

BUCHANAN COUNTY, MISSOURI

[Draft 2] Zoning Ordinance for Wind Energy Conversion Systems

This ordinance is designed to address the authorization of Wind Energy Conversion Systems in Buchanan County, Missouri. The ordinance is organized as follows:

- I. Purpose
- II. Applicability
- III. Definitions
- IV. General Requirements
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- VI. Permit Application Contents
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I. PURPOSE

To set forth standards that will assist property owners and wind developers in the determination of the proper placement of commercial wind energy conversion systems, with the understanding that wind development may not be possible or feasible on all properties within Buchanan County, Missouri.

Or

The purpose of this ordinance is to preserve and protect public health and safety without significantly increasing the cost or decreasing the efficiency of a commercial wind energy conversion system and to allow for the orderly development of land, protect property values and aesthetic conditions, and enable the continuation of agricultural operations within the county. This ordinance does not repeal, abrogate, annul, impair, or interfere with any existing ordinance.

II. APPLICABILITY

This ordinance applies to all unincorporated lands within the boundaries of Buchanan County [or all unincorporated lands east of I-29 within Buchanan County] and pertains to commercial scale wind energy conversion systems.

[Optional (more restrictive area allowed for wind development):

Because of the presence of significant wildlife habitat along the Missouri River corridor and the prevalence of forested areas and conservation areas in the western half of Buchanan County as well as the desire of the County to minimize wildlife and conservation area impacts, wind development will be permitted only in the eastern portion of the county; specifically, east of Interstate 29. This would avoid wind development in the most favorable habitat areas for bald and golden eagles and bat species, and would avoid a large, multi-species migratory flight path along the Missouri River corridor.]

III. DEFINITIONS

As used in this ordinance, the following terms shall have the meaning indicated:

- A-weighted equivalent-continuous sound pressure level (LAeq) – The time-averaged sound pressure level in decibels as measured on a sound level meter using the A-weighting network, a method for weighting the frequency spectrum to mimic the human ear. Expressed as dB(A) or dBA.
- ANSI - The American National Standards Institute. The current revision of each referenced standard shall be used.
- ASTM - The American Society for Testing and Materials. The current revisions of each referenced standard shall be used.
- Background sound - The all-encompassing sound associated with a given environment without contribution from the source or sources of interest, as defined by ANSI S12.9 Part 3.
- Buildable land – The land available for siting of wind turbines after all required setbacks have been applied.
- Commission - The Buchanan County Commission.
- Continuous background sound - The background sound measured during a measurement period, after excluding the contribution of transient background sounds, as defined by ANSI S12.9 Part 3.
- County or Buchanan County - The Buchanan County Commission and Buchanan County Planning and Zoning Board.
- Decibel - See “Sound Pressure Level and Sound Power Level”
- Downwind - A position where the direction of the wind vector is within an angle of $\pm 45^\circ$ of the direction connecting the center of the sound source and the center of the specified receiver area, as defined by ANSI S12.18.
- Equivalent-continuous sound pressure level (Leq) - The unweighted, time-averaged sound pressure level in decibels as measured on a sound level meter. Expressed as dB.
- FAA - The Federal Aviation Administration.
- FERC - The Federal Energy Regulatory Commission.
- Frequency - The number of oscillations or cycles per unit of time, expressed as Hertz (Hz).
- Hertz - The frequency of sound expressed by cycles per second.
- Hub height - When referring to a wind turbine, the distance measured from ground level to the center of the turbine hub.
- IEC - The International Electrotechnical Commission. The current revision of each referenced standard shall be used.
- ISO - The International Organization for Standardization. The current revision of each referenced standard shall be used.
- INCE - The Institute of Noise Control Engineering.
- Habitable (or inhabitable) structure - A structure designed for human occupancy and that provides complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.
- Met tower - A meteorological tower used for the measurement of wind speed.
- NERC - The North American Electric Reliability Corporation.

