STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Petition of BNE Energy Inc. for a Declaratory Ruling for the Location, Construction and Operation of a 3.2 MW Wind Renewable Generating Project on New Haven Road in Prospect, Connecticut

Docket/Petition No. 980

February 16, 2011

SAVE PROSPECT CORP'S EXHIBIT LIST AND REQUEST FOR ADMINISTRSTIVE NOTICE LIST

A. EXHIBIT LIST

1. Town of Rensselaerville, New York: Wind Power Committee Recommendation Report for Industrial Wind Power

2. Town of Dixmont, Maine: Wind Energy Facility Ordinances

3. Town of Jackson, Maine: Amended Wind Turbine Ordinance

4. Trempealeau County, Wisconsin: Wind Generator and Wind Generating Facility Ordinance

5. Thorndike, Maine: Wind Energy Facility Ordinance

6. Montville, Maine: Wind Turbine Generator Ordinance (including Findings and Rationale)

7. Vermont: House Bill 677 as Introduced ("An act relating to wind energy plants") (2010) and letter from Nina Pierpont, M.D., Ph. D. in support of H.677

8. New Jersey Senate, No. 2374 ("Prohibits siting of industrial wind turbines within 2,000 feet of any residence or residentially zoned property") (introduced Nov. 8, 2010)

9. United Kingdom Parliament, House of Lords Bill (regarding minimum distances of wind turbines from residential premises) (Session 2010-11)

10. First International Symposium on Adverse Health Effects from Wind Turbines - The Global Wind Industry and Adverse Health Effects: Loss of Social Justice? Picton, Prince Edward County, Ontario, Canada (October 29-31, 2010)

11. GE Energy: Ice Shedding and Ice Throw – Risk and Mitigation; David Wahl and Philippe Giguere, Wind Application Engineering

12. Vestas Wind Systems A/S – Safety Regulations for Operators and Technicians (see numbers 2 (Stay and Traffic by the Turbine) and 16 (Precautions in Case of Fire)

13. Article by Professor Terry Matilsky, Rutgers University, regarding wind turbine blade throw and break

14. The Morning Journal (Northern Ohio), December 1, 2010: "Blade comes off wind turbine at Perkins High School"

15. Watertown Daily Times (New York), December 30, 2009: "Fallen Turbine"

16. Audiology Today (Jul/Aug 2010): "Wind Turbine Noise – What Audiologists Should Know," by Jerry Funch, Richard James, and Dan Pabst

17. Journal of Sound and Vibration 277 (2004) 955-970: "Effects of the wind profile at night on wind turbine sound," by G.P. van den Berg

18. "Visual and Noise Effects Reported by Residents Living Close to Manawatu Wind Farms: Preliminary Survey Results," by Drs. Robyn Phipps, Marco Amati, Sue McCoard and Richard Fisher

19. Deputation to the Standing Committee on General Government Regarding Bill C-150, by Dr. Robert McMurty, M.D., F.R.C.S (C), F.A.C.S

20. Noise-Con 2007: "Communicating the Noise Effects of Wind Farms to Stakeholders," by Christopher J. Bajdek

21. Affidavit of Michael A. Nissenbaum, M.D. submitted to the State of Maine Board of Environmental Protection in the Record Hill Wind Project matter (excluding exhibits referenced by affiant)

22. "Location, Location, Location: An investigation into wind farms and noise by The Noise Association" (July 2006)

23. Palmerston North Commission: Moturimu New Zealand Wind Farm Application – Evidence of Dr. Robyn Phipps

24. Chatham-Kent Public Health Unit – "The Health Impact of Wind Turbines: A Review of the Current White, Grey, and Published Literature (June 2008)

25. "Disconnect Between Turbine Noise Guidelines and Health Authority Recommendations," by Prof. John P. Harriston, Queen's University

26. "A Review of the Science, Literature and Recommendations Concerning Public Safety and Ice Throws from Wind Turbines," by Kenneth Jaffe, MD (June 2006)

27. 3460 J. Accoust. Soc. Am. 116 - "Perception and annoyance due to wind turbine noise – a dose – response relationship," by Eja Pedersen and Kerstin Persson Waye (2004)

28. "Noise Radiation from Wind Turbines Installed Near Homes: Effects on Health" by Barbara J. Frey, BA, MA and Peter J. Hadden, BSc, FRICS (2007)

29. Noise-Con 2008: "Simple guidelines for siting wind turbines to prevent health risks," by George W. Kamperman, P.E. and Richard R. James, INCE

30. "The 'How To' Guide to Siting Wind Turbines to Prevent Health Risks from Sound," by George W. Kamperman, P.E. and Richard R. James, INCE

31. Report by Dr. Christopher Hanning on Sleep disturbance and wind turbine noise on behalf of Stop Swinforrd Wind Farm Action Group (June 2009)

32. "Wind Turbines, Noise and Health," by Dr. Amanda Harry (Feb. 2007)

33. "Wind Turbine Syndrome and the Brain," by Nina Pierpont, MD, PhD (Nov. 15, 2010)

34. Affidavit of Michael M. Nissenbaum, MD, filed in the matter of McKinnon v. Red Lily Wind Power L.P., et al, Court of Queen's Bench, Judicial Centre of Saskatoon

35. "A Review of Published Research on Low Frequency Noise and its Effects," by Dr. Geoff Leventhall (May 2003)

36. 2009 Wind Turbine Impact Study by Appraisal Group One

37. "The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-State Hedonic Analysis," by McCann Appraisal, LLC (Dec. 14, 2009)

38. Inquiry into rural wind farms – Submission to the Legislative Council General Purpose Standing Committee No 5, by Dr. David Burraston and Ms. Sarah Last (2009)

39. "Impact of wind farms on the value of residential property and agricultural land," a survey by the Royal Institution of Chartered Surveyors

40. Baileyville Wind Farm Development Issues prepared by Tom Hewson of Energy Ventures Analysis, Inc. (Nov. 30, 2005)

41. The Telegraph, July 26, 2008: "Homeowners living near windfarms see property values plummet"

42. Republican-American, December 4, 2010: "Canaan denies local permit for BNE Energy wind turbine"

43. Boston Herald, December 6, 2010: "Conn. residents see Falmouth wind power up close"

44. USA Today, November 3, 2008: "Neighbors at odds over noise from wind turbines"

45. The Newport Current, February 27, 2009: "A 292-foot mistake"

46. Letter from Christy Capone, PhD in support of complaint filed by Barry Funfar regarding noise generated from windmill near his home in Falmouth, Massachusetts

47. Statement of Barry Funfar to board of selectmen dated November 17, 2010

48. Letter from Barry Funar to Kay and Richard Turgeon dated December 7, 2010

49. The New American, November 8, 2010: "An ill Wind Blowing"

50. The Wall Street Journal, August 23, 2010: "Wind Power Won't Cool Down the Planet"

51. "Cost and Quantity of Greenhouse Gas Emissions Avoided by Wind Generation," by Peter Lang

52. "Speaking Truth to 'Wind' Power," by Prof. Michal J. Trebilcock, University of Toronto (April 15, 2009)

53. Republican-American, 2002: "Old Cap & Jacket property has chilling clean-up c cost"

54. January 6, 2003 letter from Connecticut Department of Environmental Protection to Mayor Chatfield regarding contamination at the U.S. Cap and Jacket site (with enclosures).

55. U.S. Dept. of Energy, National Renewable Energy Laboratory – Connecticut - 50 m Wind Power (Feb. 6, 2007)

56. Scale Drawing of residence and wind turbine

57. New York State Public Health and Safety – Investing in a Cleaner NY (prepared by Global Energy Concepts)**

58. Wind Power Siting, Incentives, and Wildlife Guidelines in the United States (Oct. 2007)

59. "Calculating Wind Power's Environmental Benefits: Erroneous assumptions can cast doubt on wind power's ability to cut greenhouse gas emissions," by Thomas Hewson, Jr. and David Pressman, Energy Ventures Analysts Inc.

60. "Permitting Setback Requirements for Wind Turbines in California," prepared by California Wind Energy Collaborative (Nov. 2006)

61. "Permitting Setbacks for Wind Turbines in California and the Blade Throw Hazard," prepared by Scott Larwood, California Wind Energy Collaborative, Univ. of California, Davis

62. National Wind Watch – European Setbacks (minimum distance between wind turbines and habitations) (March 24, 2009)

63. Town of Sedgwick Maine – wind power development moratorium ordinance

64. Wind Turbine – Materials and Manufacturing Fact Sheet, prepared for the Office of Industrial Technologies, US Department of Energy by Princeton Energy Resources International, LLC

65. CCEF Minutes November 12, 2009

66. CCEF Minutes June 24, 2010

67. GER 4277 – Extreme Wind Speed – Risk and Mitigation

68. GE Energy GE Wind – Setback Considerations for Wind Turbine Siting

69. BNE Answers to Interrogatories Served on it by the Siting Council or any party or intervenor in this matter

70. Town of Prospect Zoning Map

71. All exhibits listed by any party or intervenor

72. Any item referred to in any interrogatory response or pre-filed testimony.

B. REQUEST FOR ADMINISTRATIVE NOTICE LIST

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Respectfully submitted,
SAVE PROSPECT CORP

By: _____

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CERTIFICATION

This is to certify that a copy of the foregoing has been delivered via electronic mail and/or first class mail, postage pre-paid, on this 16th day of February, 2011 to the following:

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On behalf of Party Town of Prospect

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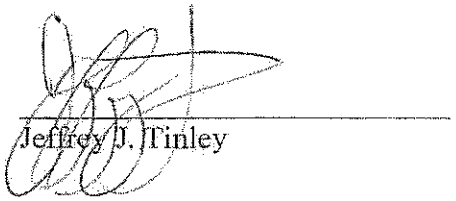

Jeffrey J. Tinley

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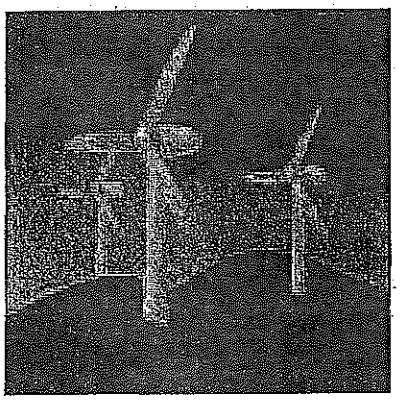

Town of Rensselaerville, New York

Wind Power Committee Recommendations Report for Industrial Wind Power

July 2010

Website: http://www.rensselaerville.com/windstudy.php
Email: WindStudyCommittee@gmail.com

The Rensselaerville Wind Power Committee was tasked with making recommendations for Non-Commercial Wind Power and large scale Industrial Wind Power.

Phase I of our committee's work was completed last summer with the report: *"Town of Rensselaerville, New York Wind Study Committee Recommendations Report for Non-Commercial Wind Power - July 2009"* and the adoption and filing of Local Law No. 2 *"Non-Commercial Wind Power Facilities Law of 2009 of the Town of Rensselaerville"* soon after.

This *"Wind Power Committee Recommendations Report for Industrial Wind Power"* represents the completion of Phase II of our committee's research. Once local law for Industrial Wind Power becomes adopted our committee will have achieved its objectives and completed its responsibilities.

Rensselaerville Wind Power Committee Recommendations Report for Industrial Wind Power - July 2010

User Note: The main categories and significant subcategories in this Table of Contents are set up to Hotlink directly to those sections.

Table of Contents:

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Introduction & Overview

Formation of Wind Power Committee – Background & Rationale

Background – How this committee was established:

The primary impetus for the formation of the Wind Power Committee was Industrial Wind Developers' interest in installing wind facilities in the Hilltowns. In the Summer of 2008 one of these developers Shell Energy Services, through their Cinco marketing affiliate, started approaching landowners in the Hilltowns, including Rensselaerville, to sign wind power leases. This developer withdrew from the area in October 2008, citing strong and organized resistance as the reason. The Rensselaerville Town Board acted quickly and voted for a six-month moratorium on any wind power permits or construction in order to study the impact of wind turbine installations in the town. This moratorium began December 3rd, 2008 and was scheduled to end on June 3rd, 2009.

The Wind Power Committee was then established by Town Board resolution, effective December 3rd, 2008 (see next section of this report), and had its first meeting on February 17th, 2009. After a few weeks of work it became apparent that the three-and-a-half month working period remaining was insufficient to accomplish the goals of the resolution. It also became apparent that the challenge of crafting recommendations for large-scale Industrial Wind Power facilities was a more complex task than for Non-Commercial wind turbines. Accordingly, the committee recommended, and the town adopted, moratorium extensions of three months for Non-Commercial wind turbine installations (ending September 3rd 2009), and twelve months for Commercial wind turbine installations (ending June 3rd 2010). The Town Board then adopted an additional extension taking the moratorium end date to September 3rd, 2010.

This report represents the culmination of research, discussion and work done by the committee related to Industrial Wind Power in the Town of Rensselaerville. It also builds on the base of knowledge that our committee has done in Non-Commercial Wind Power.

The final products of this Phase II report on Industrial Wind Power are:

- Town of Rensselaerville Local Law for the year 2010 for Industrial Wind Power Facilities. (To be drafted).
- This report, which will be incorporated into that local law.

The information in this report is intended to provide a clear rationale and backup guidance for the Summary Recommendation that this committee is making and the local law that will be crafted. Also as resource guide for future Town Boards, Planning Boards, and Zoning Board of Appeals, Code Enforcement Officer, Highway Superintendent and others. It is also intended to provide forward guidance on what to be aware of if Industrial Wind Developers approach the Town in the future.

The Wind Power Committee serves only in an advisory role with no decision-making authority. As a committee we have experienced strong support (although not without questions and guidance) from various town agencies and persons with whom we have worked. We would like

to extend our appreciation (in no order of priority) to the Town Board, Planning Board, our two town attorneys, Zoning Review Committee members, Code Enforcement Officer, Town Appraiser, Town Clerk, and to the citizens who faithfully attended our meetings and enriched our process with their questions, comments, concerns, and their humor.

Within our committee there has been positive collaboration and great synergy. Each member of our committee has provided unique and special knowledge, skill sets, and points of view that blended together to produce this report.

In a world of radical change, this report should be viewed as a "work in progress". As Industrial Wind technology evolves and the grid capacity and flexibility expands and refines, perhaps there will be a day when Industrial Wind Power will fit within the framework of the Town's Comprehensive Plan. At this stage we view that time to be far into the future – if ever it comes to pass. The reason for this comment is that "the nature of the beast" – 400' tall industrial wind plants might, by their nature, never align with our Town's Comprehensive Plan.

Town of RensselaervilleTown Board Resolution

Adopted by Town Board 12/3/2008

WHEREAS, the Town Board has authorized the creation of an advisory Wind Power Committee to assist the Town Board in developing regulations applicable to the siting and permitting of private and commercial wind power facilities as well as to provide recommendations on the use of wind power in the Town; and

WHEREAS, the Town Board has advertised and interviewed applicants for membership on said Committee; and

WHEREAS, the Town Board is prepared to make appointments to the Wind Power Committee and prior to the formation of the Committee it is necessary and prudent to provide the specific charge and responsibilities of the Wind Power Committee;

NOW, THEREFORE, BE IT RESOLVED as follows:

1. The Town of Rensselaerville Wind Power Committee is hereby officially created and shall have a maximum of 7 members.
2. The term of each member will end on December 31, 2009. The Chairperson of the Committee is Noel Abbott.
   (Note: This term was extended with the Moratorium Extensions.)
3. A quorum of the Committee shall be necessary for it to hold and conduct meetings and a majority of its membership shall constitute a quorum. All decisions or acts of the Committee shall be accomplished by vote of a majority of its membership.
4. The Committee may meet at a frequency and on particular days or nights as it will decide, but all meetings of the Committee must follow the Open Meetings Law and be duly noticed and open to the public.
5. In recognition of the current wind power facility moratorium in effect and due to expire on June 4, 2009, the first responsibility of the Committee is to develop draft zoning regulations for private and commercial wind power facilities and present such draft to the Zoning Review Committee for its review. The Zoning review Committee will then consult with the Town Attorneys and forward proposed regulations to the Town Board.
6. After completing the aforementioned task, the Wind Power Committee may then investigate, consider, and prepare recommendations regarding the overall use of wind power in the Town including but not limited to development of such facilities as a Town function, revenue sources from such types of facilities policies regarding wind power, and other relevant issues. The Committee may report directly to the Town Board as to its findings and recommendations.
7. The Committee shall have no decision-making authority that will bind the Town Board or the Town of Rensselaerville to any policy, act, or future action. The Committee's specific authority is to provide the Town Board with non-binding recommendations on the aforesaid topics.
8. The Committee, or any Committee member, is not authorized to contact or hold itself, himself, or herself out as an official of the Town, any vendor, contractor, or supplier of the Town or any governmental agency without the express authorization of the Town Board.

Wind Study Committee Purpose and Goal Statement

Adopted by Wind Study Committee 2/24/09/Revised 3/7/09

[Note: The Committee had chosen the name "Wind Study Committee" and used that name in its Non-Commercial report. The correct name of our committee is the Wind Power Committee as stated in the initial Town Board Resolution and the Moratoria. We are leaving this document intact with the old name.]

To develop draft zoning regulations for private and commercial wind power facilities and present such draft to the Zoning Review Committee for its review.

To recommend policies, and procedures that will provide maximum long-term benefit to the Town.

The issue of what kinds of wind power will be permitted, encouraged, and disallowed by the Town could have a large impact upon our future quality of life including our:

- Rural atmosphere
- Viewsheds
- Taxes
- Economics
- Overall long-term community and environmental health

A well-constructed set of zoning regulations, policies and procedures will balance various factors in whether to allow and support different kinds of wind generation.

The recommendations that we make are intended to maximize the benefits of wind power for residents of the town and the town as a whole concerning both residential and commercial installations.

Committee Goals and Outcomes:

- Recommend zoning laws, policies, and procedures for both small-scale residential wind power and large-scale commercial installations. As these two kinds of installations are very different in scale, implementation, and effect, our recommendations will be unique to each one.

- To align our recommendations with the Town of Rensselaerville Comprehensive Plan finalized March 8, 2007.

- To research zoning laws we can provide to our Town attorney in crafting final zoning laws. The intended purpose: If necessary, our Town will be able to withstand challenges from large scale corporate wind developers and others, if their intended wind projects are not in the interest of our Town or the spirit of the Town of Rensselaerville Comprehensive Plan.

- Education and Citizen Input: To educate ourselves and our Town's residents to the various economic models for wind power installations, and the range of options and agreements, so that both property owners and the Town can enter viable arrangements with commercial developers should we choose to do so.

- To seek input and learn from many varied sources within our town and beyond. Within our town we'll interact with:
    - Our citizens!
    - Zoning Review Committee
    - Zoning Board of Appeals
    - Rensselaerville Town Board
    - Planning Board
    - Town Attorney
    - Town Code Enforcement Officer

Core Principles that Guided Our Work

In performing our duties, our committee has been guided by these core principles. We consider them core principles because we believe them to be constant guidelines that will persevere even as technologies, practices, and laws change.

- To make recommendations that answer these questions:
  - What recommendations, on balance, will benefit our citizen's Public Interest & their quality of life?
  - Will our recommendations protect Rensselaerville's unique character and quality of life as laid out in the latest Comprehensive Plan adopted March 6, 2007.
  - Do our recommendations comply with the Town Board Resolution establishing the Wind Power Committee adopted 12/3/2008?
  - Will our recommendations align with a negative SEQRA declaration?
  - Do our recommendations provide appropriate controls for environmental protections, and public health and safety?

- To provide information and resources for the town to implement our recommendations, and to manage their outcome. The information, charts, and background contained in this report are intended to provide tools that our town agencies – especially the Town Board, Planning Board, and the Zoning Board of Appeals - can utilize in responding to industry initiatives at a local level.

- Draw knowledge and information from a wide range of resources beyond the arena of wind power and extract relevant principles to support our recommendations.

- Actively solicit ideas and feedback from a wide range of sources and resources.

- Communicate consistently and often with all town agencies and affected stakeholders to strengthen our knowledge, the quality of our recommendations and public support for these recommendations.

- Listen to all sides of an issue. Listen to all stakeholders, then make our recommendations.

- Extract "Best Practices" from other town's zoning laws, policies and experiences. Also work to understand the underlying rationale for those policies to determine if they apply to our town and situation.

- Provide recommendations based, as much as possible, upon objective inquiry and scientific research.

- Because Industrial Wind Power is a relatively new industry, consider the possibility that these recommendations could become "dated" or obsolete at some future point. However, these core principles should be the guiding framework for any policy changes at a local level.

Research Methodology

Our committee's goal was to arrive at recommendations that were factually and/or scientifically based and aligned with our Town's Comprehensive Plan. For example, in research on the impacts of sound upon the human body, our research focus was broad, extending beyond the wind power arena. Our committee attempted to extract principles from diverse areas in crafting our recommendations.
We also paid close attention to the experiences and information coming from towns that had dealt with Industrial Wind turbine installations before us. That said, we did not blindly graft their experience upon ours but questioned whether their experience and conclusions were likely to be valid in our town.

The committee also consulted diverse resources from the internet, various towns, town and state officials, other consultants, and the experience and commentary of ordinary citizens in other geographical areas.

