable local, state and federal laws pertaining to wetlands.
- **o. Wildlife.** All large wind energy systems, associated roadways and transmission lines shall be constructed to avoid or minimize impacts to wildlife, with particular attention paid to avian and bat species, as well as rare species, endangered species and species of special concern.
- **p.** Stormwater Management. All stormwater controls installed at the large wind energy system site and on associated roadways shall be constructed and managed according to the Massachusetts Department of Environmental Protection's Stormwater Policy.
- **q. Invasive Species Management.** The applicant and subsequent large wind energy system operator(s)/owner(s) shall utilize best management practices during construction and post-construction to control the introduction of invasive species at the large wind energy system site and along the associated roadways and transmission lines.

# 6.7.7 Pre-application Conference.

Prior to the submission of an application for the construction or modification of a large wind energy system, applicants are required to meet with the SPGA at a public meeting to discuss the proposed large wind energy system project and to clarify the filing requirements and permitting process. The applicant is encouraged to prepare sufficient preliminary architectural and/or engineering drawings to inform the SPGA and the public of the location of the proposed large wind energy system, as well as its overall scale and design.

### 6.7.8 Large Wind Energy System Site Assessments.

- **a. Balloon/Crane Test.** After the application is submitted, and not more that fourteen (14) days before the public hearing, the applicant shall arrange to fly a brightly colored four-foot diameter balloon at the site of the proposed large wind energy system at the maximum height of the large wind energy system. A balloon shall be flown for each proposed wind turbine and each balloon shall contain a beacon light similar in color and output to the beacon light to be required by the FAA. The balloons shall be flown for a period of forty-eight (48) hours. The date and location of the flight shall be advertised at least fourteen (14) days, but no more than twenty-one (21) days, before the flights, and again in the public hearing advertisement in a Berkshire County newspaper with a general circulation in the town. If visibility and weather conditions are inadequate for observers the SPGA may require additional tests.
- **b.** Sight Line Simulations. The SPGA shall select up to five (5) locations from which the applicant shall prepare and submit with its application sight line simulations from the chosen locations to the proposed large wind energy system site. All simulations shall be in color and provide an accurate representation of the height, width and breadth of the proposed large wind energy system.
- c. **Project Viewshed Map.** The applicant shall submit as part of its application a viewshed map showing all areas within eight (8) miles of the proposed large wind energy system site that will be able to view the large wind energy system. The viewshed map shall identify streets, historical resources, cultural facilities, recreational resources, publicly owned land, and other local landmarks.
- **d.** Noise Analysis. The applicant shall submit the results of a noise analysis to the SPGA as part of its application. The noise analysis shall be conducted in accordance with industry standards and certified by a qualified independent acoustical engineer. The noise analysis shall contain sufficient information for the SPGA to determine whether the operation of the proposed large wind energy system will comply with the noise regulations set forth in § 1.6 (h). In completing the noise analysis, the acoustical engineer shall consider the unique topography of the surrounding area, both daytime

and nighttime ambient noise levels, seasonal conditions, nearby residences, prevailing wind direction and atmospheric conditions, such as high wind shear or thermal inversion that may affect the propagation of sound emitted from the large wind energy system. The noise analysis shall also analyze and discuss the anticipated impacts of low frequency noise emitted from the large wind energy system.

- e. Post Construction Noise Monitoring. The large wind energy system operator(s)/owner(s) shall conduct one year of post construction noise monitoring to document the noise levels during operation of the large wind energy system. The operator(s)/owner(s) shall take noise measurements at the property lines on a quarterly basis and submit its findings to the SPGA.
- f. Shadow/Flicker Analysis. The applicant shall conduct a shadow/flicker analysis and submit its findings to the SPGA as part of its application. The analysis shall include a detailed discussion of the anticipated shadow/flicker impacts for all off-site inhabited buildings and undeveloped lots estimated to receive thirty (30) or more shadow/flicker hours per year worst case scenario. At least fourteen (14) days prior to the public hearing, the applicant shall notify, by certified mail return receipt, all the owners of off-site inhabited buildings and undeveloped lots expected to receive thirty (30) or more shadow/flicker hours per year worst case scenario. The applicant shall submit proof of notification to the SPGA.
- g. Avian & Bat Species Analysis. The applicant shall submit the results of an avian and bat species analysis to the SPGA as part of its application. The avian and bat species analysis shall be conducted and certified by a qualified independent wildlife biologist. The avian and bat species analysis shall contain sufficient information to fully characterize and determine the risk posed by the proposed large wind energy system to avian and bat species. Applicants are strongly encouraged to comply with the most recent <u>US Fish & Wildlife Service Wind Turbine Guidelines Advisory Committee Recommended Guidelines</u>: "Recommendations on developing effective measures to mitigate impacts to wildlife and their habitats related to land-based wind energy facilities", when planning and conducting studies to meet the requirements of this section. The large wind energy system operator(s)/owner(s) shall\_conduct one year of post construction monitoring to document avian and bat species injuries and mortalities and submit its findings to the SPGA.