- Noise-sensitive receptor - An inhabited structure, school, hospital, church, public library, or other area designated by the Planning Commission.
- Non-participating parcel - A parcel of real property which is not under lease or other property agreement with a Wind Energy Conversion Facility (WECF) owner/operator.
- Octave band - The frequency interval where the upper frequency is twice the lower frequency.
- One-third octave band - The frequency interval where the upper frequency is the lower frequency times the cube root of two.
- Participating parcel - A parcel of real property which is under lease or other property agreement with a Wind Energy Conversion System (WECS) owner/operator.
- Project boundary – the outermost limit of the area encompassing all of the participating properties and elements of a wind project.
- Rotor - An element of a wind energy system that acts as a multi-bladed airfoil assembly, generating kinetic energy directly from the wind.
- SCADA - Supervisory control and data acquisition, a computer system for gathering and analyzing real-time data.
- Shadow flicker - Alternating changes in light intensity caused by the moving blade of a wind energy system casting shadows on the ground and stationary objects, such as but not limited to a window at a dwelling.
- Sound power - The rate per unit time at which sound energy is radiated, expressed as watts (W).
- Sound power level - Ten times the logarithm to the base 10, of the ratio of a given sound power to the reference sound power of 1 picowatt, expressed as decibels (dB).
- Sound pressure - The difference at a given point between the pressure produced by sound energy and the atmospheric pressure, expressed as pascals (Pa).
- Sound pressure level - Twenty times the logarithm to the base 10, of the ratio of the root-mean-square sound pressure to the reference pressure of twenty micropascals, expressed as decibels (dB). Note that, unless expressed with reference to a specific weighing network (such as dBA), the unit dB shall refer to an un-weighted measurement.
- Total height - The vertical distance from ground level to the tip of a wind turbine blade when the tip is at its highest point.
- Transient background sound - Background sound associated with one or more sound events which occur infrequently during the basic measurement period, a measurement interval with or without the source operating, as defined by ANSI S12.9 Part 3.
- Wind Energy Conversion System (WECS) or Wind Project, or Wind Energy System - An electricity 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, located on private land which is under lease or other property agreement with a WECF owner/operator, whose main purpose is to supply electricity to off-site customers(s). It includes substations, MET towers, cables and wires and other buildings accessory to such facility. Wind Energy Conversion Facility accessory structures shall comply with the requirements of the agricultural zoning district in addition to applicable elements of this ordinance.
- Wind Energy Conversion System Permit - A zoning permit issued upon compliance with standards of this ordinance.

- Wind Energy Conversion System Site Plan Review - The process used to review a proposed wind project.
- Wind Energy Overlay Districts - Districts created by the Buchanan County Planning and Zoning Department, upon receiving a recommendation of the Commission, by identifying specific areas within the agricultural zoning district best situated for development of wind energy facilities and adopting specific provisions that apply in that area in addition to other provisions of the zoning ordinance.
- Wind turbine - A wind energy conversion system which converts wind energy into electricity through the use of a wind turbine generator, and includes the turbine, blade, tower, base and pad transformer.
- Zoning order - The most recent version/amendments to the Buchanan County Zoning Order.

IV. GENERAL REQUIREMENTS

1. Wind Energy Conversion Systems (WECS) shall be permitted in the agricultural zoning district through the WECS Permit process.
2. Permit Requirements
 - a. A Wind Energy Conversion System (WECS) Permit issued by the Buchanan County Planning and Zoning Commission is required for any commercial wind energy system before construction begins.
 - i. A WECS Permit expires if the permitted WECS has not begun construction within 3 years from the date the permit was issued or if the WECS is out of service or unused for a 12 month continuous period of time. The Buchanan County Planning and Zoning Commission may grant extensions to the 3 year and 12 month deadlines based on hardship conditions.
 - ii. Fee – The application fee for a WECS Permit is based on the number of turbines included in the application and is non-refundable. The fee will be \$5,000 per turbine for the county to process the application; if the county incurs expenses greater than can be covered by this permit fee, the county will directly invoice the applicant for the additional costs.
 - b. Any physical modification that materially alters the WECS after the initial permit is issued, including, but not limited to repowering, shall require approval under this regulation. Movements of 300 feet or less to approved locations of wind turbines and other elements of the wind project are allowed without the need for County re-approval.
 - c. Any movements of wind turbines or other portions of the WECS after the WECS Permit is approved shall be provided as an update to Buchanan County Planning and Zoning and to each affected landowner. If changes result in impacts significant enough to warrant additional review, the county may charge an additional \$1,000 per turbine affected at the discretion of the Commission.
 - d. The WECS Permit shall be revoked if the WECS is moved or otherwise altered so as not to be in conformity with these regulations. This provision does not apply to future repowering of the project or to routine maintenance and repairs.
 - e. Accessory structures included in a wind project, such as met towers, substation, laydown yard, and operations and maintenance building are included in the WECS

Permit process; however, building permits will also be required from the County before construction of met towers, operations and maintenance building, and wind turbines.