We consistently invited involvement and comments from various stakeholders and decision makers in our community including:

- Our citizens via email, by posting meeting minutes, and other documents on the web, holding a Public Information Session, and through inviting dialogue at all of our meetings.
- Various town agencies and officials including:
    - Our Town Board
    - Zoning Review Committee
    - Town Attorneys
    - Code Enforcement Officer
    - Town Assessors

We also consulted our town's Comprehensive Plan and researched NY State laws that had been introduced in the NY State Senate and the Assembly related to wind power. We also made contact with the New York State Attorney General's Office Public Integrity Division involving the Wind Industry's Code of Conduct and the lead attorney for New York State Energy Research and Development Authority (NYSERDA).

The town is in the process of reviewing its zoning laws through a Zoning Review Committee (ZRC). A part of the Town Board's resolution for our committee was to present our findings to that body, which includes representatives from the Town Board, Planning Board, Zoning Board of Appeals, Town Attorney(s), and Code Enforcement Officer. We did present our Summary Recommendation and the reasons behind them and received feedback from members of that group.

During the tenure of our work, various members, or the full committee, made field trips to multiple wind tubine installations - Industrial and Non-Commercial - in our area and well beyond. These included:

- Tug Hill Commercial Wind Installation - 195 turbines in the Lewis County Towns of Lowville, Martinsburg, Harrisburg, and Watson
- Fenner & Madison Commercial Wind Installations, Madison County, New York.
- Jiminy Peak, Hancock, Massachusetts.
- Andy Freihofer's 10 kW Bergey Wind Turbine in Town of Knox.
- Woodstock Road 10 kW Bergey Wind Turbine 325' away from the home of the O'Connors (wind turbine removed last year).

Those visits gave us first hand experience in the reality of wind turbine installations and an additional dimension of experience that guided our recommendations.

We looked at the laws and experiences of other regions, and other countries with a longer track record in Industrial Wind Power, and vetted those experiences through our assessment of what is relevant to the character of our community and its Comprehensive Plan.

Committee Members

Noel Abbott - Preston Hollow – chairperson

"I have a strong commitment to seeing well thought out wind power policies and zoning laws that serve our town, as they will likely have a large impact on our town's future."

Alan Wilson – Rensselaerville

"As dramatic change is on our Town's doorstep, Wind Power will be of great interest to all in our community, whether for private or communal reasons. I desire to contribute to current efforts, as this community seeks to responsibly manage a new source of energy and its use."

Melissa McGrath – Rensselaerville

"I believe it is important to gather as much information as possible to permit informed consideration of alternatives and that the implementation of sound and reasoned policies, procedures and zoning regulations are necessary to balance competing interests, ensure maximum benefits to landowners and citizens of Rensselaerville, and preserve the town's rural atmosphere and quality of life."

Peter Sedlmeir - Preston Hollow

"I joined the wind power committee to help research wind power so that up to date information can be presented to the Zoning Board and Town Board for the benefit of the people of the town of Rensselaerville."

Wind Power Committee Contact Information:

Website Link: http://www.rensselaerville.com/windstudy.php
Email: WindStudyCommittee@gmail.com

Acknowledgments

Within the Town of Rensselaerville government, our committee wishes to thank our Town Board, especially Marie Dermody, current Town Supervisor; Joe Catalano, Town Attorney; Zoning Review Committee (which encompasses multiple Town agencies); Jeff Pine, Assessor and Assistant Town Supervisor; Mark Overbaugh, Code Enforcement Officer; Jost Nickelsberg, Former Town Supervisor, for their information and support as our committee did its work.

Our committee also wishes to thank the following people who provided their ideas, suggestions, information and resources. The contributions both from within our Town government and those outside strengthened our process and the final product.

Note: Acknowledgement of any individuals does not mean that they share our perspective or agree with our conclusions.

Don Airey and Bob Neid, founders, Schoharie Valley Watch

Russell Cary, Town Supervisor, Town of Fenner, and Board of Supervisors, Madison County, New York.

Jim Cooke, Chairman, Town of Berne Comprehensive Planning Committee

Dan Driscoll, Certified Sound Engineer, and Town of Knox Planning Board

Roswell Eldridge, M.D., Medical Officer, Retired, National Institutes of Health

Andy Freihofer, private citizen, Town of Knox, New York

Andrew Hefner, Assistant Attorney General, New York State Attorney General's Office Public Integrity Bureau

Ron and Dawn Jordan, founders, Helderberg Wind Watch

Peter Keane, Associate Counsel, NYSERDA

Tim Lippert, member, Berne Planning Board, and Town of Berne Comprehensive Planning Committee

Leslie Lombardo, Senior Planner, Albany County Department of Planning

Bob Price, Chairman, Planning Board, Town of Knox

Victoria Roy, County Treasurer, Lewis County, New York

How to Navigate and Use This Report

Table of Contents Hyperlinks:

The Table of Contents contains *Hyperlinks* to each of the main sections and to significant sub-sections. To navigate directly to that location, simply click on that section hotlink in the Table of Contents.

Main Sections Shaded:

The main sections and significant sub-sections of the report are formatted as shaded elements like this:

Main Section

Sub-Section

Formatting Convention for Referencing Resources:

When referencing works or quoting text, you will see both quotations " ", and *italics*.

Source for Backup Documents:

For backup research documents, go to the Rensselaerville website/Wind Power Committee Section: **http://www.rensselaerville.com/windstudy.php**

Glossary:

There is a glossary at the end of the report, and a separate glossary for the Health, Environmental and Safety section at the end of certain sub-sections as appropriate.

General Discussion & Related Issues

Industrial Wind Power: Definition and difference with Non-Commercial Wind Power:

We should start with a definition of the term "Industrial Wind Power" as used throughout this report:

Industrial Wind Power is any Wind Turbine installation that produces power for sale through the grid. There are two options at present: Supply power into the grid; or supply power to the structures on the property on which wind turbines are installed.

- The distinction between those two categories of wind power is simple:
  - Non-Commercial Wind Turbines are installed on a property to provide electricity to structures within that property's boundaries. Most are grid-connected, and any excess power produced can be sold back into the grid, however this excess power is minimal and incidental. NYSERDA currently limits the amount of excess power production to a maximum of ten percent more than a property's overall average power usage.
  - Industrial Wind Turbine installations are installed to produce electric power for sale through the grid. Most often this electricity is distributed to end users in locations remote to the Industrial Wind Turbines actual location but is not set up to feed the locality in which the power is produced.

Why we have chosen to use the term "Industrial Wind Power"

We have chosen to use the term *Industrial Wind Power* with the understanding that it will be criticized as "biased". We would simply point out that the phrases "Wind Farms", "Harvest The Wind" and other terms adopted by wind developers are also biased, but in the direction that the wind industry would like to shape perception for the purpose of making Industrial-Commercial Wind Power seem more acceptable to the public. These terms mask the fact that Large-scale Wind Power installations are really **industrial** installations. While many of these installations have been placed on farmland, they are ***not*** farming operations. Four hundred foot towers with their necessary related infrastructure including sub-stations, four-hundred plus ton concrete foundations, 140' blades, ongoing disruptive noise, and large vehicle maintenance have all the elements of industrial operations. While heavy machinery and the noise and smells of farming operations have an industrial component, the size of Industrial Wind structures, the noise they produce (both audible and inaudible), shadow flicker events, and night lighting to meet FAA requirements leave a very different impact upon the quality of rural atmosphere. Unlike farming operations they impact, the environment, the view shed and the communities that host them. Also, installed electrical infrastructure can shift a farmer's access to their own lands and their ability to live in quiet enjoyment on their own property.

There is a clarity to the term "Industrial Wind Power" that the term "Commercial Wind Power" lacks. Commercial Wind Power can be misconstrued as a wind installation that provides power for a local business or commercial establishment. As stated, Industrial Wind turbines produce power that is fed into the grid for remote consumption.

Relationship of this report to our recommendations:

The detailed nature of this report is intended to give backup rationale for our recommendations. As such it is our intention to have it incorporated into Local Law for Industrial Wind Power. We recognize that a future town board might choose to allow Industrial Wind Power within Rensselaerville's boundaries. If that happens, our intention is to provide a reference guide on what to be aware of in dealing with the many and complex issues introduced by Industrial Wind Power.

Recommendations not a starting point to be negotiated down from:

The recommendations in this report are not a starting point to be negotiated down from. If the Town finds itself in the position of negotiating an agreement with a wind developer in the future these recommendations are intended to serve as the end point. They are structured to protect the town and its citizens. It is the developer who reaps huge rewards based upon multiple streams of tax breaks and incentives and strong financial income. It is the developer who should cover the costs of ensuring that the benefits the Town receives are not eroded – or in the worst case totally eliminated, leaving the town with a net financial burden.

Neighboring Towns and Uniqueness of Circumstance:

We acknowledge that neighboring towns might arrive at different conclusions concerning Industrial Wind Power and therefore adopt different policies. Through Home Rule Law it is their legal right to do so. It is our right as a committee to make recommendations that we believe will support our town's specific circumstances, clearly align with our town's Comprehensive Plan, maintain the Historical Landmark status within certain portions of the Town, and support the town's long-term interests.

Perception of Committee:

There has been an attempt, primarily by parties outside of our town to paint our committee as biased from the outset. We choose address that criticism. To let it pass unaddressed, might form the basis for an attempt to invalidate our committee's work and recommendations in the future.

At the start of our committee work in February 2009, each individual on the committee was either very positive about Industrial Wind Power, or open to where the research would lead. After only three weeks of an initial global scan of the literature and resources, our committee began to develop concerns about this technology at an industrial scale. In our fourth meeting, on March 10th, 2009, our committee discussed the need to extend the moratorium . http://www.rensselaerville.com/minutes/WindStudy/3-10-09_WindStudyMinutes-Approved.htm

- In following weeks our committee unanimously came to several conclusions:
  - That there were significant potential issues with Industrial Wind power that were not initially obvious.
  - That these issues required more in-depth study and research than our six-month moratorium would allow.

- That, in order to responsibly perform our duties, we needed more time, which led to extending the initial moratorium.
- That we would focus our research first on Non-Commercial Wind Power recommendations in order to develop a base of knowledge and experience dealing with this simpler and smaller scale issue.
- We concluded that with "experience under our belts" we would have a much better foundation to study and make recommendations on Industrial Wind Power.

Accordingly, our committee recommended, and our Town Board adopted, a first moratorium extension. In the first nine months our committee completed our work on Non-Commercial Wind Power, which resulted in the implementation of a local law for Non-Commercial Wind Power. This law is entitled: **"Local Law No. 2 for Non-Commercial Wind Power Facilities 2009".**

With this report we are now completing Phase II for Industrial Wind Power.

No one on the committee has any direct or indirect personal financial interest in either Non-Commercial or Industrial Wind power. Every one of us has a strong commitment to recommending policies that, in our opinion, are for the immediate and long-term health and viability of the Town of Rensselaerville and in keeping with our town's Comprehensive Plan adopted in March 2007. We hold our charge as a public trust. As such we have collectively invested at least a thousand hours of time, reviewed thousands of documents, articles, and other information. Our full committee and/or various members have made multiple field visits to Industrial and Non-Commercial installations, attended the New York State Energy Research and Development Authority's (NYSERDA) Stakeholder Conference, attended meetings run by Albany County Department of Economic Development, Conservation and Planning, presented at other town's meetings, and been in close touch with the lead attorney from NYSERDA who approves all wind permits in New York State, and with the Associate Counsel for the Attorney General's Office involved with the implementation of Wind Industry Code of Ethics.

Our information is drawn from multiple sources and resources and we have made efforts to hear all points of view while sorting through and analyzing the patterns of information that we receive.

The Perfection Game - Perfect vs. Reasonable:

The decision to support, restrict, or disallow Industrial Wind Turbines in any town results from an assessment of many variables. It also looks at many areas of information including health, environmental and safety, social, financial, technological, legal, political, and others. In any such decision it would be inevitable that opposing views exist. Of strong concern are the objectivity of the views and positions held by Industrial Wind Developers and related parties who make money only when Industrial Wind facilities start up.

We could not possibly be perfect in all of our research and all of our conclusions. However, the questions we pose are:

- Are our recommendations reasonable given the large amount of evidence presented in this report?
- Are they protective of the Town?
- Have the benefits and concerns been weighed?
- Are our recommendations in line with the core of the Town's Comprehensive Plan?

- Have we considered the overall public interest of our citizens?
- If opposing views and arguments are presented, are the sources of this information disinterested parties with no financial profit at stake?

There are aspects of Industrial Wind Power that can be called "controversial". One such question is whether Industrial Wind Power installations raise or lower real estate values (see analysis in section "Financial Impacts & Property Values"). There are some studies that indicate they do not. Some might point to one aspect of this report and attempt to use it to invalidate our overall conclusions by calling our committee "biased". In fact we are biased, but biased towards policies that serve the best interests of this town. Our Summary Recommendation was arrived at after much consideration of all the factors and was based upon our readings, research, interviews, meetings, and discussions. While sincere people often disagree and one might find fault with some fact or detail in this report, we suggest that sometimes the source of the criticism might be prompted by a bias of another kind. That of the Wind Industry or their representatives whose livelihood is dependent upon only one outcome: The installation of Industrial Wind Turbines. Where they are the source of that criticism, their criticisms might have some validity, but we suggest that their points of view might be captive to their own financial interests.

Industrial Wind Developer Practices:

As in any industry there are a range of practices ranging from highly ethical to strongly unethical. Especially in a new industry which has not had the benefit of history and hindsight, regulation can initially be lax.

We do not say that all Industrial Wind Developers operate unethically. Anecdotally, we heard that some wind developers work hard to meet the needs of the communities in which they operate, and are sensitive to setback distances, landowner concerns, maintaining town roads, and responding to citizen concerns.

However, the New York State Attorney General's Office Public Integrity Division created The Wind Industry's Code of Ethics (also called "Code of Conduct" – see section "Compliance with New York State Attorney General's Code of Conduct."). This was established in response to widespread complaints about Industrial Wind Industry practices.

The key is that the Industrial Wind Industry has enormous financial resources at their disposal, a targeted agenda, and wields power and influence to achieve their ends. The "so what" for a small town: Be educated, use caution, and craft your policies to achieve the ends of your town's comprehensive plan, not that of the developers. While a wind developer can mount a lawsuit at will, they will be far less likely to do so if the town has adopted policies in line with a well crafted Comprehensive Plan and zoning laws aligned with its roadmap.

Recommendations Considered:

Our committee considered different basic options as seen in the chart below:

Final Recommendation Option	Comments
Industrial Wind Turbines should not be permitted within the town.	This is the recommendation that our committee adopted because of Industrial Wind Power's incompatibility with the Town's Comprehensive Plan. While a cursory read of that plan might indicate some limited ambiguity on this point a deeper analysis clearly shows otherwise. (See discussion in "Detailed Recommendations..." under "Community Impacts".
Industrial Wind Turbines should not be permitted within the town, but provide back up zoning recommendations to protect the Town in case of Eminent Domain (at either State or Federal levels) and/or a wind developer successfully mounts a lawsuit against the Town.	Our committee did not believe it was appropriate to attempt to suggest zoning law, especially as our Town's Zoning Review Committee has been charged with this task. We have reported our Summary Recommendations directly to that committee.
Permit Industrial Wind Turbines but with clear zoning laws and policies that *might* protect the town.	While this approach might possibly be effective, it's very risky. A wind developer could much more easily challenge Zoning Laws than a prohibition based upon the Comprehensive Plan. If there were limited numbers of turbines allowed in restricted zoning areas their impact would still be out of alignment with the Town's Comprehensive Plan.

Common Misconceptions

We would like to offer some commonly held ideas that, under closer inspection, turn out to be at least partially flawed. We are strongly committed to seeing our country move to a Renewable Energy future, a reduction in oil usage, particularly imported foreign oil. Our purpose in this section is to challenge misconceptions that might stand in the way of our country's actually moving to a greener future, and, at the local level to indicate that Industrial Wind Power might not be as green as it seems.

Claim: Wind Power is a cheap source of Renewable Energy.

For Your Consideration: Industrial Wind Power is very capital intensive at the outset. Also, consumers are paying a 1¢ to 2¢ premium per Kilowatt Hour of energy purchased through Renewable Sources. At each stage of the way Industrial Wind Power has costs. Some of these costs are:

- The additional tariff of 2 to 2.5% assessed on every New York State electric consumer's energy bill, part of which goes to fund the installation of Industrial Wind Power projects.
- Double Declining Depreciation on their investment.
- Production Tax Credits given to Industrial Wind Power producers for the energy produced and sold into the grid. This is currently 2¢ per Kilowatt hour.
- Renewable Energy Credits – ultimately paid for by taxpayers and consumers (see section "Miscellaneous Matters" and interview notes with Central Hudson's Corporate Communications department.)

If Industrial Wind Power is truly cost efficient, then once the capital costs are paid down, the price of this energy to the consumer should be sharply reduced. We are skeptical that this will occur.

Claim: The installation of Industrial Wind Turbines will radically reduce our need for foreign oil.

For Your Consideration: Only 2.7% of foreign oil goes to produce power for the grid nationally. While incremental gains have clear value, Industrial Wind Power does not displace the need for this source, since the Independent Systems Operators that run the grid put on *standby* the two reliable sources of power: Coal and Nuclear. When coal plants are on standby they are still polluting, they just don't produce energy.

Conventional power plants are needed to back up wind power via either a strongly interconnected grid between countries, hydro, or other stable power source, storing the energy (by pumping the water into a high lake during excess periods of wind power production), thermal, or other technique.
"*Design and Operation of Power Systems with Large Amounts of Wind Power, first results of IEA collaboration*, presented at the Global Wind Power Conference September 18-21, 2006, Adelaide, Australia."
http://www.ieawind.org/AnnexXXV/Meetings/Oklahoma/IEA%20SysOp%20GWPC2006%20paper_final.pdf (IEA = International Energy Agency)

Also, due to the variability of the wind, conventional power plants are needed to smooth out power generation. China is building many new coal power plants to back up the wind turbines it has constructed. Part of the problem is the poor grid system, but part is also the need to provide a smooth supply of power. (Wall Street Journal, *China's Wind Farms Come With a Catch: Coal Plants*, Sept. 29, 2009 http://online.wsj.com/article/SB125409730711245037.html

Claim: Industrial Wind Power is a reliable source of Renewable Energy.

For Your Consideration: If the production cycle timing of wind power were matched to peak demand, wind power could be considered a reliable resource, but in fact it is not. Because wind blows in unpredictable, variable, and intermittent cycles grid operators (ISOs) need to keep peak power capacity available from the reliable sources of energy. In Denmark which has

been a prime mover internationally in wind power, can't utilize it's own wind power effectively because of the difficulty of storing this power:

> From: http://www.cepos.dk/fileadmin/user_upload/Arkiv/PDF/Wind_energy_-_the_case_of_Denmark.pdf
>
> *" Denmark generates the equivalent of about 19% of its electricity demand with wind turbines, but wind power contributes far less than 19% of the Nation's electricity demand.*
>
> *The claim that Denmark derives about 20% of its electricity from wind overstates matters. Being highly intermittent, wind power has recently (2006) met as little as 5% of Denmark's annual electricity consumption with an average over the last five years of 9.7%. In the absence of large-scale electricity storage, any modern electricity system must continuously balance electricity supply and demand, because even small variations in system voltage and frequency can cause damage to modern electronic equipment and other electrical equipment."*
>
> *"Denmark manages to keep the electricity systems balanced due to having the benefit of its particular neighbors and their electricity mix. Norway and Sweden provide Denmark, Germany and Netherlands access to significant amounts of fast, short term balancing reserve, via interconnectors. They effectively act as Denmark's "electricity storage batteries". Norwegian and Swedish hydropower can be rapidly turned up and down, and Norway's lakes effectively "store" some portion of Danish wind power.*
>
> *Over the last eight years West Denmark has exported (couldn't use), on average, 57% of the wind power it generated and East Denmark an average of 45%.The correlation between high wind output and net outflows makes the case that there is a large component of wind energy in the outflow indisputable."*

Along the same line of thinking is Glenn Schleede's report:
http://alleghenytreasures.wordpress.com/2010/02/04/glenn-schleede-"the-true-cost-of-electricity-from-wind-is-always-underestimated-and-its-value-is-always-overestimated"/

Claim: Industrial Wind Power can provide an unlimited amount of our energy needs into the future.

For Your Consideration: Because wind power is an unpredictable, variable, and unreliable source of power for electric energy production, grid operators (ISOs) need to keep peak power capacity available from other reliable sources of energy – like coal and nuclear. Electricity can not be easily or reliably stored on a large scale. Two of the most likely storage sources are battery storage and using wind power to pump water into holding tanks to later be released as hydro power. The original function of Windmills in Holland, where many of them are still working today, was to replace animal power in grinding of grain, to drain marsh lands, and to pump irrigation water -- not to provide electric power. Also, even a country like Denmark would need to undergo a vastly expensive retooling of it's electric grid to prevent instability. The current problem is that because electric power can't be stored, the grid in its current form, can be destabilized by high levels of wind power. The Governor's Executive Order 111, in 2002, that requires State facilities to operate with 20 percent renewables by 2010 has not been achieved. And perhaps it is not currently a technological possibility: There was a study done concerning California's electric grid that is applicable in New York State. It makes the case that *"hour-to-hour variations in wind energy (speed) will create large hourly energy deficits that require installation of other, more predictable, compensation generation capacity and*

infrastructure." This same article states that in California, a 15% grid capacity supplied by wind power will destabilize the grid as it exists today. The "so what" is that NY State's 20% target faces the same challenges.
http://arxiv.org/pdf/1002.2243

Claim: Industrial Wind Power is a totally green resource reliable upon an inexhaustible source of energy – the wind.