#### 6.7.9 Application Procedures.

Upon receipt of a complete application for a large wind energy system, the SPGA shall review and take action upon the application in accordance with the special permit procedures set forth in § 9.3 and this section.

## 6.7.10 Technical Review.

Upon receipt\_of an application for a large wind energy system special permit, the SPGA may engage professional and technical consultants, including legal counsel at the applicant's expense, pursuant to M.G.L. Chapter 44 § 53G, to assist the SPGA with its review of application materials and to monitor construction projects to ensure that all work is conducted in accordance with approved plans and conditions. The SPGA may direct the applicant to deposit funds with the SPGA for such review at the time the application is accepted, and to add additional funds as needed upon notice. Failure to comply with this section shall be good grounds for denying the application. Upon approval of the application, any excess amount in the account attributable to the application processing, including any interest accrued, shall be refunded to the applicant.

### 6.7.11 Reasonable Conditions & Mitigation.

The SPGA may impose reasonable conditions, safeguards and limitations on time and use and may require the applicant to implement all reasonable measures to mitigate unforeseen adverse impacts of the large wind energy system should they occur.

# 6.7.12 Application Requirements.

The applicant shall submit the following required information as part of the application for a large wind energy system special permit. All site plans shall be signed and sealed by a registered land surveyor in consultation with a licensed professional engineer.

**a.** Contact Information. Name, address, phone number, e-mail and signature of the applicant, as well as all co-applicants and property owners, and the name and contact information and the signature of any agents representing the applicant.

- **b.** Site Identification. Identify the location of the proposed large wind energy system. Provide the street address, if any, and the tax map and parcel number(s).
- c. Location Map. A relevant portion of the most recent USGS Quadrangle Maps at a scale of 1 = 25,000' or similar scale showing the proposed large wind energy system

site, associated roadways, transmission lines and the area within at least a two mile radius of the proposed site.

- d. Vicinity Map. A map of the proposed large wind energy system site at a scale of 1" = 300' or similar scale, with existing contour intervals no greater than ten (10') feet showing the entire area within a ½ mile radius of the proposed large wind energy system, showing the following:
  - i. Existing topography, public and private roads, recreation trails, property lines of all lots, structures including their use, historic sites, cultural sites, wetlands, known bat hibernacula, known critical habitat areas, other environmentally sensitive areas, location of existing and proposed electric distribution lines, transformers, substations, and access easements.
- e. Site Plan. A site plan with a scale of 1'' = 40', unless otherwise noted with contour intervals no greater than two (2') feet showing the following:
  - i. Property lines of the proposed large wind energy system site and adjacent parcels within two (2) times the height of the large wind energy system.
  - ii. Outline of all existing structures, including their uses, located within one <sup>1</sup>/<sub>2</sub> mile the height of the large wind energy system with exact distances to the large wind energy system listed.
  - iii. Existing and proposed public and private roads, driveways, and recreational trails within two (2) times the height of the large wind energy system.
  - iv. Representations, dimensioned and to scale, of the proposed large wind energy system including, but not limited to, tower foundations, guy anchors, cable locations, associated equipment and structures, fencing, electric distribution infrastructure, parking and access roads.
  - v. All proposed changes to the existing site, associated roadways and transmission lines, including but not limited to areas of temporary clearing, areas of permanent clearing, areas of grading, and areas of cut and fill.
  - vi. Delineation of all wetland resource areas and buffers on the proposed large wind energy system site, associated roadways and transmission lines.
  - vii. Location of known habitat areas for rare species, endangered species and species of special concern
  - viii. A cross section of the proposed access road indicating its width, crown, depth of gravel, drainage, and paving or other surface material.

- **f. Elevations.** Siting elevations or views at grade from north, south, west and east for a distance equal to 1.5 times the height of the large wind energy system. Elevations shall be at one quarter inch equals one foot or similar scale and show the following:
  - i. The proposed large wind energy system, associated equipment, existing and proposed structures, and security barriers with total elevation dimensioned.
  - ii. Existing and proposed trees and shrubs at the time of application with approximate elevations dimensioned.