- f. Reasonable evidence of financial ability to construct the WECS as determined by the County Commission is a condition precedent to the issuance of any WECS Permit under this ordinance. Buchanan County requires a performance bond, surety bond, escrow account, letter of credit or other financial assurance to the county for each WECS that guarantees the performance of the decommissioning and restoration requirement at the end of the useful life of the WECS.
- g. It is unlawful for any person to construct, install, maintain, modify, or operate a WECS that is not in compliance with this ordinance or with any condition contained in a WECS Permit issued pursuant to this ordinance.
- h. This ordinance shall be administered by the County Planning and Zoning Inspector/Code Enforcement official.
- i. The County official may enter any property for which a WECS Permit has been issued under this ordinance to conduct an inspection to determine whether the conditions stated in the permit have been met.
- j. Each WECS shall have a written agreement with the County regarding use of county roads, bridges, and rights-of-way. Performance/surety bonds or other financial assurance documents may be required to guarantee the performance of the road agreements before a WECS Permit can be issued.

V. PERMIT APPLICATION PROCESS

The WECS Permit application process will involve the following steps. Throughout this process, the County will be involved as a resource to assist in maintaining good relationships between all stakeholders in the project, including potentially affected nonparticipating landowners:

1. Pre-application meeting. An informal meeting shall be held between the County and developer/applicant representatives at least 60 days before the intended submittal date of the WECS Permit application. This meeting will be a question/answer session to be used for familiarization of the County with the proposed project and for clarification of requirements before the application is finalized. The applicant shall be responsible for arranging a mutually acceptable meeting time and date. If requested by the County, the pre-application meeting shall include an applicant-facilitated site visit.
2. [Optional inclusion to allow earlier public involvement/comment] The WECS Permit applicant will submit the proposed boundary of the wind project for review and approval by the County as an appropriate area for wind development. The County will solicit public comments on this proposed area for 30 days so that public comments and feedback can be incorporated into the further design of the wind project and into the WECS Permit application. The County will approve or deny the proposed project area within 15 days after closure of the public comment period. Approval of the proposed project area is required before a WECS Permit application for the area will be considered by the County.
3. The WECS Permit application (see Section VI for application requirements) will be submitted to the County, after which the County will review the application for completeness and request additional information from the applicant, as appropriate. The County review process is

expected to have an approximately 3 month duration (including the public hearing described below) assuming the application is complete and no substantive additional information is required.

4. The County will hold a public hearing on the WECS Permit application that may be attended by any member of the public. This hearing will be noticed in the largest circulation local newspaper at least 15 calendar days before its scheduled occurrence. Members of the public who are residents of Buchanan County or who are participating landowners in the project will be offered the opportunity to provide verbal comments and/or written comments on the application. Members of the public who are not residents of Buchanan County, except for participating landowners in the project, will be allowed to submit written comments only. Written comments can be submitted to the County at any time between the announcement of the public hearing until 15 calendar days after the closure of the public hearing.
5. The County will consider all public comments received and will issue a permit approval or denial within 45 days after the closing of the public hearing. The County will include conditions on the permit approval at its discretion.

Note that the County has the right and duty to make a decision on each WECS Permit application as it determines best for the county and its residents. Fulfillment of the requirements of this ordinance in a WECS Permit application does not constitute an obligation on the part of the County to approve a permit for the project.

VI. PERMIT APPLICATION CONTENTS

An applicant proposing a WECS must submit an application that contains the following materials:

1. [Optional] A wind resource study indicating that wind resources in the proposed project area are feasible for development using the wind turbine technology planned by the developer.
2. Survey of the property showing existing features such as contours, large trees, buildings, structures, roads (rights-of-way), utility easements, land use, zoning district, ownership of property, and vehicular access.
3. Plan(s) showing the location of proposed turbine towers, underground and overhead wiring (including depth of underground wiring), access roads (including width), substations and accessory structures, and crane paths. Plans must demonstrate that the criteria outlined in Section VII will be met.
4. A description of the routes to be used by construction and delivery vehicles and of any road improvements that will be necessary in the County to accommodate construction vehicles, equipment or other deliveries, and an agreement or bond which guarantees the repair of damage to public roads and other areas caused by construction of the WECS. A Road Use Agreement must be signed by the WECS developer/owner and the County, and must include provisions for restoring county roads to a condition equal or better than before construction of the WECS.
5. Engineering data concerning construction of the tower and its base or foundation, which must be engineered and constructed in such a manner that upon removal of said tower, the soil will be restored to its original condition to a depth of (5) feet from established ground level.
5. Anticipated construction schedule.