For Your Consideration: Each Industrial Wind Turbine requires about four hundred tons of concrete in the base, plus approximately another 80 tons for the tower and nacelle and blades. Because of the size and scale of these machines and the length of blades (often in the range of 130'), at least two to four acres of cleared land is necessary around each wind turbine, in addition to the transportation infrastructure to service them, and the electrical infrastructure to transport electricity to the grid. This requires heavy, long equipment, which is used in the initial construction stage and in ongoing maintenance. There are approximately 200 gallons of various fluids needed for lubrication and if an Industrial Wind Turbine collapses these fluids would fall around three hundred feet to the ground and can potentially cause environmental damage.

Wind Speed in Albany County

The wind speed in Albany County is not sufficient to support an Industrial Wind Power project based upon the criterion of power produced alone.

The U.S. Department of Energy's wind map for New York State shows the Resource Potential to be "Marginal" – just above the lowest category of "Poor". There are three areas of New York State classified as either "Excellent", "Outstanding" or "Superb" – the three top categories. They are the areas South and East of Lake Ontario, Lake Erie, and Long Island, not Albany County.
http://www.windpoweringamerica.gov/maps_template.asp?stateab=ny

NYSERDA's own current evaluation of New York State counties that have viable wind omits Albany County as well. While it is true that in October 2002, Albany County was listed as an upstate county with *potentially* developable wind resources
http://text.nyserda.org/programs/pdfs/windguide.pdf
a more recent evaluation indicates that Albany County does not have viable wind resources.
http://www.powernaturally.org/programs/Wind/Wind%20Energy%20Toolkit.pdf
(page 5 of report, or page 11 of .PDF document)

This is a significant point. Because other portions of New York State are viable for wind development, and Albany County is not, our recommendation that Industrial Wind Power should not be permitted is in alignment with a negative SEQRA declaration. If the wind power in Albany County were classified in the top categories, potentially a recommendation to disallow Industrial Wind projects could be perceived as having a negative effect upon the environment through the necessity to provide more electric through coal fired power plants, with their subsequent negative impact upon the environment.

Wind Power Committee Industrial Wind Power Summary Recommendation and Related Rationale

Overall Recommendation:
Industrial Wind Power installations within the town of Rensselaerville should not be permitted.

Note: See full *"Town of Rensselaerville, New York, Wind Power Committee Recommendations Report for Industrial Wind Power July 2010"* for detailed research and rationale leading to these recommendations.

The key reasons for these recommendations:

1. Industrial Wind Power is strongly out of alignment with the Town of Rensselaerville's Comprehensive Plan.
   Note: This reason alone would be enough to justify a strong recommendation prohibiting them.

2. There are significant health, environmental, and safety concerns associated with Industrial Wind Power.

3. Albany County does not have the sustained high level of wind speed to make Industrial Wind Power viable for consistent energy production.

4. Citizen's property values would be negatively affected.

5. On a cost-benefit basis, the income to the town would be minimal, while the costs to the quality of life would be disproportionately large. Also, the total costs to the Town in terms of time spent by the Town Board, town committees, town attorneys, Highway Superintendent, Code Enforcement Officer, and other town employee's time would be large, and is often uncounted in the project's life cycle costs.

6. Irreversible decision: Once Industrial Wind Turbines are installed, it would be practically impossible to remove them. Industrial Wind leases and easements give developers long term property control through long initial terms and option extensions: Shell Oil's contract provides the developer with control for as long as 67 years from contract signing. Flat Rock Wind Power's Amended and Restated lease for Tug Hill provides the developer with control for as long as 46 years. That would commit the town to these industrial installations for the equivalent of three generations.

7. The Town would likely lose control of its ability to independently negotiate with Wind Developers.

8. Even if the Town attempted to restrict Industrial Wind Power zoning to a small portion of the town, Wind Developers could challenge that zoning and quite possibly be successful in overturning it. It would be easier for a wind developer to successfully challenge a zoning restriction than a total prohibition based upon the comprehensive plan.

Community Impacts
Relationship to Comprehensive Plan and Historical Impact

Rensselaerville's Comprehensive Plan Does not Support Industrial Wind Power Installations

- In New York State, all town land use laws must be in accordance with the town's Comprehensive Plan (New York State Town Law Section 272-a)
- *In Rensselaerville, protection of rural character and the Town's environment is a primary goal of this Comprehensive Plan* – See Town of Rensselaerville Comprehensive Plan dated March 8, 2007 ("Comprehensive Plan") at page 5.
- *Public input has strongly indicated that large-scale industrial uses are not desired...* See Comprehensive Plan at page 22.

I. The Overall Vision for the Town of Rensselaerville as set forth in its Comprehensive Plan is Incompatible with Industrial Wind Power Installations.

- *Our Quality of life is the guidepost we use to direct our community decision- making process, as defined by the valued attributes of rural character; active, sustainable agriculture; scenic beauty; cultural and historic richness; a healthy environment; diverse housing resources; and economic opportunity.* Comprehensive Plan at page 11.
- *The Town of Rensselaerville is treasured by its residents as a place where landscape, history, and community are tightly entwined.* Comprehensive Plan at page 11.
- *We accomplish this vision in a fiscally responsible manner, limiting costs to our citizens, and encouraging growth that is both fiscally and aesthetically beneficial to our town.* Comprehensive Plan at page 12.
- *The Town understands that its quality of life is the critical factor in attracting and retaining desirable businesses and appropriately growing our local economy.* Comprehensive Plan at page 12.
- *New businesses are designed to fit into the town's aesthetic character and are protective of the environment. Small, "one of a kind" businesses are the norm. As a result, their environmental impact has been kept low and their visual appeal is consistent with the town's historic, rural character.* Comprehensive Plan at page 12.

II. The Goals of the Town of Rensselaerville are Incompatible with Industrial Wind Power Installations.

Industrial wind power installations in the Town would be in direct opposition to the following goals set forth in the Comprehensive Plan:

- *Goal 1: To encourage appropriate types of rural land use in an orderly manner to support safety, health and quality of life.*
  - *Objective 1: Land use and growth patterns will be based on the lands environmental ability to accommodate such uses ...and on the desire of the community to retain our rural character.*
- *Goal 2: To protect important natural resources in the town such as water bodies and wetlands, water supply and recharge areas, important wildlife areas, natural habitats, stream corridors and scenic views which are an essential part of the rural character, quality of life and economic viability.*
- *Goal 3: To promote and encourage a business environment in and around the hamlets and other designated areas that serve to encourage the kind of economic activity that best benefits its citizens, is protective of the environment, and is consistent with the rural and historic character of the town.*
  - *Objective 4: To maintain a viable agricultural economy in the Town as both a source of economic activity and means of preserving the traditional landscape of the Town.*
- *Goal 6: To encourage the growth and economic viability of agriculture as both a source of economic activity and as a means of preserving the important components of the Town's rural character.*
  - *Objective 1: Develop a supportive business environment for agriculture and help maintain the economic viability of farming and preserve the traditional landscape of the town.*

See Comprehensive Plan Section IV- Goals, beginning on page 16 of the Comprehensive Plan.

III. Industrial Wind Power Installations would threaten the Town of Rensselaerville's Natural Resources.

Our natural resources are an essential part of our rural character, quality of life, and economic viability. Protection and wise stewardship of those natural resources through preservation of natural habitats, careful management of land/water resources, and conservation of existing agricultural lands is a high priority for the Town. See Comprehensive Plan at page 14.

- The Comprehensive Plan includes various recommendations regarding the identification, mapping and developing special zoning to protect intact patches of natural vegetation and rare landscape habitats as well as promoting conservation easements to protect important wildlife areas and the formation of a Town Conservation Advisory Board. Until these recommendations are fully implemented, it is impossible to determine the full extent of the effect of a industrial wind power installation on Town, county and state natural resources. See Comprehensive Plan- Programs and Policy Initiation – Subsection 6. Natural Resources beginning on page 58 of the Comprehensive Plan.

- The Comprehensive Plan includes recommendations related to zoning and land use laws that further recognize the need to protect natural resources. Among those recommendations include:

- *Strengthen current zoning requirements for Erosion and Sediment Control... Prohibit disturbance of any kind on areas of 20% slope or greater.* See Comprehensive Plan at page 39.
- *Prohibit development on slopes greater than 20%.* See Comprehensive Plan at page 39

IV. Industrial Wind Power Installations would threaten the Town's Historic Resources.

- The historic nature of the Town is one of its most valuable resources. See *Town of Rensselaerville Comprehensive Plan – Considerations Relating to Historic Preservation*, below.

- Town has chosen to protect its historic resources by enacting the Historic District Overlay zoning in 2007

- The Hamlet of Rensselaerville Historic District was named a 2010 recipient of the New York State Society for Historic Preservation "Seven to Save".

- See Historic Character beginning on page 14 of the Plan.

  "The residents, through many of their civic/volunteer organization, work hard to retain our community's historic character because we recognize, as did our predecessors, the importance of our rich, rural, agricultural heritage. We value the special beauty and splendid, historic landscapes; all of which continue to attract people to our town and contribute to the value of our property and to our quality of life."

  "The Town's extraordinary number of historic buildings – some on State and National Registers of Historic Places -- scenic roadways, places of worship, burial grounds, stone walls, and streams are integral to its beauty, sense of place, sense of community, economy, and attraction as a visitor destination and residential home market."

- 2009 – 2013 New York State Historic Preservation Plan -State Historic Preservation Plan Memorandum #2 – *Key Themes & Threats Identified During the Planning Process* (included at page 110 of the pre-publication final plan) summarizes information and comments from personal interviews and public outreach meetings.
  - List of needs for proactive development of guidelines and standards includes siting of wind turbines and wind farms (pg. 112 of the pre-publication final plan).
  - Listing of 17 Threats including (p. 120 of the pre-publication final plan):
    - Lack of awareness about cultural resources or political will to protect them
    - Wind farm location
    - Failure of communities to comply fully with SEQRA

http://nysparks.state.ny.us/publications/documents/NewYorkStateHistoricPreservationPlan.pdf.

- See Item 7.3 Historic Character of Section D. Programs and Policy Initiation on page 62 of the Comprehensive Plan.

7.3 The Planning Board and Zoning Board of Appeals should use the historic inventory and maps to assist in determining new project impacts on historic resources as required by the New York State Environmental Quality Review Act (SEQRA). Both boards should carefully

evaluate the impacts of proposed products on historical resources by conducting thorough SEQRA procedures that give full emphasis to historic resources.
The attached chart shows all references to Wind Power specific to the Comprehensive Plan.

Given the nature of Industrial Wind Turbine installations and their clear incompatibility the Town of Rensselaerville's Comprehensive Plan, we recommend that Town Law include the provision that no variance for Industrial Wind Power facilities or any of their infrastructure be given.

SEE RELATED DOCUMENT "Town of Rensselaerville Comprehensive Plan and Industrial Wind Power – Chart"

This document directly extracts every relevant reference to Wind Power or Renewable, or Alternative Energy in the Town's Comprehensive Plan and comments accordingly. It is an integral part of this section, but was not included because it's in landscape format.

Health, Environmental and Safety Considerations
Summary of Observations

SUMMARY OF OBSERVATIONS: (A more detailed discussion and listing of some of the reports and studies used in arriving at this summary is included below.)

NOISE AND SOUND

- Noise and sound produced by industrial wind turbines is a major issue. The wind farm developer will assume the cost of an independent sound engineer, selected by the town and paid by the wind farm developer through the town, who will generate a contour map of the area showing expected sound level measurements at property lines. The program generating this map must take into account not only topology but also prevailing winds, temperature, air density, ground cover, and other effects which contribute to the distance the sound can travel.
- The sound level of the wind turbines at the closest property line should not exceed L_{A90} + 5dBA with a maximum (10 minute average L_{Aeq}) of 35dBA. The C weighted sound level of the wind turbines at the property line should not exceed L_{C90} + 5dBC. The difference between these wind turbine sound levels (dBA-dBC) must not be greater than 20dB. The L_{A90} and L_{C90} are the pre-construction background sound levels. This 20dB restriction prevents the possibility of complaints about rumble or other low frequency problems. The maximum C weighted sound pressure limit at the nearest property line is $55L_{Ceq}$. The manufacturer must be required to supply measurements of A weighted and C weighted sound level measurements.
- A bond or some other means of guaranteeing that the wind farm developer/operator will work with those affected by noise to minimize the effects must be in force. The operator must respond in a satisfactory manner in a time period set down by the town or be fined for non-compliance.

SHADOW FLICKER

- Setback: Determine appropriate setbacks for Shadow Flicker, using computer modeling by an independent contractor chosen by the town and paid for by the wind farm developer through the town. Because of the Town's hilly terrain, shadow patterns affect setback distances. . The distance of the shadow cast by the turbine varies greatly according to a number of variables (detailed later in this section, but could be approximately 0.5 miles for certain turbines, although a British study would indicate about 1 mile.

  Maximum Exposure Periods: German regulations state that under no circumstances is the shadow flicker to exceed 30 hours per year and 30 minutes maximum per day. Shadow flicker is determined primarily by blade width, tower height, and sun's elevation and azimuth, although topography must be taken into account. Shadow flicker can trigger photosensitive epilepsy in susceptible individuals

ICE THROW

- Ice/debris throw for each turbine must be calculated because of the dependence on height, blade length, and rotational speed. Probability of being injured by thrown ice is low and setbacks for sound would be greater than this. The distance ice could be thrown could be approximately 0.5 miles for a common turbine.

GROUND VIBRATION

- A comprehensive study should be done by an independent contractor chosen by the town and paid for by the wind farm developer through the town to calculate the vibrational coupling between the concrete tower bases and the surrounding land, especially as it relates to the nearest residences and the effect on any caves or other underground features.
- The wind farm developer/operator should post a bond or some other binding means of guaranteeing that the developer will remediate conditions that cause ground vibration for those so affected to minimize the effects. The operator must respond in a satisfactory manner in a time period set down by the town or be fined for non-compliance.

CONSTRUCTION TECHNIQUES

- The wind farm developer must submit detailed drawings of the construction technique used for each turbine. The technique used will determine how much cement is to be used and how it is to be configured. Methods of crossing streams with cables must also be detailed by the wind farm developer to show that they will not interfere with the natural flow of the streams.
- Soil studies should be done by an independent contractor chosen by the town and paid for by the wind farm developer through the town on a tower-by-tower basis. This is necessary because the soil composition (structure?) can change in distances as small as 50ft necessitating different construction procedures
- Decommissioning procedures and standards must be in place and apply to the wind farm developer and to their successors.

AQUIFER

- Before developing a site the town should mandate that a comprehensive study be done by an independent contractor chosen by the town and paid for by the wind farm developer through the town on the geology and hydrogeology of the area, the effects of microseismic vibrations on caves and in general on the aquifers potentially affected by each tower since there is little published independent study done on these areas.
- Studies should be done on the effects of the hardening chemicals used in the cement which can leach into the aquifer.

WILDLIFE IMPACT – BIRDS, BATS, OTHER WILDLIFE

- Before developing a site the town should mandate that a study be done by an independent contractor chosen by the town and paid by the wind farm developer through the town on the effects of ground vibration, noise, and blade rotation as it relates to the local wildlife. This must be undertaken since some local caves, especially Hailes Cave in Thatcher Park, rank high on a biodiversity scale.

EFFECTS ON ROADS AND INFRASTRUCTURE

- A bond, or other financial instrument, must be posted before construction of the wind turbines is to begin. This will be used to repair any damage to town roads, bridges, culverts, and other infrastructure. It should also be used to repair any damage to the property of citizens in the event that roads are to be widened or other undesired incursion of vehicles or components of construction destroy their property. This bond should remain in effect for the life of the project. Even though the highest level of activity will be during the construction phase, there is still ongoing maintenance on turbines, blades, electrical infrastructure, and parts replacement including blades. The heavy-duty nature of the equipment points to the need for the developer, not the town, to bear the

financial burden of keeping roads used for such purpose in good condition, and the authority to determine remediation methods should reside with the town.
- A separate road maintenance contract should be drawn between the developer/operator and the town.

FIREFIGHTING

- Wind farm developers must demonstrate that they have installed fire detection and suppression systems throughout each of their turbines. Fire fighting plans must be detailed and realistic. Water sources near each turbine must be indicated. Payment for fires which spread from the turbines to the surrounding forests is to be guaranteed by the developer and their successors. Each tower must have a means of being easily identified by local firefighters, such as an address locator.
- In the event of a fire or turbine collapse or other disasters, Town Officials shall be given the same access as the developer or their representatives throughout the response and remediation process.

Health, Environmental and Safety Considerations Rationale for these Recommendations

N.B. References that follow are just a few of the total number of references used in the preparation of this report. For a more complete listing of references, see the separate document titled: "Wind Power Committee Resources".

NOISE AND SOUND

As stated before noise and sound produced by industrial wind turbines is a major issue. One of the most thorough peer reviewed studies on the noise produced by wind turbines is *The "How to" Guide to Siting Wind Turbines to Prevent Health Risks from Sound* by Kamperman, G, and James, R. This study refers to IEC 61400-11 and other reference standards as documents which serve to provide uniform methodology and sound level standards.

Noise can cause problems in several areas including, but not limited to, sleep deprivation, inability to concentrate, irritability, and other physical symptoms. The World Health Organization (WHO) recommends that the sound level for continuous sounds should be less than 30dBA during sleep periods to protect children's health. (World Health Organization guidelines for community noise especially para. 4.2.1-4.2.8) http://www.ruidos.org/Noise/WHO_Noise_guidelines_4.html#2.3) The WHO also states that when prominent low frequency components of noise are present, measures based on A-weighting are inappropriate. However if the difference between dBC and dBA measurements is more than 10dB it is recommended that a frequency analysis of the noise be performed. (Para. 4.3) Differences of 20 dB and above between the L_{A90} and L_{C90} measurements result in a rumbling sound. It is for this reason that this 20dB difference is not to be exceeded. It is interesting to note that no wind turbine manufacturer's measurements of A weighted or C weighted sound levels could be found on the internet. They do give sound power levels at the hub for wind speeds at which the turbines generate electricity. It is not easy to convert this measurement into sound pressure levels that could be understood by the public.

Because of the attenuation (lowering the loudness) of higher frequency sound (greater than 200Hz) by the walls of a home (typically 10dBA to 15dBA) the WHO states that a 45dBA measurement outside the house will probably be measured as about 30dBA inside the home. However, low frequency noise (20Hz-200Hz) is only attenuated 6dBC to 7dBC by the structure. This could cause sleep problems. Frequencies below 20Hz can cause parts of the house to vibrate, especially windows, which would result in audible noise. Lower frequencies will cause human internal organs to resonate. (*Influence of Low Frequency Noise on Health and Well-Being*, Martin van den Berg, Ministry of Environment, Netherland, 2005) The International Standards Organization recommends a 25dBA maximum night time limit in rural communities. (ISO 1996-1971). An independent study *Measuring Background noise with an attended, mobile survey during nights with stable atmospheric conditions* by Schneider 2008, measured a night time, stable atmosphere noise as 25.7 to 26.7dBA at Cape Vincent. This measurement correlates well with that which is measured in the Helderberg area and is considered typical of the Rensselaerville area. (*Regulation of Noise in Rural and Quiet Suburban Areas*, Daniel A. Driscoll, PE, Ph D, Board Certified in Noise Control Engineering)

There is a penalty recommended for prominent amplitude modulated sound, impulsive sound, or sound with a tonal character. Research has shown that such sounds are much more annoying and noticeable than other sounds without those qualities.

If wind turbine noise has a low enough frequency, the individual may not hear them but yet still be affected by them. (*Low Frequency Noise: Technical Research Support for DEFRA Noise Programme*, prepared by Casella Stanger; *Wind Turbines and Infrasound*, prepared by Howe Gastmeier Chapnik Limited for CANWEA) An analogous example of this would be the effects of light which is not visible (ultraviolet) on the skin (sunburn). While one wouldn't be sunburned by sound, the body will still be physically affected by it, often appearing as unexplainable symptoms such as annoyance, stress, irritation, fatigue, headache, nausea and disturbed sleep. Another result of low frequency sound is that it is able to cause parts of a home to vibrate, for example windows, which can cause difficulty sleeping.

A CANWEA study on infrasound generated by wind turbines states that it is no worse than those found in nature. (http://www.canwea.ca/images/uploads/File/CanWEA_Infrasound_Study_Final.pdf This is true in some cases, however who would want the continuous rumble of thunder pervading their home?

It is important to keep in mind that the "sound pressure level" or the "sound level" of the turbine at a given distance (reference distance) is the sound level measured at the test site with the turbine operating minus the background noise. The units of these measurements are usually "dBA". The equation then used is:

$$SPL = 20 \log_{10} (10^{SPLt\&b/20} - 10^{SPLb/20})$$

where:

SPL is the Sound Pressure Level of the turbine in dBA
SPLt&b is the Sound Pressure Level of the turbine plus the background noise
SPLb is the Sound Pressure Level of the background noise

The background sound (L_{A90}) refers to the sound level present at least 90% of the time. Background sounds are those heard during lulls in the ambient sound environment, that is, when transient sounds from flora, fauna, and wind are not present. Background sound levels vary during different times of the day and night. Because wind turbines operate 24/7 the background sound levels of interest are those during the quieter periods which are often the evening and night. Sounds from the wind turbine of interest, near-by birds and animals or people must be excluded from the background sound test data. Nearby electrical noise from

streetlights, transformers, and cycling AC units and pumps, etc. must also be excluded from the background sound test data.