# g. Technical Information

- i. Documentation of the large wind energy system's nameplate capacity, manufacturer, model number, tower height, rotor diameter, braking mechanisms, other safety mechanisms, tower type, color, foundation type and foundation dimensions.
- ii. One or three line electrical diagram detailing the large wind energy system, associated components and electrical interconnection methods with all National Electrical Code compliant disconnects and overcurrent devices.
- **h.** Stormwater Control Plans. Engineering plans showing the drainage of surface water and detailed plans to control erosion and sedimentation, during construction, and as a permanent measure, which show conformance to the Massachusetts Department of Environmental Protection's Stormwater Policy.
- **i. Transportation Plan.** A written transportation plan discussing the anticipated transportation issues created by the transportation of the large wind energy system components, which shall include the following:
  - i. A map showing the anticipated transportation route commencing at the Massachusetts state line.
  - ii. All locations in the Town of Becket where land alterations and clearing of vegetation will be required, regardless of ownership, including the approximate square footage of each land alteration and clearing.
- iii. A detailed list of all bridges and culverts to be crossed in the Town of Becket during the transportation of the large wind energy system components that include the applicable width and weight restrictions of each bridge and culvert.
- iv. Detailed site plans for all anticipated road, bridge, or culvert alterations in the Town of Becket along the anticipated transportation route, regardless of ownership.
- v. A list of the anticipated combined weight of the delivery vehicles and cargo.

- vi. A list of the turning radii of the delivery vehicles with cargo.
- vii. All anticipated road closures and traffic disruptions that may affect emergency response vehicles and plans to manage these road closures and traffic disruptions in cooperation with local emergency officials.
- viii. All off-site staging areas.

# 6.7.13 Waiver.

Upon written request of the applicant, the SPGA may waive any of the application requirements contained in § 1.12, as the SPGA, in its discretion, deems appropriate.

### 6.7.14 Damage to Public/Private Ways & Public/Private Lands.

The applicant shall be responsible for the cost of repairing any damage to public/private ways and public/private lands in the Town of Becket in connection with the transportation, construction, operation, maintenance and decommissioning of the large wind energy system.

- a. In furtherance of this section, the Becket Highway Superintendent in conjunction with an independent licensed professional engineer, paid for by the applicant and selected by the town, shall document the condition of all public/private ways and public/private lands along the anticipated transportation route prior to the transportation of any large wind energy system component.
- b. Within thirty (30) days after all large wind energy system components have been transported, the Becket Highway Superintendent in conjunction with the independent licensed professional engineer, paid for by the applicant and selected by the town, shall re-document the condition of all public/private ways and public/private lands along the actual transportation route to determine whether the public/private ways and public/private lands have been damaged by the applicant and if so, the total cost to repair such damage. The applicant is responsible for the total cost of all repairs even if this exceeds the amount of the surety held by the Town.

# 6.7.15 Abandonment & Removal of Large Wind Energy Systems.

a. The most recent operator(s)/owner(s) shall remove the large wind energy system, or any part thereof, at the end of its useful life or when it is has been abandoned, as defined herein, and restore the site in accordance with its removal plan. The most recent operator(s)/owner(s) shall notify the Building Inspector by certified mail of the proposed

date of discontinuance. Without notice of a proposed date of discontinuance, the large wind energy system, or any part thereof, shall be presumed to have been abandoned if it is not in operation for a period of six (6) months. The Building Inspector may engage, at the applicant's expense, a licensed professional engineer to help determine whether the large wind energy system has been abandoned.

- b. After six (6) months of non-operation of any portion of the large wind energy system, the Building Inspector shall issue a written notice of discontinuance to the most recent operator(s)/owner(s) of the large wind energy system. The most recent operator(s)/owner(s) shall have thirty (30) days to rebut the presumption of abandonment raised by such non-operation by submitting information to the Building Inspector demonstrating that the part of the large wind energy system in question has operated within the six (6) month period or that it will return to operator(s)/owner(s) does not rebut the presumption or fails to return the discontinued portion of the large wind energy system to operation within six (6) months from the date of the written notice of discontinuance, or within such other time as agreed to in writing by the Building Inspector, it shall be deemed abandoned.
- a.c. The most recent operator(s)/owner(s) shall physically remove the large wind energy system and restore the site within one-hundred eighty days (180) days from the end of its useful life or from when it has been abandoned, as defined herein. If the most recent operator(s)/owner(s) fails to remove the large wind energy system within the one-hundred eighty (180) day period, the town shall have the right, to the extent it is otherwise duly authorized by law, to enter onto the site and physically remove the large wind energy system and restore the site at the sole expense of the most recent operator(s)/owner(s).

# 6.7.16 Lapse of Approval.

Any special permit approved to construct, operate or modify a large wind energy system pursuant to this bylaw shall automatically expire if:

- a. The large wind energy system is not installed and operating within two (2) years from the date of approval; or
- b. The large wind energy system is abandoned or discontinued.

# 6.7.17 Violations.

It is unlawful for any person or entity to construct, install, modify or operate a large wind energy system that is not in compliance with this bylaw or with any condition contained in a special permit, issued pursuant to this section.

## 6.7.18 Penalties.

Any person or entity that fails to comply with any provision of this bylaw or any condition contained in a special permit, issued pursuant to this section shall be subject to enforcement and penalties as allowed by applicable law.

# 6.7.19 Severability.

The provisions of this bylaw are severable, and the invalidity of any section, subdivision, subsection, paragraph or other part of this bylaw shall not affect the validity or effectiveness of the remainder of this bylaw.