6. Description of operations, including anticipated regular and unscheduled maintenance.
7. Digital versions of all planning and construction documents required, in pdf format.
8. Plan(s), permits, and/or data showing compliance with the Rosecrans Memorial Airport Zoning Ordinance (if applicable).
9. A property values impact study.
10. Proof of submittal of notifications to the FAA. If FAA determinations of no hazard have been issued, the determinations should be included in the application.
11. An application fee in the amount of \$5,000 per turbine.
12. Financial assurance information including:
 - a. Evidence of financial ability to construct the WECS.
 - b. A performance bond, surety bond, escrow account, letter of credit or other financial assurance for each WECS that guarantees the performance of the decommissioning and restoration requirement at the end of the useful life of the WECS (see Section IX(2)).
13. Written consent from property owners affected by shadow flicker stating that they are aware of the WECS and the shadow flicker limitations imposed by this regulation, and that consent is granted to allow shadow flicker limits to exceed the maximum limits otherwise allowed (if applicable).
14. Written consent from the property owners affected by noise stating that they are aware of the WECS and the noise limitations imposed by this regulation, and that consent is granted to allow noise levels to exceed the maximum limits otherwise allowed (if applicable).
15. A complaint resolution program. See Section VIII(2) for minimum program requirements.
16. A decommissioning and restoration plan (see Section IX(1)).

16 (Optional). Environmental information including:

- a. Site Characterization Study. The applicant shall submit its preliminary project area study identifying potentially environmentally sensitive areas within the project boundary and how these will be avoided/how environmental impacts are planned to be minimized.
- b. Wildlife Studies/Consultation. The applicant shall submit reports with results (partial or full) of avian and bat surveys performed to assess the potential impact of proposed WECS upon bird and bat species. The survey reports shall, at a minimum, report on a literature survey for threatened and endangered species, and any information on critical flyways. 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. The applicant shall include documentation pertaining to compliance with the U.S. Fish and Wildlife Service voluntary Land-Based Wind Energy Guidelines, as amended. Results of any project consultation with the Missouri Department of Conservation and/or Department of Natural Resources and with the U.S. Fish and Wildlife Service about potential presence of protected species or rare habitats

will be included with the survey reports. Developer/applicant shall provide documentation of any information requested by the U.S. Fish and Wildlife Service and the applicant’s response.

It is the intent of this ordinance to reasonably consider and protect avian and bat species, not just those that are endangered or threatened.

c. Sound Modeling Study. The applicant shall provide a predictive sound modeling study of all turbine noise for a WECS to verify that ordinance requirements can be met for the A-weighted Sound Level limits in Table 2. The sound modeling study shall use the maximum apparent wind turbine sound power levels as determined by measurement according to IEC 61400 – Part 11, or as determined by analytical calculations according to the manufacturer, plus 2 dB to each frequency band. The sound power source shall be modeled at hub height. The sound modeling study shall include a map with all proposed wind turbine locations, all noise-sensitive receptors, and all participating and non-participating parcels. The sound study map shall also be overlaid with sound contour lines at 5 dBA intervals from the center of each turbine that is part of the proposed WECS.

VII. DESIGN STANDARDS AND CRITERIA

1. **Setbacks.** The following setbacks are required at a minimum for all wind turbines in a WECS. If there are particular setbacks that a WECS Permit applicant believes are too restrictive or that cause hardship for the project, Buchanan County will review specific locations, at the applicant’s expense, to determine whether a modified setback would be appropriate on a case-by-case basis. Setback exceptions must be authorized in writing by Buchanan County before being used as part of any site layout included with a WECS Permit application. Buchanan County reserves the right to increase setback requirements on a case-by-case basis.

For wind projects, the land mass required for development and the number of structures allowed on any land tract will be determined through determination of the amount of buildable land available once the required setbacks have been applied to the project area.