Background sound level (dBA and dBC (both as L_{A90} and L_{C90})) is the sound level present 90% of the time during a period of observation that is representative of the quiet time for the soundscape under evaluation and with duration of ten (10) continuous minutes. Several contiguous ten (10) minute tests may be performed for one (1) hour to determine the statistical stability of the sound environment. Measurement periods such as at dusk when bird and insect activity is high or the early morning hours when the "dawn chorus" is present are not acceptable measurement times. Background L_{A90} sound levels documenting the pre-construction baseline conditions should be determined when the maximum wind speed is less than 2m/sec (4.5 mph) near ground level during the ten (10) minute measurement period. The anemometer used shall be orientated to record the maximum wind velocity within 5 meters (16.4 feet) of the measuring microphone.

Longer term sound level averaging tests, such as 24 hours or multiple days are not at all appropriate since the purpose is to define the quiet time background sound level. It is defined by the L_{A90} and the L_{C90} descriptors. It may be considered as the quietest one (1) minute during a ten (10) minute test. L_{A90} results are valid only when L_{A10} results are no more than 10dB above L_{A90} for the same period. Likewise, L_{C10} less L_{C90} are not to exceed 10db to be valid.

The background noise environment consists of a multitude of distant sources of sound. When a new nearby source is introduced the new background noise level would be increased. The addition of a new source with a noise level 10 dB below the existing background would increase the new background 0.4dB. If a new source has the same noise level as the existing background then the new background is increased 3.0dB. Neither of these two situations would result in a noticeable audible increase in sound. Lastly, if the new source is 5dB above the exiting background then the new background would have increased a little more than 6dB, a factor which must be considered in compliance measurements.

The sound level of the wind turbines at the closest property line should not exceed L_{A90} + 5dBA with a maximum ten-minute average L_{Aeq} of 35dBA. The C weighted sound level of the wind turbines at the property line should not exceed L_{C90} + 5dBC with that level not to be different from L_{A90} + 5dBA by more than 20dB. This prevents the possibility of complaints about rumble or other low frequency problems. The maximum limit at the nearest property line is $55L_{Ceq}$.

The wind industry measures the turbine sound at a height of 10m (33ft) above the ground. At this height there is enough wind to mask the noise of the turbines while at ground level there is little to no wind. This is especially true at night. This condition is responsible for noise complaints within 3km (1.86miles) of a wind farm. (This and the previous information on sound measurements and limits is from *The "How to" Guide to Siting Wind Turbines to Prevent Health Risks from Sound* by Kamperman, G, and James, R.) Other detailed information can be obtained in a dissertation from the University of Groningen *The sound of high winds: the effect of atmospheric stability on wind turbine sound and microphone noise* by Godefridus Petrus van den Berg.

Some non-wind turbine related studies on low frequency sound and infrasound have also been done. Many of these have tested for the short term effects of very loud low frequency noise or infrasound, generally above 95dBA. Most do not show any lasting effects of the sound even though the sound levels were high. Only a few studies, mostly done in work situations where people spent much time, determined that low level low frequency noise or infrasound were responsible for workers becoming ill. One such study (*Indoor Air '96*, proceedings 7th International Conference on Indoor Air Quality and Climate, held July 21-26, 1996, Nagoya, Japan, Volume 1, pp 1025-1030, 13 figs, 10 refs., Burt T) indicates that low frequency noise centered around 7Hz from an office building ventilation system caused

symptoms typical of sick building syndrome in workers even though it was not audible. Another study (Radneva, R. 1997. *Studying the effect of acoustic conditions in the living environment of multifamily buildings on inhabitants.* Khig. Zdraveopazvane 40 (3-4):40-44.) reaches the same conclusion as does a 1980 study (INTERNATIONAL PROGRAMME ON CHEMICAL SAFETY Environmental Health Criteria 12 section on Noise para. 1.1.3.3 to 1.1.4 http://www.inchem.org/documents/ehc/ehc/ehc012.htm), viz., that people exposed to low level low frequency sound and infrasound for long periods of time develop psychosomatic complaints such as fatigue and weakness in addition to sleep deprivation. A DEFRA (Department of Environment, Food and Rural Affairs) report (*A Review of Published Research on Low Frequency Noise and its Effects*, Report for DEFRA by Dr Geoff Leventhall, Assisted by Dr Peter Pelmear and Dr Stephen Benton) points out that A weighted sound measurements underestimate annoyance in the frequency range below 200Hz.

A book called "Wind Turbine Syndrome" by Nina Pierpont, M.D. published in 2009 takes a case study approach with people who have developed a series of related symptoms that are impacted by Industrial Wind Turbine exposure. Her conclusions point to the constellation of symptoms that can be medically defined as a syndrome and while not a double-blind study her interviews indicate that symptoms that began after the installation of Industrial Wind Turbine installations abated, and in some cases completely disappeared, when those same subjects moved away. She has also collected evidence that when those subjects returned their symptoms also returned. While not a fully conclusive body of work because of the small sample size and the fact that not all subjects within the same family were affected to the same extent, Dr. Pierpont's thoughtful work indicates a need for continuing research. It also points to a need for much larger setback distances than currently in use, and clear caution in the siting of these installations.

DEFINITIONS FOR THE SECTION ON NOISE

Amplitude modulated low frequency sound: Sound with energy in the lower frequency range of 20 Hz to 200 Hz which varies in loudness and other characteristics in a rhythmic pattern.

Annoyance: A technical term meaning a significant degradation in the quality of life and health. The WHO defines health as meaning total physical and mental well-being, as well as the absence of disease. The term annoyance used in noise studies does **not** mean an inconsequential disturbance.

Impulsive sound: A sound of short duration or an abrupt change in sound level which may either increase or decrease the level of background sounds.

L_{Aeq} is the A weighted equivalent sound level, or "average" noise level, is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound. The L_{Aeq} is determined by summing the total sound energy, then dividing the total energy by the total time.

L_{A90} or L_{C90} refers to the sound level measurements that are exceeded for 90% of each sample period. This would represent the lower sound levels in the environment.

L_{A10} or L_{C10} refers to the sound level measurements that are exceeded for 10% of each sample period. This would represent the higher sound levels in the environment.

Tonal sound is a sound for which the sound pressure is periodic function of the time, and characterized by a single frequency. Tonal sound may have a simple or complex wave shape.

SHADOW FLICKER

A field trip taken by the wind committee to the Maple Ridge Wind Farm in Tug Hill, New York in January 2010 demonstrated that even though one turbine may be turning at a

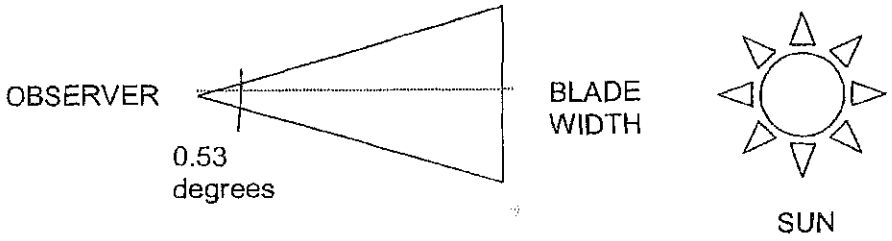
frequency less than that needed to trigger photosensitive epilepsy, the combination of two of them may cause an different sensation. This effect was experienced when two turbines were turning at about the same rotational velocity but were slightly out of phase with each other. The result was a flicker which was twice that of one turbine but still less than the frequency needed to trigger photosensitive epilepsy. Standing at the site for a few minutes caused a disorienting, dizzying sensation in at least two of the team members.

Below is a calculation for shadow flicker which does not round off the angular displacement of the sun's disk. The results given are for the blade blocking off the center of the sun's disk which would be the worst case for distance from blade to observer. This calculation does not round off the angular width of the sun's disk as had been done in the previous residential calculations.

BACKUP FOR CALCULATION TO DETERMINE SHADOW FLICKER

Shadow = (0.5 times average Blade width)/ tan 0.053degrees

Shadow = 540 times average Blade width

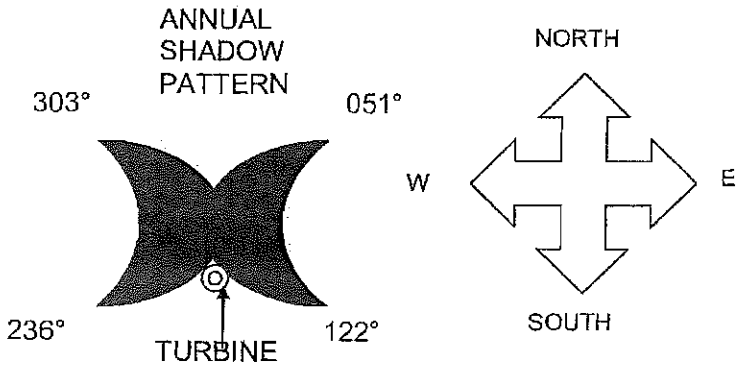


In the equation the 0.5 comes from the use of half the blade width to determine the straight line distance (the line splitting the triangle in half). The "tan 0.053 degrees" comes from using half the angle when 20% of the sun's disk is covered, or 0.5 times 0.2 (or 20%) times 0.53 degrees. For this 20% blockage of the sun's disk, an elevation of 0.8 degrees, and an estimated average blade width of 5 feet, the distance from observer to the tower's base would be about 2700 feet.

The equation comes from a determination of the shadow cast by the blade. A German wind study (referenced in "*Enbridge Ontario Wind Power Project Shadow Flicker Assessment*" and also at http://www.douglasma.org/selectmen/windfarm/files/090216-shadow.pdf) indicating that the disturbing effects of the shadow flicker may affect people with photosensitive epilepsy up to a point when 20% of the sun's disk is occluded. In other words, if the observer is in a position such that the blade blocks off anywhere from 20% to 100% of the sun's disk which has an angular measurement of approximately 32arcminutes, or about 0.53 degrees, then the shadow will be dark enough to cause a seizure provided the frequency of rotation of the turbine rotor is great enough to cause more than 3 shadows per second. This would imply the rotation of a three bladed horizontal axis turbine (like a propeller) would be about 60 rpm. The maximum rotational speed for a Vestas 3MW turbine is 19rpm, or about 1 shadow per second. A British study indicated that only 10% of the sun's disk need be covered. (*Wind Turbines, Flicker and Photosensitive epilepsy: Characterising the Flashing that May Precipitate Seizures and Optimising Guidelines to Prevent Them*, by Harding, Harding, Wilkins, http://www.mfe.govt.nz/rma/call-in-turitea/submissions/186changeappendix3.pdf) The 20% figure is used here. More scientific studies need to be done on this topic to safeguard

individual health, although the distance needed to assure safety from the noise of the turbines is greater than the shadow flicker distance.

Shadows plotted throughout the year can vary significantly and are greatly affected by the surface contours of the land. In this area, those who would not be affected by the shadow throughout the year would live south of the turbine between bearing angles of approximately 236degrees (sunrise) and 122degrees (sunset) (summer maxima). For seasonal residents south of the turbine the winter bearing angles would be approximately 303 degrees (sunrise) and 051degrees (sunset) in order not to have any shadows. For flat terrain the shadow cast for the entire year takes on the rough shape of a butterfly with the turbine at the lowest central part of the butterfly as shown roughly below. (Shadow pattern from Danish Wind Industry Association http://www.talentfactory.dk/en/tour/env/shadow/shadow2.htm)



According to the Epilepsy Foundation approximately 90,000 Americans suffer from photosensitive epilepsy. (http://www.epilepsyfoundation.org/about/photosensitivity/) Most people discover they have it between the ages of 7 to 20. The frequency range which can cause a seizure is in the 3-30 HZ range with very few people sensitive to the extremes of the range.
((http://www.epilepsysociety.org.uk/AboutEpilepsy/Whatisepilepsy/Triggers/Photosensitiveepilepsy)

German guidelines for shadow flicker affecting a particular residence is that it may not exceed 30 hours per year and 30 minutes on the day of maximum shadow. There are computer programs which calculate the shadow pattern and distance, given the topography, latitude, and longitude. (*AIM PowerGen Plateau Wind Generation Project, Shadow Flicker Report*,
http://www.iprcanada.com/Plateau/PLATEAU%20FINAL%20ESR%20JUNE%2011%2009/AppendixK_Shadow-Flicker-rpt.pdf)

ICE THROW

The distance that ice or other debris, such as blade parts, can be thrown is very much determined by the hub height, blade diameter, and rotational speed. One turbine used is the Vestas 90 which can be used as either a 1.8MW or 3MW machine. The difference between the two is the operating wind speed and rotational speed. The Vestas 90 1.8MW turbine has a revolution rate of 8.8-14.9rpm at a rated wind speed of 11meters/sec (24.6miles/hour) while the 3MW turbine has a revolution rate of 9-19rpm at a rated wind speed of 15meters/sec (33.5 miles/hour). Rotational speed of the turbine is computer controlled and is accomplished by varying the angle of the blades with respect to the direction of the wind, a process called "feathering". In our trip to the Maple Ridge Wind Farm in January we passed several turbines

which were not rotating due to "feathering". Tip speed for the 3MW machine at 19rpm (hub height =262ft, blade length = 148ft.) would be about 200mph and the calculated distance of a throw using the equation below neglecting air resistance is approximately 2800 ft. or a little over 0.5 miles. Air resistance is neglected in the equation because the density of the air would be dependent on the air temperature, humidity, barometric pressure, and altitude. The mass and shape of the debris also is important in determining the throw. In addition to this, and of more significance, is the concept that should a piece of ice be thrown from the tip of the blade, its shape could be that of the blade and the aerodynamics of the debris could allow the wind to increase or decrease the distance of flight. Even if the debris were not the shape of the blade, the wind would most likely have a significant effect on the distance thrown. Air turbulence produced by the blades would also contribute to the distance thrown.

During a field trip to the Maple Ridge Wind Farm at Tug Hill in January, 2010, ice was seen on the blades by the committee members. The thickness of the ice was difficult to estimate, however it was clearly visible on the operating turbines at a distance from the base of the turbine of about 600 ft. The guess was that the ice had to be at least 2-3 inches thick at the time for it to be visible. The temperature was 4 degrees F as measured by the car's thermometer. We did not see ice being thrown from the blades, however we did observe chunks of ice missing from portions of some of the blades, implying that some of the ice had been thrown off at some previous time.

The simplified general equation for calculating the ice throw is:

$$x= -0.5((1.414r - (r\omega)^2/g) + sqrt[(1.414r - (r\omega)^2/g)^2 - 4\{-(y + 1.414r)((r\omega)^2/g) + 0.5r^2\}]) - 0.7r$$

where:

x is the horizontal distance from the base of the tower to the landing point in feet
r is the blade length in feet
ω is the angular frequency of rotation in radians/second
g is the acceleration due to gravity = 32feet/second^2
y is the hub height in feet
sqrt means that the square root of the following expression is taken

Since most manufacturers give the angular frequency of rotation in revolutions/minute the equation used to convert to radians/ second is:

ω = (π times angular frequency in revolutions/minute)/30

or approximately

ω = 0.105 times revolutions/minute

The Excel file uses the appropriate conversions to calculate the ice throw in feet. (N.B. the original equation in the residential turbine report did not have the last term (-0.7r). It compensates for the horizontal distance of the ice from the tower at the moment of release. For residential turbines the distance is small compared to the throw distance. For industrial turbines the distance would be larger.)

A slightly different way of calculating the ice throw giving essentially the same results as the Excel program and the rationale for not considering the effects of air resistance can be found at the following website written by Prof. Terry Matilsky of Rutgers. (http://www.physics.rutgers.edu/~matilsky/windmills/throw.html) In this article he also discusses difficulties in the ice throw models and studies of the wind developers.

Risk assessment papers such as *Risk Analysis of Ice Throw from Wind Turbines* by Henry Seifert, Annette Westerhellweg, Jürgen Kröning DEWI, Deutsches Windenergie-Institut

GmbH Ebertstr. 96, D-26382 Wilhelmshaven, Germany DEWI-OCC Offshore and Certification Centre GmbH Am Seedeich 9, D-27472 Cuxhaven, Germany and *Assessment of Safety Risks Arising from Wind Turbine Icing* by Colin Morgan*, Ervin Bossanyi*, Mr Henry Seifert** http://www.renewwisconsin.org/wind/Toolbox-Fact%20Sheets/Assessment%20of%20risk%20due%20to%20ice.pdf determine a safe distance of 1.5 times the total height of the turbine (hub height plus blade length) would give an acceptable risk of 10^{-6}hits/m^2/year at a distance of 400m (1312ft) from the turbine. This number is considered acceptable because it is taken from a British study for an estimate of the risk of getting hit by a bolt of lightening in Britain. The authors do state that different turbines would have to be evaluated. Note that the above studies only dealt with turbines with a radius of about 24meters (78ft) and hub height of about 85meters (about 279ft) or a total height of 357ft. Rotational speed of these turbines in the study was not given. If a distance of 1.5 times the total height of the turbine is used, the safe distance according to these studies is approx 545 ft. The distance calculated using the equation for this turbine is 893ft. at an angular velocity of 19rev/min. The Vestas V82 turbine (a 1.65MW turbine) has a diameter of 82meters (41meter radius= 134ft). Considering that the tangential velocity of the tip of the blade is dependent on the radius, assuming the angular velocity remains constant, doubling the radius doubles the tangential velocity. For example for a turbine (hub height 279ft) turning at 19rev/minute the tip speed of the 134 ft blade is about 180mph (which would result in a throw of 2350ft) whereas the tip speed for a blade length of 78ft would be about 105mph (resulting in a throw of 890ft). The authors of the above studies estimate the weight of a typical piece of ice would be about 1.8kg (about 4lb). Another consideration is that the blade mass would be larger for a larger blade and would require more ice build up to slow it down or cause vibrations which would shut down the turbine. From this it can be concluded that the distance of debris throw from a larger turbine would be larger than the 1.5 times the total height due to the mass of the blades and higher tip speed (tangential velocity).

At a Town of Berne Planning Board meeting on 3/18/10, Joseph Swaha, a representative for Sustainable Energy Developments, Inc., in speaking about residential wind turbines, said that he had not seen ice thrown any great distances but had seen a blade thrown about 400 feet. Neither the height nor make of the turbine was stated but many residential turbines are no higher than 150ft, so the distance of the blade throw is considerably greater than the recommended 1.5 times the total tower and blade height.

GROUND VIBRATION

A New Zealand study on seismic effects of wind turbines done in the Tararua region to determine the cause of resident's complaints that they could hear the sound of the turbines through their pillows did not come up with definitive causes of the problem although the noise itself and the seismic vibrations were measureable. One hypothesis is that the rock formation forms a type of sound lens which focuses the vibrations, both acoustic and seismic, into the area of the residence which is 2 km away from the wind farm. Standing waves are also considered because one residence may experience the vibration, while the one next to it may not. "The question, therefore, is not whether turbines actually generate seismic energy, but whether this signal can be significant for nearby residents. In the present instance, the turbines are well coupled into the mechanically competent 'old' rocks of the ranges by their concrete bases, which will ensure good coupling of whatever seismic energy they generate into the ground." The authors of the study suggest more research be done. An interesting comment is that the turbine towers in the area themselves produce a seismic vibration through the base of about 0.3Hz. This of course would vary with the size and power generation of the turbines. (Third International Meeting on Wind Turbine Noise, Aalbour, Denmark, June 17-19,2009: *Seismic Effect on Residents from 3MW Wind Turbines*, by Bakker (Massey University, NZ), Bennett

(Kea Petroleum Limited, NZ), Rapley (Atkinson&Rapley Consulting, NZ), Thorne (Noise Measurement Services, NZ)) It is interesting to note that most of the studies done on the seismic effects of wind turbines were done to determine the effects on facilities that monitor seismic events such as earthquakes, bomb testing, etc. The amount of vibration measured was small in the seismic monitoring site at Eskdalemuir, Scotland, near the Scottish border however the measurements were taken 80km from the wind farm. Another consideration might be the effects of the ground vibration of wind turbines would have in an area which has many caves used by bats. To our knowledge there are no studies that have addressed this problem.

The Eskdalemuir study states that "Wind turbines are large vibrating cylindrical towers, strongly coupled to the ground with massive concrete foundation, through which vibrations are transmitted to the surroundings and with rotating turbine blades generating low-frequency acoustic signals which may couple acoustically into the ground. This may occur in several ways: 1. As a cantilever carrying the nacelle/blade mass with frequencies typically less than 1 Hz, depending on the height of the tower. 2. As a torsional oscillator at low frequencies. 3. As a complex distributed system at higher frequencies. Additionally, the blade tower interaction is a source of pulses at a low repetition rate, which contain components in the infrasound region." (*Microseismic and Infrasound Monitoring of Low Frequency Noise and Vibrations from Windfarms: Recommendations on the Siting of Windfarms in the Vicinity of Eskadalemuir, Scotland* by Professor Peter Styles, Dr. Ian Stimpson, S. Toon, R. England, M. Wright Applied and Environmental Geophysics Research Group, School of Physical and Geographical Sciences Keele University) This study included measurements of seismic effects from fixed and variable speed industrial wind turbines.

CONSTRUCTION TECHNIQUES

An article regarding the construction of a wind turbine for a ski resort near Vancouver, Canada describes the use of 150 cubic meters (about 196 cubic yards) of cement, and 15,000 kg (over 33,000 lbs or 16.5 tons) of steel. The foundation is anchored by "32 seismic anchor rods, which are 63mm in diameter and drilled 50 feet into the bedrock." (*Construction nears completion on mountaintop wind turbine near Vancouver*, Richard Gilbert, Journal of Commerce, Feb, 23, 2010, http://www.journalofcommerce.com/article/id36416/concrete)

The publication Wind Turbine Technology Overview prepared by Global Energy Concepts (www.powernaturally.org) points to two base construction techniques that are commonly used, an inverted "T" design and "the patented concrete cylinder design." Dimensions of these two forms of bases were not given. The cylindrical design does use anchor bolts that run the entire length of the cylinder. Another article indicates the amount of cement in the base as more than 450 cu. yards. (*Construction starts on Thub's farm*, Amy Payne, Saginaw Bay Watershed Watch, July 16, 2008) The type of soil is not given in the article. http://blog.mlive.com/watershedwatch/2008/07/construction_starts_on_thumbs.html The number given in the first paragraph (196 cu yds) does not agree with that in this article. Perhaps it is because the mountain construction was anchored in the bedrock and did not need as much cement.

Another construction company which builds the foundations for wind turbines, Advanced Development Systems, Inc. states that there are three techniques for wind turbine foundations. The list them as:

1. Tube-Style (P&H) Foundation which involves drilling a 40 ft deep hole 18-20ft in diameter, inserting concentric steel tubes into which bedrock anchors and steel reinforcing are installed, communications and electrical lines are brought in, the space between the two cylinders is filled with concrete, the center of the tube is backfilled, and a concrete cap is placed on top.
2. Gravity Foundation is shaped like an "upside-down mushroom" which keeps the turbine upright through sheer weight and leverage.

3. Rock-Anchored Foundation used when the turbine is to be set on solid, non-fracturing rock involves drilling a series of anchors into the base stone and then tied to a foundation cap on the surface. (http://advanceddevelopmentsite.com/structural-engineering.php)

A proposal for construction of a wind farm in New Zealand (*Mount Stuart Wind Farm Proposal* by NZ Windfarms Limited, October 2008) indicates that the worst case removal of earth in the project including access roads, crane pads, gravity pad turbine foundations and "miscellaneous operations" would be approximately 530 m^3 (690 $yards^3$) per turbine (600kW) and would be spread evenly around the site and re-grassed. No definitions were given for the two possible foundations, the gravity pad and the augured pile.

The town must assure that the wind farm developer presents detailed plans of all aspects of the construction of the wind farm. This would include but not be limited to: type of foundation to be used at each turbine, the amount of earth removed for each turbine, what will be done with the removed earth, details of erosion prevention and scheduled inspections, detailed study by an independent contractor involving the type of rock to be used as an anchor and its suitability over the long term especially related to fracturing and other bedrock related weaknesses if the rock-anchoring technique is used, details related to how much of the original vegetation and types will be removed, what will be done with removed vegetation and what will replace it.

AQUIFERS

The Helderberg Escarpment region is known to be karst terrain. "Karst or karst terrain refers to a type of topography formed in limestone, dolomite, or gypsum by dissolution of these rocks by rain and underground water, and is characterized by closed depressions or sinkholes, and underground drainage." (Water Fact Sheet, U.S. Geological Survey, Department of the Interior, Hydrologic Hazards in Karst Terrain) In karst areas, soils are generally thin, and surface water easily flows via sinkholes or rock crevasses into underground rock conduits and caves, which allow groundwater to flow quickly and unimpeded by soils. As a result, the water does not have the benefit of being filtered and purified by soil. (*Helderberg Escarpment Planning Guide*: Karst Hydrology http://www.mohawkhudson.org/Library/iii-Exec%20Summary.pdf) "Underground streams flow at velocities commonly between 0.1 and 5 miles per day" and for this reason contaminants may move in a shorter period of time than contaminants in aquifers that are unaffected by karst development. (*Water Fact Sheet*, U.S. Geological Survey, Department of the Interior, Hydrologic Hazards in Karst Terrain) For this reason any forms of chemical spills, such as the spilling of oils or coolants in wind turbines could greatly affect the aquifer of the region.

Oils and fluids used in turbines are substantial. The relatively small 1.5MW wind turbines used in the Kittitas Valley Wind Power Project (1.5MW) included the following fluids: 1)generator cooling system approx. 50gallons of glycol-water mix 2) Hydraulic systems (blades, variable pitch; brake; yaw; and other uses – hydraulic oil approx. 85 gallons 3) gearbox lubrication – lubricating oil approx. 105 gallons (*Kittitas Valley Wind Power Project EFSEC Application* – Jan. 12, 2003) The oil is changed anywhere from every year to once every 5 years. From available information at the Kittitas Valley Project oil is manually lowered to the ground in buckets via a small maintenance crane in the nacelle. (http://www.efsec.wa.gov/kittitaswind/appl/2.3%20Construction%20On%20Site.pdf)

Depending on the outcome of the comprehensive geologic study the developer may have to tap into the aquifer for lightning protection. "To establish adequate lightning protection for wind farms developed on rocky ground where there is no soil mantle, it may be necessary to drill one or more wells into which a current-conducting metal rod is inserted to extend the grounding path to the nearest aquifer. Moreover, the aquifer must be continuous over a large area rather than perched to provide reliable protection. In some western states within the study area, the nearest appropriate aquifer may be thousands of feet below a candidate wind site.

Installation of such grounding wells will increase costs,□not only costs directly related to well installation, but also costs to support the hydrogeologic studies that may be required to identify appropriate aquifers." Properly designed and installed "grounding wells" have no potential to adversely impact groundwater quality. This is found in the document paragraph D.5.6. of Appendix D of the Wind Energy Technology Overview of the *Wind Energy Final Programmatic Environmental Impact Statement* prepared by the U.S. Department of the Interior, Bureau of Land Management (http://windeis.anl.gov/documents/fpeis/maintext/Vol2/appendices/appendix_d/Vol2AppD_1.pdf)

While some areas of the Town of Rensselaerville may have karst terrain because of its proximity to the Helderberg area, the rest of the town has various types of terrain. It is difficult to determine which part of the town has a specific type of soil and terrain. Although a study has been done on the soil in the area (*Soil Survey of Albany County, New York*, published by the National Cooperative Soil Survey, June 1992) For this reason a comprehensive study must be done by an independent contractor chosen by the town and paid by the developer through the town on the geology and hydrogeology of the area, the effects of microseismic vibrations on caves and in general on the aquifer for each tower since there is little published independent study done on these areas.

WILDLIFE IMPACT

For a general idea on how wildlife studies related to the effects of industrial wind turbines are to be conducted see: *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects* Prepared by New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, January 2009.

BIRDS

Studies on bird collisions vary widely on the number of bird fatalities resulting from collisions with wind turbines due to siting and methodology of the studies. The numbers vary from 0 fatalities/turbine/year to almost 4 fatalities/turbine/year (Journal of Wildlife Management, 2007, *Wind Energy Development and Wildlife Conservation:Challenges and Opportunities* by William P. Kuvlesky, Jr, Caesar Kleberg Wildlife Research Institute, TX 78363, USA ;Leonard A. Brennan, Caesar Kleberg Wildlife Research Institute, TX 78363, USA; Michael L. Morrison, Department of Wildlife and Fisheries Sciences, , TX 77843, USA; Kathy K. Boydston, Texas Parks and Wildlife Department, Austin, TX 78744, USA; Bart M. Ballard, Caesar Kleberg Wildlife Research Institute, TX 78363, USA; Fred C. Bryant, Caesar Kleberg Wildlife Research Institute, TX 78363, USA) The same study indicates that the issue of bat fatalities has not been studied to the extent that bird fatalities have. It states that estimates range from 1 bat fatality/turbine/year to 44 fatalities/turbine/year.

BATS

Another consequence of the Helderberg Escarpment region being karst terrain is that the caves are the hibernacula of the several species of bats. Species of bats are known to occur on the Helderberg Escarpment, including the endangered Indiana bat (*Myotis sodalis*), Eastern small-footed bat (*Myotis leibii)*, northern long-eared bat (*Myotis septentrinalis*), little brown bat (*Myotis lucifugus*), Red bat (*Lasiurus borealis*), Hoary bat (*Lasiurus cinereus*), Big brown bat (*Eptesicus fuscus*)and eastern pipistrelle (*Pipistrellus subflavus*). (from *Significant Habitats and Habitat Complexes of the New York Bight Watershed: Helderberg Escarpment Complex #35* http://library.fws.gov/pubs5/web_link/text/heldberg.htm)

Studies of bat fatalities due to wind turbines both in the United States and Europe point to increased fatalities in the late summer and autumn of bat species which roost in tall trees. It is speculated by the authors of these studies that these species seek out the tallest trees and mistake the turbines as tall trees. Bats are not killed so much by contact with blades of turbines (as are birds) but rather are killed by hemorrhaging in the lungs due to more pliable lungs than birds. The rapid change in pressure associated with the wind turbine blades causes the hemorrhaging. (Current Biology Vol 18 No 16 R696 *Barotrauma is a significant cause of bat fatalities at wind turbines* Erin F. Baerwald, Genevieve H. D'Amours, Brandon J. Klug and Robert M.R. Barclay) Tree bats killed by turbines in North America include the hoary bat (*Lasiurus cinereus*), eastern red bat (*Lasiurus borealis*), and silver-haired bat (*Lasionycteris noctivagans*); (Johnson 2005, Kunz et al. 2007, Arnett et al. 2008) (cited in *Mating Behavior as a Possible Cause of Bat Fatalities at Wind Turbines,* Paul M. Cryan, United States Geological Survey, Fort Collins Science Center, Fort Collins, CO 80526, USA) .

Note that the red bat (*Lasiurus borealis*) and the hoary bat (*Lasiurus cinereus*) are found in this area and are tree roosting bats. The big brown bat (*Eptesicus fuscus*) and the little brown bat (*Myotis lucifugus*) roost in trees or man-made objects.The latter also hibernates in caves in the winter. The Indiana bat (*Myotis sodalis*) uses caves for its winter hibernacula with Hailes Cave in Thacher State Park being a prime hibernaculum in this region. The Eastern small-footed bat (*Myotis leibii)* uses buildings, rocky bluffs and tunnels to roost and hibernates in caves in the winter. The Northern long-eared bat (*Myotis septentrinalis*) and the eastern pipistrelle (*Pipistrellus subflavus*) migrate to caves to hibernate in the winter. A vast majority of these bat species have been affected by White Nose Syndrome which has killed thousands of bats. Further stress due to blasting to construct the turbines, ground vibration from the operating turbines (see reference in the Ground Vibration section of this report), and the apparent attraction of certain species to the turbines can cause significant harm to the bat population in the area.

"The New York State Natural Heritage Program, in conjunction with The Nature Conservancy, recognizes the Hailes Cave site within the Helderberg Escarpment habitat complex as a "Priority Site for Biodiversity" with a rank of B3 (high biodiversity significance). Hailes Cave has a large hibernaculum with over 27,000 bats in 1994."
(Southern New England - New York Bight Coastal Ecosystems Program. "Significant habitats and habitat complexes of the New York bight watershed". US Fish and Wildlife Service. http://library.fws.gov/pubs5/web_link/text/heldberg.htm) There is no study for the Rensselaerville area done by the U.S. Fish and Wildlife Service comparable to that done for the Helderberg area because the Helderberg is considered a biodiverse area.

The Huyck Preserve in Rensselaerville lists four species documented there, the little brown bat, big brown bat, red bat and Keene's Myotis. All four of these bats to some extent roost in trees or man made objects and hibernate in caves in the winter. However, the area overlaps the range of the Indiana bat, Eastern pipistrelle, silver-haired bat and hoary bat of the Helderberg Escarpment so that it would not be surprising to find them in the Rensselaerville area.

OTHER ANIMALS

There also does not seem to be a consensus on how the wind turbine noise affects animals other than birds and bats. From the dearth of available reliable information on line few scientific studies have been done. Much is anecdotal. A Department of Energy report states they expect no change in deer and other game animals (Department of Energy *Record of Decision for the Electrical Interconnection of the Arlington CEP Wind Project, January 2005* http://www.bpa.gov/corporate/pubs/rods/2005/EFW/Arlington-Wind-Interconnection-ROD-1-14-05.pdf) for a proposed project in Oregon. A report done for the U.S. military (*Effects of military noise on wildlife: a literature review*, Ronald P. Larkin, Center for Wildlife Ecology, Illinois

Natural History Survey, 607 E. Peabody Drive, Champaign, Illinois, USA 61820) indicates that different species react differently to low frequency noise. Although the review examined low frequencies produced by helicopters and heavy equipment, the general conclusion is the same, that is, one would need to study the specific animal with the specific noise source. AWEA (American Wind Energy Association) says that "Wind is one of the healthiest energy options, and the most compatible with animals and humans. Wind has some minor wildlife impacts (breaking up uninterrupted forest or grassland habitat at some locations, avian and bat collisions, noise disturbance during construction), but they are small compared to other electric generation choices." http://www.awea.org/pubs/factsheets/050629_Wind_Wildlife_FAQ.pdf

The Wyoming Game and Fish Commission in a 2009 study states that the same amount of study into the effects on wildlife, including large game animals, should be done for wind turbines as has had to be done on other sources of energy, such as oil and gas pipelines, strip mining, etc. (page 7, *Recommendations for Wind Energy Development in Crucial and Important Wildlife Habitat, October 2009 (10/26/09) Draft.*)
http://gf.state.wy.us/downloads/pdf/Finalpublicwindenergyrecommendationsdraft10.pdf

EFFECTS ON LOCAL ROADS AND INFRASTRUCTURE

Transportation of the various components of the wind turbine to the tower is done by truck. In some cases the roads may have to be widened and curves straightened. Studies must be done to assure that the roads are capable of supporting the vehicles. The weights of the components depends on the size of the wind turbine erected. For the sake of getting a sense of the weights being transported the following information about a Vestas 2MW wind turbine is given: Blade approx. 7 tons, nacelle approx. 76 tons, hub approx. 20 tons, 80meter tall tower (which is shipped in sections) approx. 170 tons. (*V80-2.0MW* brochure, Vestas)

Another consideration is the crane which needs a special level area next to the tower to raise the sections of the tower individually and the blade/hub assembly. From a proposal (*Mount Stuart Wind Farm Proposal* by NZ Windfarms Limited, October 2008) each turbine would need a "lay-down" area (a large flat area for assembly of the turbine components and the main erection crane) of about 18m x 15m (59ft x 49ft) or about 270 m^2 (2900 ft^2)

As can be seen, the weights of each of the components is substantial. The town roads should be able to safely carry a 20 ton load during the dry months of June, July and August. (Gary Zeh, Highway Superintendent, Town of Rensselaerville) County roads should be able to handle greater loads. The town would have to assure that a bond is posted before construction and would have to be valid should developers/owners of the wind farm change.

Some important considerations for the town to require of the wind farm developer: an estimate of how many two way trips trucks would have to make and their approximate weight; a bond for the repair of roads after a certain period determined by the town and developer to assure that deep road cracks which may surface after a few months will be repaired; how many and which roads will be used and what modifications, such as widening, will have to be made to them by the developer; what form of protection will be in place for the people whose property will be affected if road widening is necessary; what methods will be used to control dust from dirt roads used during the construction phase; what type of trucks, weight per axle, frequency etc, will be using the roads after construction for the maintenance of the turbines. This is not a complete list but the town will have to recognize that some of the problems in the local roads and infrastructure will not be obvious at first and the town and citizens must be protected.

FIRE FIGHTING

In their on-line brochure, Firetrace, a company which sells automatic fire suppression systems, the following is found: "Wind turbines manufactured today incorporate the highest quality and safety standards, but the potential for a fire always exists when electronics, flammable oils and hydraulic fluids exist in the same enclosure. Electrical fires can also result from both shorts in equipment and surges due to lightning strikes. Additionally, secondary wind-driven brush fires originating from wind turbine fires can result in significant additional damage." http://www.firetrace.com/windturbines.html

Another manufacturer of fire suppression systems also says "It is very difficult to protect wind turbines against fire, since they are difficult to reach due to their height and remote location, and often the fire brigade has to stay on the ground to secure the area." http://www.tycoemea.com/english/pdf/datasht/fire/psf165tfis.pdf The *Emergency Management Guidelines for Wind Farms* written by the Country Fire Authority (CFA) in Victoria, Australia also points to the difficulty of fighting wind turbine fires. It points out the need for water sources nearby and a close watch to ensure that vegetation does not grow beyond a specified height. It specifies road widths and construction to ensure that fire fighting equipment is able to get to the scene. http://www.cfa.vic.gov.au/documents/CFA_Guidelines_For_Wind_Farms.pdf

The European fire suppression company, Minimax, states in a brochure that "Until recently, manufacturers, operators and firefighters were unable to reduce the risk of damage by fire."
http://www.pefipresa.com/pdf/catalogos_comerciales/Folleto%20Aerogeneradores%20MINIMAX.pdf

From this it is inferred that industrial wind turbines do not as a rule contain fire suppression systems however Vestas offers it as an option on their 3MW turbine. (http://www.vestas.com/en/wind-power-solutions/wind-turbines/2.0-mw.aspx)
No other reference was made to fire protection in GE or other Vestas brochures that could be found.

LIGHTNING PROTECTION

Industrial wind turbines are very susceptible to lightning strikes because of their height above the surrounding environment. In addition to this they are sometimes placed on higher terrain which adds to possibility of a lightning strike. A 1995 German study estimated that 80% of wind turbine insurance claims were caused by lightning strikes. (*Lightning Hazard Reduction at Wind Farms*, Richard Kithil, National Lightning Safety Institute http://www.lightningsafety.com/nlsi_lhm/wind1.html) (Manufacturers are aware of this and recognize the need to protect the turbines from lightning strike damage. Generally the rotor, stator, hub, nacelle, control cabinets, data lines, and other control circuitry such as that controlling the direction of the turbine are protected by various types of protection circuitry. (*Lightning and Overvoltage protection Wind Turbines*, ABB Lightning Protection Group, France) Blades of the turbine are generally designed to conduct lightning to some type of grounding circuit.

As indicated in the section above on the "Aquifer" a method used to conduct the lightning safely to earth (this is called "grounding") in certain situations involves a "grounding well" in which a conductor is inserted into the aquifer. Other methods, again depending on the soil include, but are not limited to grids of conductors or rebars buried in the ground at depths necessary to assure connection to moist earth; concentric rings of conductors again buried at the appropriate depth to assure good ground contact.

The National Renewable Energy Laboratory (NREL) paper strongly recommends that the purchaser of the industrial turbine demand that the manufacturer conform to Class 1 of IEC (International Electrotechnical Commission) 61024 (*Wind Turbine Lightning Protection Project*, 1999-2001, Brian McNiff, for the NREL http://www.nrel.gov/docs/fy02osti/31115.pdf). It is

thought that due to the nature of this topic updates to this document will be frequent, therefore the latest IEC standard on lighting protection for industrial wind turbines should be used as the standard for the Town of Rensselaerville. The complexity of dealing with managing the electromagnetic fields due to lightning strikes would demand that an expert in this area be hired by the Town and that the developer pay the fee.

SOIL IMPACT

According to an article by the "Keepers of the Blue Ridge", anywhere from 2-5 acres of cleared and level space is needed for each industrial wind turbine. This site has before and after aerial photos of the Mountaineer Wind Power Site in Tucker County, West Virginia (http://www.keepersoftheblueridge.com/environmental-impact.html) which dramatically shows the amount of land that had to be cleared for the project. Admittedly, if the developer follows good practice and restores as much land as practical to as close to the original conditions as possible, the effect on the land eventually will not be so obvious, however the ridge lines as viewed from the ground would be forever changed.

It is for this reason that the town must demand a detailed plan of construction including the plan for site restoration as mentioned in the above section on "Construction Techniques".

EROSION

Due to the large areas of vegetation which are disturbed and removed in the construction of an industrial wind turbine installation and the time needed for nature to renew the area, the developer must present to the town a detailed plan for restoring vegetation and how erosion will be prevented or minimized during the time needed for various grasses and native vegetation to grow. This requirement would be similar to that found in the *Union County Oregon Wind Facility Permitting*, http://www.oregon.gov/ENERGY/RENEW/Wind/Permitting-UnionCountyOregon.shtml. Also, the impact of heavy equipment on potential breakdown of local road sub-surface (even if roads are remediated by developer) could have an impact on soil structures adjacent those roadways and be an additional cause of erosion.

BLASTING

Leveling out the industrial wind turbine site may involve considerable blasting depending on the nature of the terrain, especially if the bedrock is a few feet below the soil level. The terrain in the Town of Rensselaerville varies and there would be a need for a geotechnical review of the proposed sites by a professional chosen by the town and paid for by the developer. (Hounsfield Wind Farm Blasting Plan, American Consulting Professionals of New York, prepared for Upstate NY Power Corp., http://www.dec.ny.gov/docs/permits_ej_operations_pdf/hnsfldappendixa.pdf) The effects of any necessary blasting within the town's boundaries would also have to consider the effects on any caves, etc. as mentioned in the above sections on the "Aquifer" and "Wildlife Impact – Bats". Any blasting would also need to account for potential damage to housing and other foundations that could be potentially affected by blasting, and a plan for the developer to pay for the remediation costs of any damage to such structures must be in place.

MEDEVAC HELICOPTERS & EMERGENCY RESCUE SAFETY ISSUES

Helicopters along with other aircraft, do not belong near, within, or just above a commercial wind installation. The critical issue: The high winds and turbulence produced by Industrial Wind

Turbines create a high level of risk to rescue helicopters. The additional danger of entanglement due to lack of judgment, darkness, mechanical problems, or pilot error present additional risk with close proximity flights of any kind.