Table 1. Setback Requirements

Feature	Setback	Notes
<u>Structures</u>		
Habitable structures (building edge, nonparticipating) and all rural schools	1,320 feet	
Habitable structures (building edge, participating)	1,200 feet	
Habitable structures (building edge with landowner-signed waiver)	Per waiver	
Non-habitable structures	1.1 x turbine height	
<u>Property Lines</u>		
Nonparticipating property lines	0.55 x rotor diameter	

Feature	Setback	Notes
Project boundary	1.1 x turbine height [could use more conservative 1,320 feet for benefit of neighbors outside project area]	
<u>Existing Infrastructure</u>		
Cities/towns/villages	1,320 feet	
Airports	Per FAA guidelines	Requires notice to FAA and review of airports near site/airspace study
Railroad easement	1.1 x turbine height	From ROW edge
Road easement	1.1 x turbine height	From ROW edge
Road easement, major road for ice throw safety	1.1 x (hub height + rotor diameter)	For heavily traveled roads
Overhead electric utilities and communication lines	1.1 x turbine height	From ROW edge
Existing substations	1.1 x turbine height	
Pipelines	1.1 x turbine height	
Drainage easements/irrigation ditches	50 feet from easement limits	From turbine foundation
Microwave beam paths	0.55 x rotor diameter	From edge of worst-case Fresnel Zone based on communications study
Other wind turbines	4 x 7 rotor diameters (east-west and north-south spacing, respectively)	Best practice guideline to avoid wake effects
<u>Environmental Features/Considerations</u>		
Eagle nest	Custom	Based on site survey data, USFWS recommendations, and USFWS Eagle Conservation Plan Guidelines – 2 miles is standard recommendation
Potential bat habitat (forested areas including connecting forest corridors between larger areas; no minimum size threshold)	1,000 feet	Based on habitat mapping performed as part of wildlife studies. Generally, trees on a homestead parcel would not be considered forest

Feature	Setback	Notes
		unless it provides sufficient wildlife habitat.
Grasslands	660 feet	Grassland conservation parcels (such as those owned by TNC) and can include CRP land and native or other grassland that is not protected. All can be reviewed on a case-by-case basis.
Rivers/streams, minor	50 feet	Measured from bank.
Rivers/streams, major	660 feet	660 ft minimum; 1300+ ft recommended from riparian zones.
Wetlands	660 feet	Does not include farmed wetlands. On-site wetlands defined through field delineation process.
Natural areas	5,280 feet	Buffer in accordance with MDC/MDNR recommendations based on project review. Required setback distance is 1 mile from all federal, state, county, local, or private conservation and wildlife areas. These areas include, but are not limited to, Dupree Memorial Conservation Area, Pigeon Hill Conservation Area, Agency Conservation Area, Belcher Branch Lake Conservation Area, Bee Creek Conservation Area, River Bluffs Park, Sunbridge Hills

Feature	Setback	Notes
		Conservation Area, Caroline Sheridan Logan Memorial Conservation Area, Kendzora Conservation Area, Lewis and Clark State Park, Kneib Memorial Conservation Area, Bluffwoods Conservation Area and Goodell Memorial Annex.
FEMA 100 year floodplain	150 feet	
Noise limits	50 dBA for participating parcels 45 dBA for non-participating parcels	

c. An Operations and Maintenance building, a sub-station, or ancillary equipment shall comply with any property setback requirement of the agricultural zoning district. Overhead transmission lines and power poles shall comply with the setback and placement requirements applicable to public utilities.

d. Wind turbines or other permanent components of WECS shall not be placed within any stormwater conveyance system or in any other manner that would alter or impede stormwater runoff from collecting in a constructed or natural stormwater conveyance system.

e. Wind energy development will not be approved in the planned county growth area within an approximately [2 mile radius] around the city of St. Joseph. [Buchanan County to advise on further specifics about this area/boundaries of this area – boundary can be called out here using section, township, range.]

2. Visual Appearance, Lighting and Powerlines. The applicant shall use measures to reduce the visual impact of wind turbines to the extent possible, utilizing the following:

a. Wind turbines shall be mounted on tubular towers, painted a non-reflective, non-obtrusive 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, etc.). A certified registered engineer and authorized factory representative shall certify that the construction and installation of the wind energy conversion system meets or exceeds the manufacturer’s construction and installation standards.

b. The design of the WECS’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 existing environment.

c. WECS shall not be artificially lighted, except to the extent required by the FAA or other applicable authority, or otherwise necessary for the reasonable safety and security thereof.

d. Advertising on any part of the WECS is prohibited except for reasonable identification of the manufacturer of the system.

e. The electrical collection system shall be placed underground within the interior of each parcel at a minimum burial depth of five (5) feet. Collection lines routed along (parallel to) roads shall use the road right-of-way and shall not be buried under the road itself. The communication system shall be placed underground within the interior of each parcel at a minimum burial depth of four (4) feet. The final location of the electrical collection system installation shall be identified by GPS location. The actual installed burial depth of underground wiring shall be verified by the developer of the WECS. The developer shall provide certification from the installing contractor of the actual installed burial depth of all underground wiring. Such certification shall be under the penalty of perjury. The collection system may be placed overhead adjacent to County roadways, near substations or points of interconnection to the electric grid or in other areas as necessary.