The need however, for an emergency or EMS aircraft to extract injured people from the scene of an accident, especially in remote or rural areas, in order to transport them to prompt emergency care is very persuasive. Even short amounts of time lost/saved in the rescue process and subsequent transport is critical in order for lives be given the best chance of being saved. What can be considered in the quest to save lives and maintain safety standards for EMS workers and clients?

One possible solution is to apply brakes to bring turbine blades to a stand-still and to shut-down any electric current on the ground or above, so the aircraft could enter the area, however, with wind currents and turbulence from the turbines eliminated, the other risks still are present.(Would trained personnel be available at the time to do this?) Another possible solution might be to make the site easily accessible to slower EMS ground vehicles to quickly move victims to a safe landing and airlift zone.

Notes:

(1) Some local area (Wisconsin) EMS regulations, governing fire department and other rescue operations, require that a recue site determined to be at a wind farm, must have the fire department determine a safe Landing Zone (LZ) before a helicopter may land. This may require the victim(s) being transported by other means to the LZ prior to boarding and lift-out to the hospital. This costs precious time, just the reason EMS agencies exist in the first place. But danger to aircraft and people involved is too severe to not observe this safety precaution. [report by representative of Eagle III, an EMS company that uses a variety of equipment including helicopters, especially in rural locations.] http://www.eagle3.org/

(2) FAA requires nighttime location lights on wind towers, generally on the perimeter of the installation, not in the interior area. So, nighttime pilots and EMS workers, approaching a wind installation, often fly above a dark void only to land at the side, perhaps far from the emergency site. Then they must wait for some while before other vehicles, traveling roads and at much slower ground speed, can rescue and deliver clients to the aircraft.

Additionally, turbulence can cause either or both rotors of a helicopter to malfunction in controlling flight stability, altitude or flight path of the aircraft, and, if severe enough can cause failure of the craft to maintain balance and crash. This would be doubly unfortunate following an actual recue.

There is also the reality that aircraft, even helicopters, require maneuvering room to take off properly (direction influenced by wind direction) and to turn to gain the proper heading tor the desired course. This "room" is measured in terms of ¼- ½ mile minimum, depending on take-off angle and wind speed. Other factors have to do with weather conditions, visibility, ceiling for flight and proscribed safe distances from objects on the ground. An example of safety factors versus reality is given as requiring flight 500' above a ground object as fair clearance. If the wind tower is already 400' high and the turbine blades are 200' or more in diameter, the flight elevation should be 500' + 500' or 1000' minimum for that example. If clouds are low and visibility is less than ½ mile, the margin of forgiveness for error is difficult to deal with safely. [See "H is for HELP!", a transcript of an interview with a retired EMS helicopter pilot. 12/27/08]

http://betterplan.squarespace.com/todays-special/2008/12/24/122708-h-is-for-help-what-did-the-ems-helicopter-pilot-say-a.html

Aerial crop spray applicators (crop dusters) have enormous difficulty coping with wind installations. A typical installation places 2.5 turbines per square mile. A usual area consumed by an active plane spraying fields is about 3 square miles of maneuvering room to account for change of direction and distance between swaths to be sprayed. This amounts to about 7 turbines in the work area. The turbines generate enormous amounts of wake turbulence, affecting any aircraft crossing the wake, and because of their great size, the towers and blades are a huge distraction to the pilot engaged in so many factors for his attention while flying and spraying.
[see "No Fly Zone" of 3/14/09 by an experienced aerial crop sprayer.]
http://betterplan.squarespace.com/todays-special/2009/3/14/31409-no-fly-zone-why-small-airplanes-emergency-medical-heli.html

Some EMS providers have given notice of refusing to enter an installation area and propose strategic safe LZ areas to affect receival of emergency clients for transport.
http://www.betterplan.squarespace.com

(3) In some areas of the country, some communities have experienced problems with an EMS helicopter not being able to land at an emergency site, compromising the time factor critical to effective rescue/treatment. Some communities (especially agricultural) are concerned about problems associated with crop-dusting aircraft which use a lot of space to fly their circuits accurately and safely. Many are concerned about problems getting airborne EMS providers to such wind sites, especially at night. [see survey and report conducted by the Informed Farmers Coalition, published by the Illinois Wind Energy Association in article "Bureau-Lee Co. Anti-wind . . . 17 May'10] www.windforillinois.org

HEALTH, ENVIRONMENTAL, AND SAFETY CONSIDERATIONS
AREAS NOT COVERED – For Future Consideration

Due to time constraints our committee did not address the following areas. We recommend that any future discussion of Industrial Wind Turbines consider these issues in addition to those we have already presented:

- FAA Requirements
- Turbine Failure and Impacts
- Effect upon Doppler Radar, Weather Forecasting, Radio, TV, Telephone, Microwave and Satellite Transmission.
- Access/Security
- Transmission Lines – Above ground and below ground
- Sub-Stations
- Gas Lines – "Dig Safely New York"
- Electrical Safety, Induced Ground Voltages, and Extraneous Electrical Effects

Property Values

Overview:
The question of whether property values are affected by the presence of Commercial Wind Turbine installations is another area of contention. Various studies and anecdotal reports reach diametrically different conclusions. We believe that property values would be negatively affected based upon our research and the studies below.

Some of the forces that might play into this equation:

Forces that could indicate an increase in property values	Forces that could indicate A decrease in property values
• Developer payments could increase net inflow to town income & lower taxes.	• Town, or parts of town, become perceived as an industrial zone.
• Lower taxes could reduce the overall annual cost of owning a home with a possible increase in property values.	• Loss of view shed.
• Individual property owners could increase their own property values because their property now comes with an annuity in terms of wind developer lease payments.	• Loss of rural character
	• Increased road traffic for heavy equipment maintenance.
	• Increased expenses yielding higher taxes as a result of possible deferred, hidden, or indirect costs to town. Examples: Developer and/or town initiate a lawsuit against each other.

What does common sense indicate?
People normally don't want to live in an industrial zone and wind turbines are essentially industrial installations usually placed on farmland.

It could be argued, that Industrial Wind Turbines, turn a farming zone into an industrial one. The issue is not only the presence of the turbines but their ongoing noise levels, increased heavy vehicle traffic - likely constant during the construction phase – and thereafter at various times during the ongoing maintenance of these machines.

Does it make any sense that houses in the area of a large scale wind site would be more desirable than those in an area which maintained its rural atmosphere. There are enough anecdotal stories from many sources that talk to the radical change due to these installations.

Study	Comments
Forward Wind Project Dodge County, WI 5/31/05 Client: Horicon Marsh System Advocates. Report writer: Metropolitan Appraisal's Kevin Zarem MAI, WCGA (Wisconsin Certified General Appraiser) Intended users: Client and PSC	Strengths of study: • Intended to comply with Uniform Standards of Professional Appraisal Practice, Standards 4 and 5. • Included large data set information of Transmission Line (not Industrial Wind Turbine) impacts on residential property values. • Appraiser reaches conclusion that "generalizations must rely on the weight of evidence from numerous studies, samples, and locations". Weaknesses of study: • Only view loss analyzed. No consideration of wind turbine noise, shadow flicker/strobing, road traffic, and community impact included in analysis. • This is a forward looking study for a proposed project, not one that yields statistically significant data based upon actual arms-length sales. (Note: a situation in which a wind developer is buying a property affected by turbines can not reasonably be considered an arms length sale.) • No property owner interviews or field studies.. • Paired analysis compares transmission lines to wind turbines for view loss impacts. Different heights, different impacts. Also, key negative impacts could arguably be said to include noise, shadow flicker, etc. not, viewshed alone. The negative health effects of wind turbines could arguably have a much greater impact upon property values than viewshed. One can choose not to look at a turbine (if this is an annoyance factor) but tuning out the variety of sounds is a very different matter. • Size of study too small to draw statistically significant conclusions. Note: Lit review in Appraisal Institutes WSC Conclusions: • To analyze property value impact based solely upon the single variable of viewshed calls this study into serious question. Especially given the direct and reported feedback on residents due to noise, shadow flicker, etc. • The fact that the appraiser had to interpolate from other datasets indicates that, for this study at least, he could not find relevant information as of the 2005 study date. • Conclusion reached by study that "*generally* suggest little or no impact on residential property values due to proximity to transmission lines" is not even based upon view impact but proximity of transmission lines to residential structures. A transmission line 1,000' from a residential structure would likely have far less impact than an Industrial Wind Turbine at the same distance.
REPP (Renewable Energy Policy Project) Report May 2003 www.repp.org Report: http://www.repp.org/articles/static/1/binaries/wind_online_final.pdf	Strengths of Study: • Likely a science based organization, not a proxy organization for industry interests. • Weaknesses of Study: • Criticized in Dodge County WI report as flawed because it includes 70% of related party transactions: o "As highlighted in the PSC Report, the REPP Report fails to properly screen data leading to critical flaws..... According to PSC Report, 70% of the data used in the REPP Report was found to be related party transactions and is therefore, in my opinion, not representative of market value; and 72% of data used in the REPP /Report does not have acutual views of wind turbines, the effect being tested for." • Place holderhao[guohrtg[hufhioghiojgg

	Possible Concerns: • REPP's Board of Directors includes Executive Director of American Wind Energy Association (AWEA). Does this indicate a bias towards wind development no matter what the concerns? However, based upon range of Board members, could well be a science-based organization.
Wind Turbine Impact Study Dodge & Fond Du Lac Counties, Wisconsin 9/9/2009 Preliminary Draft by Kurt Kielisch, Appraisal Group One	Sponsored by Calumet Count y Citizens for Responsible Energy (CCCRE) Calumet County Wisconsin. Three parts to study: 1. Literature Study 2. Opinion Survey 3. Sales Studies Possible Concerns: • What impact does being part of a sub-division have on property value vs. being "rural" property? If one strips out the sub-division sales and takes into account that larger lot sizes will sell for less per acre in general, the disparity between being within the "wind turbine influence" area and outside of it might not be that large. Looking at price per acre .

Notes on REPP Property Value Study:

http://rma.repp.org/articles/static/1/binaries/wind_online_final.pdf
81 page report.

Potential Flaws:

- Five-mile radius. Major difference between a much smaller radius (within 0.5 mile, within 1 mile, within 2 miles, etc) and a global five miles.
- Is the potential error introduced in the analysis of property values on a case by case basis greater than the property values. What overall percentage of sale price does this represent? Is it statistically significant? If a house is selling for in the $200,000 range a price change of sixty-dollars per month becomes virtually insignificant.
- Are these all "arms-length" transactions. We would like to suggest that the purchase of a property by a wind developer is not an arms-length transaction.
- Are there houses within 1,200' to a mile or more that could not sell because of their proximity to large-scale wind turbines, and therefore never made it into the study?

Pilot Payments

New York State's Real Property Tax Law - NY CLS RPTL ß 487 (2010):
Pilot Payments vs. the right of a Town to assess based upon value of the Wind Energy System:

Real Property Tax Law (NY RPTL 487 Section 2) States that a Wind Energy System, *by default*, will be exempt from taxation for fifteen years provided that:

- It meets the definitions and guidelines for eligibility for exemption provided by the president of NYSERDA (New York State Energy Research Development Authority. (Sections 3 & 4)
- Property owner completes necessary application and files with local tax assessor as well as files a copy with the Authority. (Section 6)

Town Authority when RPTL 487 is in effect:

- Town has the authority to require that property owner enter a PILOT (Payment in Lieu of Taxes) contract. (Section 9)

Notes:

- This law sunsets on December 31st 2010. (Section 5)
- The Town can elect to override the NYSERDA's authority provided in this law and replace it with their own local law. (Section 8)
- If RPTL 487 is in effect, Town has authority to require property owner to enter a contract to make PILOT payments (Payments in Lieu of Taxes). *Note that the liability for PILOT payments rests with the property owner, not the developer.*
- Exemption under RPTL 487 can only operate for 15 years (Section 9b). What happens at the end of 15 years?
- We strongly recommend that any payment agreements with an outside Industrial Wind Developer be keyed to the full term of their contracts with landowners. Also, that this full agreement be negotiated as a condition of Town's approval of industrial wind development. For example, Shell Oil/Shell Energy Services/Cinco agreement gave it the rights to extend original option for up to 67 years from time of signing.
- Agreement between Town and developer should be constructed to survive:
  - Transfers of corporate ownership
  - Shedding of corporate assets (usually set up as an LLC) so that Town has ability to go after assets of parent corporation if Wind Developer LLC defaults on its obligations.
- Ensuring that an Industrial Wind Developer is held accountable for payments to the town could be a problematic issue. The Industrial Wind Developer receives the profits, the Double Declining Depreciation, Production Tax Credits, and other state and local incentives. The landowner receives income – usually either a fixed annual payment (approximately $6,000 or $7,000 per turbine) or some combination of an annual fixed payment and a small percentage of gross energy production.
- NYSERDA funding and tax incentives and benefits from Industrial Wind Production The actual party liable under normal taxing jurisdiction is the property owner, not the developer, as the improvements reside on the property owner's land.
- contracts are for longer periods. Shell Oil's contract through their Cinco subsidiary gave them a 67-year period of control from date of signing.
- Opinion: Unless a town can levy taxes on the actual value of the turbines they are at a disadvantage. Section 9a states that PILOT payments are not to exceed the amount that would be due under taxes and the amount would effectively be negotiated with the wind developer, not the property owner.
- Once the fifteen year period is over, if the town decides to tax the wind turbines at their full value there are several potential significant problems:
  - The developer will likely walk away as the tax benefits would have been largely extracted in the first five years (at least the double declining depreciation portion).
  - Large scale wind turbines supposedly have a 20 year lifespan, so why would developer maintain their ownership with the scenario of a huge increase in operating costs (through taxation at full value), likely heavily increased maintenance costs, and a significant decrease in tax credits?
  - If developer does walk away, the town would be left in the position of negotiating a contract with the ISO (Independent Systems Operator) who controls the grid. There is no precedent in NY State, no guarantee that would happen, and likely no requirement on the ISO to do so. That would

leave the town with turbines and no agreement to generate income from them.

- Given that US Tax code provides Double Declining Depreciation over a five-year period, the developer can validly claim that the turbines are worth a fraction of their replacement cost, thus making the town's case for full initial value taxation invalid.

Recommendations:

- Pass a town law to provide that no exemption under RPTL 487 be provided for Industrial Wind Turbines and that these energy systems be taxed at their full capital value.
- However, pass a separate town law that allows a 15-year tax exemption on the improvement value of Non-Commercial wind turbines and other renewable energy devices.

Issue:

- If needed in future, check on Wind Developer's litigation in this matter. Also, outcomes of cases involving Cell Towers in NY State. While a different technology and a different kind of equipment, might be cited as part of a legal challenge to town's authority to tax.

Additional Notes

Our committee has not researched the issue of local employment in any depth. However if the town is considering the installation of an Industrial Wind Power facility on the basis of local job creation the following information might be useful.

The Town Supervisor of the Town of Fenner has stated in an interview that maintenance is always going on. There are three full time employees and sometimes 6 - 8 crew working. Because Russell is proactive they hire locally. That would place the full time employee to turbine ratio at one full time worker for every seven turbines. At peak maintenance times with eight employees that ratio would drop to one crew member for every 2.5 turbines. Anecdotally

One of the two initial developers of theTug Hill facility has stated that he was informed that "all 45 full time operations people were from Tug Hill!" This number would need to be independently verified to ensure that people on the payroll are actually working full time and not landowners receiving payments for the turbines on their properties, nor adjacent neighbors receiving payments for lease easements.

While employment after the intense startup construction phase would likely provide some local jobs, the benefit of those jobs would be strongly outweighed by the other negatives in regard to the town's Comprehensive Plan. In addition, Flat Rock Wind Power, the operator of the Tug Hill facility lost its certification for Empire Zone Funding status and the related tax benefits. While this Empire Zone status was later reinstated, in the interim, the developer withheld $6.7 million dollars (placing those funds into an escrow account). Significant to this discussion is the original reason for decertification under the Empire Zone Status: *"Flat Rock was decertified because of its designation as a "shirt-changer," defined as a company reincorporated as a different entity that claimed it created jobs when it actually just transferred employees from one entity to the other."*
(See http://www.watertowndailytimes.com/article/20100103/NEWS04/301039975)

The key point is that Industrial Wind Developer's claims of job creation needs to be closely scrutinized to ensure that a community will obtain the local job creation benefits claimed.

Law & Policy Matters, Developer Agreements, & Related Considerations

Recommended Contract Elements with Developers

While some of the recommendations in this section are related to contracts between Industrial Wind Developers and landowners, we believe it is important to present some of the possible pitfalls that we have seen in these contracts.

Disallow confidentiality agreements in Developer Contracts with both the town and landowners as a general principle. Only permit limited confidentiality in contracts if it applies to specific trade secrets or methods of operation or patent processes unique to that developer. While the town has no authority to dictate contract terms between a developer and an individual property owner, they can require non-confidentiality between developer and property owner as a condition of the Town's entering an agreement with a developer. One reason is that developer/landowner contract elements might be at odds with zoning law or the town's Comprehensive Plan. Also, if there are future problems, landowners need to retain their rights of free speech related to the issues that arise.

Bonding Issues on Decommissioning

- Key Recommendation: The developer, not the town, should bear all the liability and financial risk of decommissioning. The following recommendations are presented to achieve that end.

Elements to be included in bonding agreement:

- There are several key issues in dismantling a project:
    1. Cost of dismantling, separating components, transportation of scrap components, and scrap prices available at time to dismantling.
    2. Cost of land reclamation. Committee recommendation is to set a standard of four feet below ground surface and to specify what remediation is to be done.
    3. Wear and tear on roads from moving all this heavy equipment. Should be handled in a separate road agreement.
- Have separate expert selected by town and paid for by developer determine bonding value.
- Bond fund should not be part of developer's assets.
- Bond or surety should be held by an independent third party representing the Town or a County Commission.
- To protect Town, scrap value determining bonding should be at a fully discounted scrap value rate. The bond amount should be structured to shift the scrap value and decommissioning cost risk *away* from the community and directly onto the bonding company and developer. The bonding company will set its rates based upon its own internal risk analysis of scrap markets and costs. If the company agrees with developer cost of removal and scrap estimates, the developer should be able to obtain a very low bond rate.

Following are many elements that will affect the scrap value of a decommissioned turbine. In each case the developer, not the Town should bear the burden:

- Scrap market is volatile. Therefore scrap value very variable. Also scrap value varies based upon location (a function of transportation costs), purity, size and condition.
- Net value of scrap value needs to take into account:
  - Dismantling, separation of parts and elements into smaller parts. Size of scrap is one element in determining market value.
  - Purity or quality of final products for scrap sale.
  - Transportation costs to scrap yards.
- Bond amount for project dismantling costs should be adjusted annually based on a suitable index such as the "RS Means Heavy Construction Cost Data".
- Decommissioning to include removal of underground electrical transmission wire.
- Bonds for decommissioning to be purchased only from a highly rated insured/certified bonding firm. This issue is more important now during the volatility in the financial markets. Consider only a AA or AAA firm. The developer can make its case to the bonding company, not the town. If bonding company agrees, the cost of bonding to the developer will be less.

Question:
Would NY State take on the role of either guarantor or enforcer of the Bond?

Separate the decision about how much it will cost to decommission a wind development from the developer's liability for doing so. These decommissioning costs should be determined by a separate bonding company and not the developer, or through one of their auxiliary insurance companies (if they exist). The developer can then negotiate with the bonding company. If there is a problem the issue will be between the bonding company and the developer, not the community and the developer.

As we noted in the introduction to this document, it is the developer who "harvests" large financial rewards. It should be the developer who bears the costs and downsides of all uncertainties, not the Town.

Resources:

- *Beech Ridge Decommissioning Cost Review*, October 7, 2008 by Energy Venture Analysis, Inc.
- Multiple additional resources available in Excel Document

Compliance with New York State Attorney General's Code of Conduct

The NY State Attorney General's Wind Industry Ethics Code

The background and rationale for establishing a Wind Industry Ethics Code (also called a "Code of Conduct") is best explained in this news release from the NY State Attorney General's Media Center:
http://www.ag.ny.gov/media_center/2009/july/july29a_09.html

> "The Wind Industry Ethics Code is a direct result of the Attorney General's ongoing investigation into, among other things, whether companies developing wind farms improperly sought land-use agreements with citizens and public officials, and whether

improper benefits were given to public officials to influence their official actions relating to wind farm development."

Simply stated, the NY State Attorney General's Office received enough substantial complaints that they responded by creating this code. The initial announcement was made October 30th, 2008. Noble Environmental Power and First Wind were the first companies to sign on to the agreement:
http://www.ag.ny.gov/media_center/2008/oct/oct30a_08.html

Copies of the document signed by both wind companies can be downloaded here:
http://www.ag.ny.gov/bureaus/public_integrity/legal_documents.html
The document signed by Noble is directly accessible here:
http://www.ag.ny.gov/media_center/2008/oct/Code%20Signed%20by%20Noble%20and%20AG.pdf

Overview of Code of Conduct:
A July 29, 2009 announcement gives an overview of the Code:
http://www.ag.ny.gov/media_center/2009/july/july29a_09.html

As of that date sixteen wind power companies had signed the agreement. Among the group signing, together with their subsidiaries, they are responsible for more than 90% of wind power development in New York State.