3. **Shadow Flicker.** The allowable shadow flicker measured at the nearest external wall or walls of participating inhabited structures shall be limited to a maximum of 30 hours per year. Shadow flicker measured at the nearest external wall or walls of non-participating inhabited structures shall be limited to 30 hours per year. In the event shadow flicker from the WECS exceeds the limits stated above, a waiver to said limits may be approved provided that the following has been accomplished:
- (a) Written consent from the affected property owner(s) has been obtained stating that they are aware of the WECS and the shadow flicker limitations imposed by this Article, and that consent is granted to allow shadow flicker limits to exceed the maximum limits otherwise allowed; and
 - (b) A shadow flicker impact easement shall be recorded with the County assessor’s office which describes the benefitted and burdened properties, and which advises all subsequent owners of the burdened property that shadow flicker limits in excess of those otherwise permitted by the ordinance may exist on or at the burdened property.
4. **Noise.** The audible sound from a WECS at a noise-sensitive receptor may not exceed the A-weighted Equivalent-continuous Sound Pressure Level limits (LAeq) set forth in Table 2, measured in accordance with the methodology described in Section (1) of the Appendix.

Table 2 –A-weighted Sound Level Limits

Zone	LAeq Sound Level Limits (dBA)
Participating parcel	50
Nonparticipating parcel	45

a. In the event audible noise from the operation of the WECS contains a prominent discrete tone, the limits set forth in Table 2 shall be reduced by five (5) dBA. For a prominent discrete tone to be identified as present, the sound pressure level in the one-third octave band of interest is required to exceed the arithmetic average of the Leq of the two adjacent one-third octave bands by five (5) dB for center frequencies of five hundred (500) Hz and above, by eight (8) dB for center frequencies

between one hundred and sixty (160) Hz and four hundred (400) Hz, or by fifteen (15) dB for center frequencies between twenty five (25) and one hundred and twenty-five (125) Hz.

b. Any noise level falling between two whole decibels shall be rounded to the nearest whole number.

c. In the event the noise levels resulting from the WECS exceed the criteria listed above, a waiver to said levels may be approved provided that the following has been accomplished:

(a) Written consent from the affected property owner(s) has been obtained stating that they are aware of the WECS and the noise limitations imposed by this Article, and that consent is granted to allow noise levels to exceed the maximum limits otherwise allowed; and

(b) A noise impact easement shall be recorded in the Buchanan County assessor's office which describes the benefitted and burdened properties, and which advises all subsequent owners of the burdened property that noise levels in excess of those otherwise permitted by the ordinance may exist on or at the burdened property.

5. Safety. The following safety criteria shall apply:

a. All collection system wiring shall comply with all applicable safety and stray voltage standards.

b. Wind Turbine towers shall not be climbable on the exterior.

c. All access doors to wind turbine towers and electrical equipment shall be lockable.

d. Appropriate warning signs shall be placed on wind turbine towers, electrical equipment, and WECS entrances.

e. All spent lubricants and cooling fluids shall be properly and safely removed in a timely manner from the site of the wind energy system.

f. A sign shall be posted near the operations and maintenance building that will contain emergency contact information.

6. Signal Interference. The owner of a wind energy system must take such reasonable steps as are necessary to prevent, eliminate, or mitigate any interference with cellular, radio or television signals caused by the wind energy system. No WECS shall be installed in any location where its proximity with existing fixed broadcast, retransmission, or reception antennas for radio, television, or wireless phone or other personal communication systems would produce electromagnetic interference with signal transmission or reception. No WECS 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 in the link's operation. If it can be shown that a wind project is interfering with the television service of any resident in the wind project area and that this interference cannot be successfully mitigated to the affected resident's satisfaction, the wind project will secure alternate, dependable television service for such resident for the life of the wind project.

7. Height. The total height of a wind turbine shall be a maximum of 500 feet. The applicant shall demonstrate compliance with FAA guidelines as part of the approval process. Permit applicant may request a variance from Buchanan County as part of the WECS Permit application in the event that taller

turbines are proposed and the applicant can show likely or actual determination of no hazard by the FAA for the taller turbines.

8. Structure. Wind turbines shall be of monopole construction.

9. Minimum Ground Clearance. The vertical distance from ground level to the tip of the wind turbine blade when the blade is at its lowest point must be at least 75 feet.