From that announcement:
The Attorney General's Wind Industry Ethics Code prohibits conflicts of interest between municipal officials and wind companies and establishes public disclosure requirements. The Code:

9. Bans wind companies from hiring municipal employees or their relatives, giving gifts of more than $10 during a one-year period, or providing any other form of compensation that is contingent on any action before a municipal agency
10. Prevents wind companies from soliciting, using, or knowingly receiving confidential information acquired by a municipal officer in the course of his or her official duties
11. Requires wind companies to establish and maintain a public Web site to disclose the names of all municipal officers or their relatives who have a financial stake in wind farm development
12. Requires wind companies to submit in writing to the municipal clerk for public inspection, and to publish in the local newspaper, the nature and scope of the municipal officer's financial interest
13. Mandates that all wind easements and leases be in writing and filed with the County Clerk
14. Dictates that within sixty days of signing the Wind Industry Ethics Code, companies must conduct a seminar for employees about identifying and preventing conflicts of interest when working with municipal employees

The Attorney General's Task Force monitors the wind companies to ensure they are in compliance with the Ethics Code and receives complaints regarding the industry.

Wind Power Committee observations on the Code of Conduct:

- This is code is a definite positive step forward towards preventing abuses by Wind Developers, their subsidiaries, and by local officials who might find themselves in a *conflict of interest* situation. Local officials must recuse themselves from official duties related to Wind Developer's business.
- Wind Developer is required to file an abstract or memorandum of all Leases and

Easements. While this is not the complete document, there is adequate detail required: Filing must specify essential terms including:

- Names & addresses of parties to transaction.
- Full property description.
- Rights conveyed.
- Wind Developer's estimate of financial monetary compensation to landowner.
- Also, importantly, if owner is Municipal Officer or a relative of one.

Other points:

• Wind developers must train their employees to follow the Code of Conduct.

• Office of NY State Attorney General establishes a "Task Force to provide oversight of Wind Farm Development and monitor compliance with this Code." For three years after signing Code of Conduct, Wind Company contributes a proportional share of the reasonable administrative costs of the task force.

• If a Municipal Officer or Employee of the town transfers or conveys an interest in real property to a wind developer, the wind developer is required under the code to provide notice telling that town official to discuss their obligations with the municipality's attorney, including the obligation to recuse themselves from certain related matters.

From Attorney General's website:

Any complaints about wind development companies should be sent to the newly created Task Force by e-mailing them to WindTaskForce@ag.ny.gov.

The matter is being handled by Special Deputy Attorney General Ellen Nachtigall Biben, who oversees the Attorney General's Public Integrity Bureau, Deputy Bureau.Others in that bureau include Monica Stamm, Bureau Chief, and Assistant Attorneys General Andrew Heffner and Robert Vawter, as well as Executive Deputy Attorney General for Criminal Justice, Robin L. Baker.

Recommendations:

- Make it a requirement that any wind developer sign the Attorney General's Wind Industry Ethics Code as a prior condition of making any contact with or presentation to the town or any of its officials.
- Once it becomes clear that the Town will be approached by a Wind Developer or a related party for the purpose of installing Industrial-Commercial Wind Turbines within the Town, Town Board should act to ensure that following boards and parties read and understand the Code of Conduct.
  - Town Board
  - Planning Board
  - Zoning Board of Appeals
  - Code Enforcement Officer
  - Landowners approached by the Wind Developer.
- And, any other town officials or employees who will have contact with Wind Developer.
- If it becomes known that a Wind Developer has been approaching landowners to explore the issue, the town should pro-act with the wind developer to both disclose their activity to the Town Board, and to sign the Code of Conduct.

Web of Relationships and Their Impact Upon Town Authority/Autonomy

The purpose of the following chart is to give an indication of the complexity of the system a local town government could encounter in dealing with Industrial Wind Development.

It is important to note that there is no mechanism in New York State law at present that would allow a town to become its own Power Authority, own its own turbines, and sell electrical power back into the grid as Industrial Wind Developers do.

[Insert Powerpoint Chart: *"Web of Interconnections"*]

Miscellaneous Matters

The purpose of this section is to note issues that might not clearly belong in any other category but we felt were worthy of note:

- **No Disclaimer of Summary Recommendation:**
  No statement in this report is intended to imply anything other than our committee's Summary Recommendation: That "Industrial Wind Power installations within the town of Rensselaerville should not be permitted."

- **Freedom to hunt on one's own property:**
  Anecdotal but implied in developer contracts: Property owners have stated that they can not hunt on their property during times that Wind Developer's crews were doing maintenance on Industrial Wind Turbines. While it is fully reasonable for the wind developer's maintenance team or emergency crews to work in a "no hunting zone" the ban on hunting at any time the developer's crews are active is an unintended consequence that most landowners had not anticipated when they signed their leases.

- **Wind Power and Renewable Energy Credits (RECs)**
  A phone conversation with John Maserjian, Corporate Communications/Media Relations, Central Hudson Gas & Electric.

  > Note: This conversation arose out an attempt to determine the overall costs of Industrial Wind Power. One element in the equation is the final price that consumers pay on the back end when they choose to support Renewable Energy by purchasing their electricity through Renewable Energy Sources such as Wind Power.

  The initial question asked of John: "If a consumer chose to have all their energy supplied through Wind Power what would be the additional per KWH cost on their electric bill.

  John's information: Central Hudson does not directly sell Wind Power Energy. What a consumer purchases is *not* wind power produced electricity. They purchase *Renewable Energy Credits (RECs)*. These are actually financial credits that the Wind Power Developer receives when they produce wind power that is sold into the grid. The actual cost to the consumer for making this choice is approximately 1¢ to 2¢ per KWH of electricity consumed by that customer. The amount of the premium paid depends upon a mix of factors including which wind producer is selling the RECs, the marketer (middle man) selling them, and the mix of sources of energy. REC purchases are not specifically for wind power but for an unspecified mix or renewable energy products including wind power, bio-fuels and small hydro. The money paid by the consumer goes directly to the wind installation producing it but through an intermediary source.

  When Industrial Wind producers sell their power into the grid they are separately and concurrently selling to one of three entities:
  1. New York State

2. Marketing Firms, which purchase REC's and resell them for a profit. (Presumably these are financial institutions.) It is these firms which receive the 1¢ to 2¢ per KWH that companies like Central Hudson or National Grid receive from the consumer. They pass these funds directly through to the marketing firm who has purchased the RECs from the Wind Farm.
3. Organizations or individuals can purchase REC's directly. While there is usually no financial benefit to their doing so, they can then satisfy a value-based desire to support Renewable Energy.

The actual additional premium paid by the consumer can not be applied directly or solely to wind power because that's not the way that the mechanism works.

John said that "Central Hudson can not enter into direct contract with Wind Power producers because "their output is so variable we can't get into contract with them."

For a consumer who wants to support Renewable Energy, John's suggestion is that rather than purchasing from an energy supplier who sells Renewable Energy as part of their product mix, that they purchase RECs directly. That way they know the comparative base price of the electric they produce and, separately, how much is being paid for Renewable Energy.

Glossary

Also see definitions under the Health, Environmental and Safety Considerations attached to each sub-section.

- Empire Zone Funding - Empire Zones are geographically defined areas within New York State. Qualifying businesses located within the zone are eligible for Empire Zone program tax benefits.
  http://www.tax.state.ny.us/sbc/empire_zone.htm

- IDA – An acronym for "Industrial Development Agency" which are entities set up in each county of New York State under the authority of the State Legislature. IDA's exist to further industrial activity throughout the state but within the county level structure. Most often when Wind Developers enter agreements with towns it is through an IDA which takes lead agency responsibility and authority. When this happens usually the county receives a significant portion of the wind developer's payments.

- Independent Systems Operator (ISO): Is an organization formed at the direction or recommendation of the Federal Energy Regulatory Commission (FERC). In the areas where an ISO is established, it coordinates, controls and monitors the operation of the electrical pwer system, usually within a single US State, but sometimes encompassing multiple states.
  From: http://en.wikipedia.org/wiki/Independent_System_Operator

- Industrial Wind Power – Any wind power installation of any size, capacity, number of turbines established solely for the sale of that power produced into the electric grid.

- Lead Agency – The agency that takes "title to" (bottom line responsibility and control) of a project. In industrial Wind Power, it's most often the County IDA, but in one unique case of the Town of Fenner, was the lead agency and negotiated its own agreement directly with an Industrial Wind Developer.

- NYSERDA – An acronym for *"New York State Energy Research and Development Authority"*. NYSERDA receives its authority from the New York State Legislature and is funded through fees collected on every NY State electric user's energy bill under the line SBC/RPS which stands for *"Systems Benefit Charge/Renewable Portfolio Standard"*
  http://www.nyserda.org/

- PILOT - Is an acronym for "Payment in Lieu of Taxes". Often referred to as "PILOT Payments". These are payments that Wind Developers and Industrial Facility operators pay to the lead agency instead of (in lieu of) property taxes. The authority for PILOT payments is provided by New York State law, with that authority transferred to the President of NYSERDA.

- RPTL and RPTL Section 487 – RPTL is an acronym for "Real Property Tax Law". RPTL Section 487 first enacted in 1977 and reenacted in 1990, provides a 15 year exemption from increased property values for tax purposes under certain conditions. [See "Pilot Payments" section of this report for a fuller discussion.] http://www.orps.state.ny.us/assessor/manuals/vol4/part1/section4.01/sec487.htm

- SBC/RPS – An acronym for "Systems Benefit Charge/Renewable Power Supply". This charge is added to every residential electric customer's bill in New York State and is more than two percent of the overall electric bill each billing period. These funds are used in various ways by NYSERDA to forward energy programs including providing heating assistance for low income customers, rebates on energy efficient appliances, and funding Industrial Wind Developments.

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Town of Dixmont
Wind Energy Facility Ordinance

Section I - Purpose and Intent

This Ordinance is adopted pursuant to 30-A M.R.S.A. § 3001, to protect the health, safety, and welfare of the Town of Dixmont and its residents. This Ordinance shall be known as the "Dixmont Wind Energy Facility Ordinance."

Section II - Applicability; Site Permit and Operational License Required

(a) This Ordinance applies to all Wind Energy Facilities proposed to be constructed or operated after the effective date of the Ordinance, except that this Ordinance does not apply to stand-alone Wind Turbines constructed primarily for on-site residential or farm use.

(b) Wind Energy Facilities constructed prior to the effective date of this Ordinance shall not be required to meet the Site Permit requirements of this Ordinance, except that any modification to an existing Wind Energy Facility that materially alters the size, type or number of Wind Turbines or other equipment shall require a Site Permit under this Ordinance.

(c) Wind Energy Facilities constructed prior to the effective date of this Ordinance shall be required to obtain Operational Licenses pursuant to this Ordinance within thirty (30) days of its effective date,

(d) It shall be unlawful and a violation of this Ordinance to begin construction and/or operation of a Wind Energy Facility without a Site Permit and Operational License.

(e) The burden of compliance with all aspects of this Ordinance is on the Applicant and the Owner/operator of a Wind Energy Facility. Approval of a Site Permit and Operational License by the Planning Board does not abrogate or reduce the responsibility of the Applicant or the Owner/operator to comply with this Ordinance. Consistent violations, particularly of the sound limits, may lead to decommissioning and removal of the Wind Energy Facility.

(f) This Ordinance includes Sections (I) through (XIII), together with the Appendix and References Section. Decisions regarding compliance or approval of an Applicant's Site Permit and Operational License must be made in light of the entire Ordinance.

Section III - Definitions

The following terms are defined as follows.

(a) Ambient Sound includes all sound present in a given environment. It includes intermittent sounds, such as aircraft, barking dogs, wind gusts, mobile farm or construction machinery, and vehicles traveling along a nearby road. It also includes insect and other nearby sounds from birds, animals or people.

(b) Applicant means the individual or business entity that seeks to secure a Permit or License under this Ordinance.

(c) A-Weighted Sound Level (dBA) is one measure of the overall sound level. This measure is designed to reflect the response of the human ear, which does not respond equally to all frequencies. Lower frequency sounds are given less weight than those in the mid-range of human perception. The resulting measure is said to be A-weighted and the units are dBA.

(d) Background Sound (L_{90}) is defined over a continuous ten minute period to be the average sound level during the quietest one continuous minute of the ten minutes. L_{90} may be measured relative to A-weighting or C-weighting, in which case it may be denoted $L_{90}A$ or $L_{90}C$. It refers to sound that is normally present at least 90% of the time, and excludes any sound generated by a WEF. It also excludes intermittent sounds from flora, fauna, wind and human activity. Background sound levels vary during different times of the day and night. Because wind turbines operate continuously, the background sound levels of interest are those during quieter periods which are often the evening and night.

(e) C-Weighted Sound Level (dBC) is similar to the A-weighted sound level (dBA), but it does not de-emphasize low frequencies to the extent that A-weighting does. For sounds with a significant low-frequency component, dBC is a more accurate measure of the energy of the sound waves than dBA.

(f) Decibel (dB) refers to a dimensionless quantity which is proportional to the logarithm (base 10) of a ratio of two quantities that are proportional to the power, energy or intensity of sound. One of these quantities is a reference level relative to which all other levels are measured.

(g) Essential Wildlife Habitat means areas identified by the Commissioner, Maine Department of Inland Fisheries and Wildlife, in accordance with the provisions of 12 M.R.S.A., Chapter 925, Subchapter 3, and any Department of Inland Fisheries and Wildlife rules implementing that Subchapter.

(h) Frequency is the number of complete oscillations or cycles per unit of time. See Hertz, below.

(i) Good Utility Practice means any of the practices, methods and acts with respect to the safe operation of a WEF engaged in or approved by a significant portion of the electric utility industry and, in particular, those portions of the industry with experience in the construction, operation and maintenance of wind turbines during the relevant time period; or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision is made, could be expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method or act to the exclusion of all others, but rather to be acceptable practices, methods or acts generally accepted in the region.

(j) Height means the total distance measured from the grade of the property as it existed prior to the construction of the wind energy system, facility, tower, turbine, or related facility at the base to its highest point. In the case of a wind turbine, this includes the length of the blade at its highest possible point.

(k) Hertz (Hz) is a unit of cycles per second. A process that repeats itself a given number of times in one second is said to occur at that many Hertz.

(l) Measurement Point (MP) refers to a location where sound and/or vibration are measured.

(m) Mitigation Waiver means a legally enforceable, written agreement between the Applicant and a Non-participating Landowner in which the landowner waives certain setback, noise or other protections afforded in the Ordinance. A Parcel in which the landowner has entered into such an agreement becomes a Participating Parcel. A complete copy of any such agreement must be provided to the Planning Board and recorded in the Penobscot County Registry of Deeds.

(n) Noise means any sound produced by a WEF. Noise does need to be loud to constitute an interference with the health and well-being of residents.

(o) Non-Participating Parcel means a parcel of real estate that is neither a Project Parcel nor a Participating Parcel.

(p) Occupied Structure means a building in which people live, work or frequent.

(q) Owner/operator means the person or entity with legal ownership of a WEF or WES, including successors and assigns, that has the authority and responsibility to operate the WEF on a day-to-day basis. An Owner/operator must have the legal authority to represent and bind.

(r) Participating Parcel means a parcel of real estate that is not a Project Parcel, but is subject to a Mitigation Waiver. A complete copy of the Mitigation Waiver must be provided to the Planning Board, and filed with the Penobscot Country Registry of Deeds.

(s) Project Boundary means the boundaries of the WEF as shown on the site plan submitted to and approved by the Planning Board in accordance with this Ordinance.

(t) Project Parcel means any parcel(s) of real estate on which all or any part of a WEF will be constructed.

(u) Property Line means the recognized and mapped property boundary line.

(v) Public Way means any road capable of carrying motor vehicles, including, but not limited to, any state highway, municipal road, county road, unincorporated territory road or other road dedicated to the public.

(w) Qualified Independent Acoustical Consultant. Qualifications for persons conducting baseline and other measurements and reviews related to the Application for a WEF or for enforcement actions against an operating WEF include, at a minimum, demonstration of competence in the specialty of community noise testing and Board Certified Membership in the Institute of Noise Control Engineers (INCE). Certifications such as Professional Engineer (P.E.) do not test for competence in acoustical principles and measurement and are thus not, without further qualification, appropriate for work under this Ordinance. The Independent Qualified Acoustical Consultant can have no direct or indirect financial or other relationship to an Applicant.

(x) Scenic or Special Resource means a scenic resource of state or national significance, as defined in Title 35-A M.R.S.A. § 3451(9), any site registered in the National Registry of Historic Places, or a scenic or special resource of local significance identified as such in the Dixmont Comprehensive Plan, or listed on the Visual Resource Inventory of the Dixmont Comprehensive Plan.

(y) Sensitive Receptor means places or structures intended for human habitation, whether inhabited or not, public parks, state and federal wildlife areas, the manicured areas of recreational establishments designed for public use, including but not limited to golf courses, camp grounds and other nonagricultural businesses. These areas are more likely to be sensitive to the exposure of the noise, vibration, shadow or flicker generated by a WEF. These areas include, but are not limited to: schools, daycare centers, elder care facilities, hospitals, places of seated assemblage, nonagricultural businesses and residences.

(z) Sound. A fluctuation of air pressure which is propagated as a wave through air.

(aa) Sound Level (L_{10}) refers to the sound level exceeded 10% of the time. During any continuous ten minute period, L_{10} is defined to be the average sound level during the loudest one continuous minute of the ten minutes. L_{10} may be measured relative to A-weighting or C-weighting, in which case it may be denoted $L_{10}A$ or $L_{10}C$.

(bb) Sound Level (L_{90}) refers to Background Sound (see above).

(cc) Sound Level (L_{eq}) is the frequency-weighted equivalent sound level. It is defined to be the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound. L_{eq} may be measured relative to A-weighting or C-weighting, in which case it may be denoted $L_{eq}A$ or $L_{eq}C$.

(dd) Sound Level (pre/post). Each of the Sound Levels defined above, L_{90}, L_{10} and L_{eq}, whether A-weighted or C-weighted, may be followed by "(pre)" or "(post)"'. Post-construction Sound Levels measured with all elements of the WEF turned on will be denoted with "(post)". During the application process, before the WEF has been constructed, "(post)" will be used to denote the pre-construction estimate of the post-construction Sound Level. Pre-construction Sound Levels, or Sound Levels measured with all elements of the WEF turned off will be denoted with "(pre)". See the Appendix, particularly Parts c(3)A, c5 and d.

(ee) Wind Energy System (WES) means equipment that converts and then transfers energy from the wind into usable forms of energy on a large, industrial scale for commercial or utility purposes with sale off premises or onto the utility grid.

(ff) Wind Energy Facility (WEF) means all of the land and equipment used by the Wind Energy System and its support facilities including the wind turbine, tower, access roads, control facilities, meteorological towers, maintenance and all power collection and transmission systems.

(gg) Wind Energy Facility Operational License or WEF Operational License means a license to operate a Wind Energy System issued by the Planning Board in accordance with this Ordinance

(hh) Wind Energy Facility Site Permit or WEF Site Permit means a Permit to construct a Wind Energy System issued by the Planning Board in accordance with this Ordinance.

(ii) Wind Turbine or Turbine (WT) means a mechanical device which captures the energy of the wind and converts it into electricity. The primary components of a wind turbine are the blade assembly, electrical generator and tower.

Section IV - Site Permit Application Procedures

(a) Applications for a WEF Site Permit shall be submitted to the Planning Board. The application for a WEF Site Permit shall include all of the information, documents, plans, deposits and other items required to be submitted with an application under Section (V), a preliminary cost agreement and the fees specified in Section (VII), along with any costs outlined in the Appendix. At least eight copies of all written materials, including maps or drawings, shall be provided. Written materials shall be contained in a bound report.

(b) The Planning Board shall, with assistance from such staff, consultants, committees or commissions as it deems appropriate, determine whether the Application is complete and contains all of the materials, information, agreements, deposits and payments required to be submitted with an Application under Sections (V), (VI), (VII), and the Appendix. If an Application is not complete, then the Applicant shall be so advised, and no further action shall be taken by the Planning Board until a complete Application is received.

(c) After the Planning Board determines that an Application is complete, the Planning Board shall determine whether the Application meets all requirements of this Ordinance. In determining whether the Application meets the requirements of this Ordinance, the Planning Board may obtain assistance from such staff and consultants as it deems appropriate. The Planning Board shall process the Application as soon as reasonable and feasible, given the complexity of the Application, other business facing the Town, staff and other resources, questions that arise during the review process, and other matters affecting the time needed to complete the review process.

(d) If an Application is complete and meets all requirements of this Ordinance, and the Applicant has paid all fees and costs pursuant to Sections (V) and (VII) and the Appendix, then the Planning Board shall approve a WEF Site Permit for the WEF. If an Application does not meet all requirements of this Ordinance or the Applicant has not paid all fees and costs, then the Planning Board may deny the Application or approve the Application with conditions that will assure compliance with this Ordinance. If an Application is approved with conditions, then a WEF Site Permit for the WEF shall be issued when all conditions of approval have been satisfied.

(e) Any significant modification of the approved WEF, such as but not limited to, the number of WTs, tower height, tower locations, turbine design and specifications shall require the Applicant to obtain an amended Site Permit from the Planning Board, pursuant to this Ordinance. The application procedures and permit requirements and standards for amending a Site Permit are the same as for an initial application.

(f) An Application for a WEF Site Permit shall include the following information and meet the following requirements. Items that are considered to be part of the Site Plan are followed by "(SP)" in the list below.

(1) The Applicant's name, address and phone number, and the name, address and phone number of the Owner/operator, if different.

(2) A narrative describing the proposed WEF, including an overview of the project, the project location, and the generating capacity and expected production of the WEF.