10. Signage. Appropriate safety/warning signage concerning high voltage shall be placed at each turbine. All electrical control devices associated with the WECS, including the substation, shall be locked to prevent unauthorized access or entry.

VIII. POST-PERMITTING COMPLIANCE

1. **Compliance Reporting.** The wind facility's owner/operator shall file post-permitting compliance reports with the County per the following schedule:

- Monthly construction status reports addressing the following :
 - a. Construction schedule status (major activities completed; activities scheduled for next reporting period; and projection of construction completion/COD)
 - b. Any compliance issues encountered during the reporting period, measures taken to address said issues, and whether issues were resolved
 - c. Any anticipated issues for next reporting period
 - d. Month-specific reports are due to County by the 10th of the following month.
- Post-construction report including the following:
 - a. Confirmation of project's compliance with provisions of this regulation as well as all other all applicable laws and conformity with wind industry practices.
 - b. A copy of the as-constructed layout of the WECS.
 - c. Report is due to County within 12 months of COD.
- Annual compliance reports including the following:
 - a. Any operation, maintenance or compliance issues encountered during the reporting period
 - b. Measures taken to address said issues, and whether issues were resolved
 - c. Any anticipated issues for next reporting period
 - d. Annual reports are due to County by January 31st of the following year.

This requirement shall not preclude the county from undertaking a separate compliance report, where confirmation of data provided by the facility's operator is desired. The cost of a county-sponsored report shall be reimbursed to the county by the facility's operator.

2. **Complaint Resolution.** A description of a complaint resolution process shall be established by an applicant for a WECS Permit as part of its initial application for zoning approval. The process is intended to facilitate resolution of complaints concerning the construction or operation of the WECS from nearby residents and/or property owners. The process may use an independent mediator or arbitrator and shall include a 30 day time limit for acting on a complaint. County staff will not be involved in complaint resolution unless a complaint cannot be resolved between the WECS owner/operator and the complainant. A complaint resolution process approved through a WECS Permit shall be prepared utilizing, at a minimum, guidelines which are established by resolution of the County;

and, said process shall not preclude the County from pursuing any and all appropriate legal action on a complaint.

During construction, the applicant shall maintain a telephone number where a project representative can be reached during normal business hours and make this number readily available to residents near the WECS.

[Optional recommendation] To potentially reduce complaints, it is recommended that a WECS Permit applicant offer good neighbor wind lease agreements to those landowners who will not have physical wind project infrastructure on their land, but will be subject to the impacts of the wind project, such as noise, shadow flicker, or other perceived impacts. This will provide the option for landowners to receive a payment in exchange for these impacts from project components on neighboring land.

Any person who intentionally makes a false complaint or intentionally causes a false report of a complaint or violation to the official in charge of enforcing the WECS ordinance, knowing the report is false, is guilty of a civil infraction, and upon a finding of responsibility is subject to a fine of up to \$500.00 for each violation and all costs associated with the investigation and prosecution thereof.

3. **Penalties.** Maximum \$500 fine per offense for each week that a violation of the WECS permit or this regulation continues uncorrected.

4. **Shadow Flicker and Noise Easements.** Documentation of shadow flicker and noise impact easements shall be recorded with the County assessor's office. The easements shall describe the burdened properties where shadow flicker and/or noise limits exceed those otherwise permitted by this regulation.

5. **Post-Construction Studies.** The applicant shall complete a post-construction sound survey within 12 months of the commencement of the operation of the project per the methods outlined in Section 1 of the Appendix. If necessary, additional follow-up sound surveys will be conducted to determine compliance.

IX. DECOMMISSIONING AND RESTORATION

1. **Decommissioning Plan.** As part of the WECS Permit application, a decommissioning plan shall be provided for the WECS site that includes the following supporting documentation:

- The anticipated life of the project.
- The estimated decommissioning costs net of salvage value in current dollars.
- The method of ensuring that funds will be available for decommissioning and restoration.
- The anticipated manner in which the project will be decommissioned and the site restored.

2. **Financial Assurance.** A performance bond or equivalent financial instrument shall be posted in an amount determined by the County (to be utilized in the event the decommissioning plan needs to be enforced with respect to tower removal, site restoration, etc.). The bond shall be in favor of Buchanan County. The replenishment obligation shall be satisfied with other additional documentation determined by the County, if the bond is not replenishable. The County reserves the right to review the

decommissioning plan every 5 years, and revise requirements as necessary. Performance/surety bonds or other financial assurance documents will be required to guarantee decommissioning and restoration before a WECS Permit can be issued.

3. **Termination.** A wind energy system that is out of service for a continuous 12-month period will be deemed to have been abandoned. The Code Enforcement official may issue a Notice of Abandonment to the owner of a wind energy system that is deemed to have been abandoned.

The owner of a wind energy system shall provide the Code Enforcement official with a written Notice of Termination of Operations if the operation of a wind energy system is terminated.

Within 8 months of receipt of Notice of Abandonment or within 8 months of providing Notice of Termination of Operations, the owner of a wind project must:

- Remove all wind turbines, aboveground improvements, and outdoor storage;
- Remove all foundations, pads, and underground electrical wires to a depth of 5 feet below the surface of the ground; and
- Remove all hazardous material from the property and dispose of the hazardous material in accordance with federal and state law.

Failure to comply with any of the conditions or restrictions imposed on a WECS Permit or commitments outlined in an approved WECS Permit shall be deemed a violation of the Zoning Order/Wind Energy Zoning Ordinance.

All Code Enforcement determinations may be appealed to the County.

X. RELATED RULES AND REGULATIONS.

Each wind energy conversion system shall comply with this ordinance and all other applicable local, state, and federal requirements.

APPENDIX

1 POST-CONSTRUCTION SOUND SURVEY

The applicant shall complete a post-construction sound survey within 12 months of the commencement of the operation of the project. The applicant shall be able to determine compliance with the A-weighted sound level limits set forth in Section VII(4) and Table 2. The measurements and the reporting of the data shall be conducted in accordance with Section (1)(a) through Section (1)(c) below. The survey shall address any noise complaints on file with the County and may require additional measurement locations as deemed necessary by the County. Should the sound survey indicate a non-compliant measurement, the owner of the WECS will be required to obtain compliance through mitigation or other measures.

(a) Methodology

- i) Refer to Section (2) below for measurement personnel and instrumentation requirements.
- ii) A calibration check shall be performed and recorded before and after each measurement period, and subsequent to any equipment modifications, such as a battery change.
- iii) Measurements shall be a minimum of 1 hour and shall be continuously observed by a trained attendant. Sound level data shall be aggregated in 10-minute measurement intervals within each daytime and nighttime compliance period.
- iv) Compliance will be demonstrated when the measured A-weighted Equivalent-continuous Sound Pressure Level, after any appropriate corrections, is less than or equal to the A-weighted Equivalent-continuous Sound Pressure Level limits as set forth in Section VII, Table 2.
- v) The sound level measured in each 10-minute measurement interval above may be corrected for transient background sound and continuous background sound, according to ANSI S12.9 Part 3.

(b) Measurement Locations

- i) The measurement locations shall be chosen by the developers' Measurement Personnel and by the County prior to the Post-Construction Sound Survey.
- ii) The measurement locations shall be performed at noise-sensitive receptors in close proximity to one or multiple wind turbines and/or locations which have modeled sound levels closest to limits identified in Table 2.
- iii) To the greatest extent possible, measurement locations should be located away from potential contaminating sources of noise such as major highways, industrial facilities and urban areas.
- iv) To the greatest extent possible, measurement locations shall be at the center of unobstructed areas that are maintained free of vegetation and other structures.
- v) Care should be taken to make sure environmental conditions are suitable for sound level measurements.

(c) Data Reporting. Reports shall be submitted to the County within 45 days of completion of the post-construction survey and shall include, at a minimum, the following:

i) A statement of whether the sound from the WECS was in compliance of this ordinance for noise, during the time of the measurement period.

ii) A narrative description of the sound measurements collected.

iii) A map showing the wind turbine locations, noise measurement locations, and all applicable noise-sensitive receptors.

iv) The dates, days of the week and hours of the day when measurements were made.

v) The meteorological conditions at the time of the sound level measurements.

vi) All measuring equipment information such as make, model, and calibration certifications.

2 GENERAL SOUND SURVEY METHODOLOGY

(a) Measurement Personnel. Measurements shall be supervised by personnel who are well-qualified by training and experience in measurement and evaluation of environmental sound and are either Professional Engineers or Board Certified members of the Institute of Noise Control Engineering (INCE).

(b) Measurement Instrumentation. Sound level measurement equipment shall conform to IEC 61672 Class 1 requirements and shall have been calibrated by an independent laboratory within 24 months of the measurement period, and the microphone's frequency response shall be traceable to the National Bureau of Standards. A microphone windscreen shall be used of a type that meets or exceeds the recommendations of manufacturer of the sound level meter.