(3) Evidence of the Applicant's technical and financial ability to implement the project as proposed.

(4) An overview map that includes the extent of the entire Town, showing all roads, together with the location of all WTs, access roads, power transmission lines, and any other features of the WEF deemed to be relevant by the Planning Board. (SP)

(5) The tax map and lot number of all Project Parcels. (SP)

(6) For any Project Parcel that is not owned by the Applicant, a copy of any agreement(s) between the owner of the Project Parcel and the Applicant and/or the Owner/operator.

(7) The boundaries of all Project Parcels, surveyed by a Maine Professional Land Surveyor, with name, registration number and seal of the surveyor provided. (SP)

(8) The boundaries of all Participating Parcels. (SP)

(9) The boundaries of all Non-Participating Parcels located within 5,280 feet of any proposed WT, together with the distance to, and bearing to, all boundary lines relative to each proposed WT, as measured from the nearest point of the property line to the WT. This information shall be provided by a Maine Professional Land Surveyor. (SP)

(10) The names, addresses and phone numbers of the owners of all Project Parcels, Participating Parcels, and Non-Participating Parcels located within 5,280 feet of any proposed WT, with each property owner's status indicated (Project Parcel, Participating Parcel or Non-Participating Parcel), including the book and page reference of the identified owner's interest as recorded in the Penobscot County Registry of Deeds.

(11) An aerial photo showing all Project Parcels, Participating Parcels, and Non-Participating Parcels located within 5,280 feet of any proposed WT.

(12) Existing zoning of each Project Parcel and all required zoning setbacks on each Project Parcel. (SP)

(13) The location of all components of the WEF, including but not limited to the WTs, access roads, control facilities, meteorological towers, turnout locations, substation(s), ancillary equipment, buildings, structures, and temporary staging areas, together with maintenance and all power collection and transmission systems. (SP)

(14) The location and description of all structures located on Project Parcels, and all occupied structures located on Participating and Non-Participating Parcels located within 5,280 feet of any proposed WT. (SP)

(15) Dimensional representation and sizes of the structural components of the tower construction including the base, footings, tower, and blades. (SP)

(16) The distance between each WT tower and each of the following shall be shown on the site plan: those structures listed in (14), above, above-ground utility lines, telephone lines, towers, and public ways located within 5,280 feet of any proposed WT. (SP)

(17) Schematic of electrical systems associated with the proposed WEF including all existing and proposed electrical connections.

(18) Manufacturer's specifications and installation and operation instructions.

(19) The direction of proposed surface water drainage across and from Project Parcels and Participating Parcels, with an assessment of impacts on downstream properties and water resources, including, but not limited to, streams and wetlands. (SP)

(20) The location of any of the following found within 5,280 feet of any proposed WT: open drainage courses, wetlands, and other important natural areas and site features, including, but not limited to, floodplains, deer wintering areas, Essential Wildlife Habitats, Significant Wildlife Habitats, Scenic or Special Resources, habitat of rare and endangered plants and animals, unique natural areas, sand and gravel aquifers and historic and/or archaeological resources, together with a description of such features. (SP)

(21) Provisions made for handling all solid wastes, including hazardous and special wastes and the location and proposed screening of any on-site collection or storage facilities. (SP)

(22) The location, dimensions and materials to be used in the construction of proposed roads, driveways, parking areas and loading areas, together with an assessment of any changes to traffic flow. (SP)

(23) A topographical overlay for the Project Parcel(s), Participating Parcels and Non-Participating Parcels located within 5,280 feet of any proposed WT.

(24) The size and scale of maps and diagrams shall be as determined by the Planning Board, and shall include a north arrow, the date, the scale, and date and seal of a Maine Professional Land Surveyor or professional engineer. (SP)

(25) The site plan shall include such additional relevant information as the Planning Board may require. (SP)

Section V - Site Permit Requirements and Standards

(a) Sound Modeling, Sound Standards and Sound-Related Enforcement Procedures

(1) *Independent Pre-licensing Sound Study.* An Application for a WEF Site Permit shall include a four season sound study as specified in the Appendix. This study shall be conducted by a Qualified Independent Acoustical Consultant, selected by the Planning Board. The consultant will review this study and assist the Planning Board in determining whether the proposed WEF will comply with the sound limits set forth in this Ordinance. The Applicant shall provide financial surety that the cost of the study, and its review, will be borne by the Applicant, in accordance with Section (VII) of this Ordinance.

(2) *Sound Limits(0 to 5280 feet).* No Site Permit shall be issued if the pre-licensing information or sound study indicates that the proposed WEF will not comply with the following requirements, which are to apply everywhere within one mile (5280 feet) of any WT, except on Project Parcel(s) or on a Participating Parcel(s) which is subject to a Mitigation Waiver which specifies different sound limits than those below. If pre-construction estimates of the post-construction sound levels, exceed the limits below, then the WEF Application will be denied; if these limits are exceeded after the WEF has been built, then the WEF will be in violation of this Ordinance.

The sound limits below are stated in terms of $L_{90}A$(pre), $L_{eq}A$(post), $L_{eq}C$(post), $L_{90}C$(post) and $L_{eq}A$(post). Each of these quantities is defined in the Appendix, particularly in Parts c(3)A, c5 and d. Prior to construction of the WEF, the "pre" values are as measured and the "post" values are as calculated, following the guidelines of the Appendix. After the WEF has been constructed, the "pre" values are the WEF-Off values and the "post" values are the WEF-On values.

A. *Audible Sound Limit*

i. No WT, WES or WEF shall be located so as to generate post-construction sound levels that exceed 40 dBA at night (7:00 p.m. to 7:00 a.m.) or 50 dBA during the day (7:00 a.m. to 7:00 p.m.). The appropriate value to use for the post-construction sound level is $L_{eq}A$(post).

ii. A 5 dB penalty is applied for tones as defined in IEC 61400-11.

B. *Low Frequency Sound Limit*

i. $L_{eq}C$(post) minus $L_{90}A$(pre) must be less than 20 dB outside of any occupied structure.

ii. $L_{90}C$(post) may not exceed 50 dBC, without contribution from other ambient sounds, for properties located one mile or more away from state highways or other major roads, and it may not exceed 55 dBC for properties closer than one mile from a state highway or other major road.

C. *Mitigation Waiver*

Property owners may waive these sound restrictions with a written Mitigation Waiver agreement. A complete copy of any such agreement must be filed with the Planning Board and Recorded in the Penobscot County Registry of Deeds.

(3) *Sound Limits (5280 feet to 7920 feet).* No Site Permit shall be issued if the pre-licensing information or sound study indicates that the proposed WEF will not comply with the following requirements, which are to apply everywhere within a distance ranging from one mile (5280 feet) to one and one-half miles (7920 feet) of any WT, except on Project Parcel(s) or on a Participating Parcel(s) which is subject to a Mitigation Waiver which specifies different sound limits than those below. If pre-construction estimates of the post-construction sound levels, exceed the limits below, then the WEF Application will be denied; if these limits are exceeded after the WEF has been built, then the WEF will be in violation of this Ordinance.

The sound limits below are stated in terms of $L_{90}A$(pre), $L_{eq}A$(post), $L_{eq}C$(post), $L_{90}C$(post) and $L_{eq}A$(post). Each of these quantities is defined in the Appendix, particularly in Parts c(3)A, c5 and d. Prior to construction of the WEF, the "pre" values are as measured and the "post" values are as calculated, following the guidelines of the Appendix. After the WEF has been constructed, the "pre" values are the WEF-Off values and the "post" values are the WEF-On values.

A. *Audible Sound Limit.* No WT, WES or WEF shall be located so as to generate post-construction sound levels that exceed pre-construction sound levels by more than 10 dBA. The appropriate value to use for the pre-construction sound level is $L_{90}A$(pre); the appropriate value to use for the post-construction sound level is $L_{eq}A$(post).

B. *Low Frequency Sound Limit*

i. $L_{eq}C$(post) minus $L_{90}A$(pre) must be less than 20 dB outside of any occupied structure.

ii. $L_{90}C$(post) may not exceed 50 dBC, without contribution from other ambient sounds, for properties located one mile or more away from state highways or other major roads, and it may not exceed 55 dBC for properties closer than one mile from a state highway or other major road.

C. *General Standard*

$L_{eq}A$(post) may never exceed 35 dBA within 100 feet of any occupied structure.

D. *Mitigation Waiver*

Property owners may waive these sound restrictions with a written Mitigation Waiver agreement. A complete copy of any such agreement must be filed with the Planning Board and Recorded in the Penobscot County Registry of Deeds.

(4) *Post-construction Sound Measurements.* Starting within twelve months after the date when the WEF is operating, a post-construction sound study shall be performed, with all WTs operating, as described in Part d of the Appendix. Post-construction sound studies shall be conducted by a Qualified Independent Acoustical Consultant chosen by the Planning Board. The Permittee will provide financial surety that the costs of these studies shall be paid by the Permittee. The surety required by Section (VII) shall include these costs. A Consultant of the Permittee may observe the Town's consultant. The WEF Permittee shall provide all technical information required by the Planning Board or Independent Qualified Acoustical Consultant before, during, and/or after any acoustical studies required by this document and for local area acoustical measurements. The post-construction sound measurements, as described in Part d of the Appendix, shall be repeated at least every five years throughout the life of the facility.

(b) Set-Back Requirements

(1) A WEF shall comply with the following set-back requirements, which shall apply in addition to the siting requirements found elsewhere in this Ordinance. If more than one set-back requirement applies, the greater set-back distance shall be met.

A. All parts of a WEF shall comply with all applicable set-back requirements in the Town's zoning Ordinance.

B. Each WT shall be set back at least 2,500 feet from the property line of any Non-Participating Parcel. Property owners may waive this setback with a written Mitigation Waiver agreement.

C. Each WT shall be set back at least 1,500 feet from any public way.

D. Each WT shall be set back at least 1,200 feet from any above-ground electric power line or telephone line except that a lesser setback shall be permitted if the utility agrees, in writing, and this agreement is approved by the Planning Board.

E. Each WT shall be set back not less than 5,280 feet from any residence, business, school, daycare facility, church, hospital, or other Occupied Structure on any Non-Participating Parcel. Property owners may waive this setback with a written Mitigation Waiver agreement.

F. Each WT shall be set back not less than 1,500 feet from any residence, business, school, daycare facility, church, hospital, or other Occupied Structure, including those located on any Participating Parcel or Project Parcel.

G. All WTs must be set back a minimum of 2,500 feet from any Scenic or Special Resource as defined in Section (III).

H. All set-back distance measurements shall be based on horizontal distances.

(2) Minor changes in approved plans necessary to address field conditions may be approved by the Planning Board, provided that any such change does not affect compliance with the Ordinance. The Permittee shall submit revised plans to the Planning Board showing the proposed minor change, which, if approved, shall be considered an amendment to an existing Site Permit and/or Operational License, as appropriate. In the event that a majority of the Planning Board believes that a requested change constitutes a material change to a Site Permit and/or Operational License, or if the changes will affect compliance with the Ordinance, full reapproval is required.

(3) All construction activities must conform to the approved site plan, including any conditions of approval and minor changes approved by the Planning Board to address field conditions.

(4) Upon completion of the project, the Permittee must provide the Planning Board with a set of construction plans showing the structures and site improvements as actually constructed. These "as-built" plans must be submitted within thirty days of completion of the WEF, and before commencement of operation of the WEF.

(c) Plan and Risk Assessment for Road and Property Use

(1) An Application for a WEF Site Permit shall include a road and property use and risk assessment plan containing the following information and meeting the following requirements.

A. A description and map of all public ways, and other property, in the Town to be used or affected in connection with the construction of the WEF, including a description of how and when such ways and property will be used or affected.

B. A description of the type and length of vehicles and type, weight and length of loads to be conveyed on all public ways in the Town.

C. A complete assessment of the proposed use of public ways in the Town in connection with the construction of the WEF, including the adequacy of turning radii; the ability of the public ways to sustain loads without damage; the need to remove or modify (permanently or temporarily) signs, trees, utilities, or anything else; any reasonably foreseeable damage to public ways or other property, public or private; any reasonably foreseeable costs that the Town may incur in connection with the use of property in the Town, including but not limited to costs relating to traffic control, public safety, or damage to public ways, or to other public or private property.

D. A traffic control and safety plan relating to the use of public ways in the Town in connection with the construction of the WEF.

E. Any additional relevant information that the Planning Board may request relating to the use of public ways or other effects on public and private property that may occur in connection with the construction and operation of the WEF.

(2) The Planning Board will evaluate the risk assessment plan with assistance from such consultants that it deems appropriate, including without limitation a third-party engineer chosen by the Planning Board, the cost to be solely borne by the Applicant. The Planning Board may document the condition of public ways and other property to be used in connection with the construction of the WEF in such manner as it deems appropriate. The Planning Board may require changes to the risk assessment plan that it deems to be appropriate to protect public safety, to protect public and private property, and to address anticipated costs to the Town associated with construction of the WEF.

(3) If the Applicant requires the temporary closure of any public way, the Planning Board may require the Applicant to enter into an agreement relating to the use of the public way.

(4) The Applicant shall be responsible for paying for any damage to any public way. If the risk assessment anticipates damage to any public way, the Planning Board may require the Applicant to provide a surety in an amount that the Planning Board determines appropriate to secure any obligations under the agreement, including but not limited to any obligation relating to alterations or modifications to public ways made in connection with the Applicant's activities.

(d) Design Plan and Design Requirements.

An Application for a WEF Site Permit shall include a design plan containing the information and meeting the following requirements.

(1) The total height of any WT shall not exceed 400 feet above grade, as measured to the blade tips at their maximum distance above grade.

(2) Wind Turbines shall be painted a non-reflective, non-obtrusive color.

(3) The design of the buildings shall, to the extent reasonably feasible, use materials, colors, textures, screening and landscaping that will blend with and be compatible with the natural setting and the existing environment.

(4) Wind Turbines shall not be artificially lighted, except to the extent required by law, and strobe or other intermittent lights are prohibited unless required by law.

(5) No advertising or display shall be permitted, other than reasonable identification of the manufacturer or operator of the Wind Turbines or WEF.

(6) Electrical controls and control wiring and power-lines must be wireless or below ground, except where WES collector wiring is brought together for connection to the utility grid.

(7) The clearance between the ground and the Wind Turbine blades shall be not less than 25 feet.

(e) Additional Protection Requirements.

The Application shall include a statement from the Federal Aviation Administration that the proposed WEF will not pose a hazard to aircraft. The Applicant must also provide memoranda from the Maine Department of Inland Fisheries and Wildlife (MDIFW) Environmental Coordinator and from the Maine Natural Areas Program (MNAP) outlining any concerns that these bodies may have with the proposed WEF. In the absence of any such concerns, the Applicant must provide copies of correspondence with these bodies showing that no such concerns exist. The Applicant must demonstrate that the proposed WEF will not have an undue adverse effect on rare, threatened, or endangered wildlife, Significant Wildlife Habitat, Essential Wildlife Habitat, rare, threatened or endangered plants and rare and exemplary natural plant communities and ecosystems.

(f) Blasting Plan and Requirements.

The Application shall include a blasting plan containing the information and meeting the requirements in this section. The Applicant must execute this plan, and bears sole responsibility for the associated costs. Blasting shall be performed only after approval has been given to the Applicant for such operations and must comply with the following provisions set forth by the State of Maine Statute Title 38, Chapter 3, Subchapter 1, Article 8-A, § 490-Z(14).

(1) The contractor or any subcontractor shall use sufficient stemming, matting or natural protective cover to prevent fly rock from leaving property owned or under control of the Applicant or from entering protected natural resources or natural buffer strips. Crushed rock or other suitable material must be used for stemming when available; native gravel, drill cuttings or other material may be used for stemming only if no other suitable material is available.

(2) The maximum allowable airblast at any inhabited building not owned or controlled by the Applicant may not exceed 129 decibels peak when measured by an instrument having a flat response (± 3 decibels) over the range of 5 to 200 hertz.

(3) The maximum allowable airblast at an uninhabited building not owned or controlled by the Applicant may not exceed 140 decibels peak when measured by an instrument having a flat response ± 3 decibels) over the range of 5 to 200 hertz.

(4) Monitoring of airblast levels is required in all cases for which a pre-blast survey is required by paragraph (6). The contractor may file a permit modification requesting a waiver of the monitoring requirement if the contractor or subcontractor secures the permission of affected property owners to increase allowable airblast levels on their property and the Planning Board determines that no protected natural resources will be adversely affected by the increased airblast levels. The cost to prepare the permit modification and the affect of project delay while the Planning Board reviews the request shall be borne solely by the contractor or his subcontractor.

(5) If a blast is to be initiated by detonating cord, the detonating cord must be covered by crushed rock or other suitable cover to reduce noise and concussion effects.

(6) A preblast survey is required and must extend a minimum radius of 2,640 feet from the blast site. The information gathered by the survey must be satisfactory to the Planning Board. Pre-blast surveys should include both the interior and exterior of each structure. The pre-blast survey must document any pre-existing damage to structures and buildings and any other physical features within the survey radius that could reasonably be affected by blasting. Assessment of features such as pipes, cables, transmission lines and wells and other water supply systems may be limited to surface conditions and other readily available data, such as well yield and water quality. The pre-blast survey must be conducted prior to the initiation of blasting. The contractor or subcontractor shall retain a copy of all pre-blast surveys for at least one year from the date of the last blast on the development site.

Notification that blasting will occur must be provided to all owners of structures to be surveyed at least 10, but not more than 30, days prior to commencement of blasting. The results of the preblast survey must be provided to the property owner no later than the date on which this notification is given.

The contractor or the subcontractor is not required to conduct a pre-blast survey on properties for which the Applicant or operator documents the rejection of an offer by registered letter, return receipt requested, to conduct a pre-blast survey. Any person owning a building within a pre-blast survey radius may voluntarily waive the right to a survey.

(7) Blasting timeframes shall be coordinated with the local emergency responders, or as otherwise restricted by the local Fire Department. Blasting shall not occur between the hours of 7:00 p.m. and 7:00 a.m. No blasting shall be done on weekends or holidays.

(8) Sound from blasting may not exceed the following limits at any protected location as defined in the MDEP Regulations, 06-096 C.M.R. Ch. 400, § 1:

Number of Blasts Per Day	Sound Level Limit
1	129 dB
2	126
3	124
4 or more	123

(g) Signal Interference Requirements

The WEF shall not cause any disruption or loss of radio, telephone, television or similar signals. The Applicant shall provide a statement from the Federal Communications Commission that the proposed WEF will not cause any disruption of radio, television or similar signals.

(h) Shadow Flicker and Blade Glint Assessment and Requirements

(1) Shadow flicker occurs when the blades of a Wind Turbine pass between the sun and an observer, casting a readily observable, moving shadow on the observer and his or her immediate environment. The Application shall include a detailed shadow flicker and blade glint assessment model and an estimate of the expected amount of flicker and glint. This study must meet the following requirements.

A. The study shall be prepared by a registered professional regularly engaged in this type of work who is chosen by the Planning Board. The Applicant shall be responsible for paying the registered professional's fees and all costs associated with conducting the study. The Applicant shall provide financial surety to the Town for the cost of the study in accordance with Section (VII) of this Ordinance. There shall be an absence of any conflict of interest as defined in Section XII of this Ordinance for any professional conducting this study.

B. The study will examine the areas within a one mile radius of any WT in the proposed WEF.

C. The model will be calculated using the following minimum inputs:

i. Turbine locations (proposed and existing)

ii. Shadow flicker Sensitive Receptor locations

iii. Existing topography (elevation contours and vegetation)

iv. Rotor diameter, blade width and hub height

v. Joint wind speed and direction distribution (wind rose table)

vi. Hours of sunshine (long term monthly references)

D. The model may be prepared by use of current aerial photography and topographical maps. A site visit by the preparer is required to identify Sensitive Receptors and to verify the existing conditions.

E. The study shall estimate the locations and durations of shadow flicker caused by the proposed WEF within the study area. The study shall clearly indicate the duration of shadow flicker at locations throughout the study area, showing the total number of hours per year anticipated.

F. The study must include estimates for the duration of shadow flicker at all existing occupied structures and roadways. The estimated duration of shadow flicker at such locations shall include flicker that occurs within 100 feet of the structures.

G. The study must include a statement of the assumptions made, methodology applied, and data used by the study. This information must be sufficient to allow an independent third party to verify the results of the study.

H. The study shall include a paint sample that demonstrates the color, texture and gloss of the proposed surface coating and a certification that the proposed surface coating will not create a reflective surface conducive to blade glint.

(2) The Application will not be approved if the study estimates that the duration and location of flicker will be such that there are more than 10 hours of flicker per year at any occupied structure located on a Non-participating Parcel. If, after construction, the WEF violates this condition, then the WEF will be in violation of this Ordinance.

(3) Blade glint, defined as the intermittent reflection of the sun off the surface of the blades of a Wind Turbine, is prohibited.

(i) Sign Plan and Sign Requirements.

An Application for a WEF Site Permit shall include a sign plan meeting the requirements in this section.

(1) The plan shall provide reasonable signage at the WEF, identifying the Project Parcels as being part of the WEF and providing appropriate safety notices and warnings.

(2) No advertising material or signage other than warning, equipment information or indicia of ownership shall be allowed on the Wind Turbines. This prohibition shall include the attachment of any flag, decorative sign, streamers, pennants, ribbons, spinners or waving, fluttering or revolving devices, but not including weather devices.

(3) The address and phone number of the Owner/operator and Licensee shall be posted on all access points from public roads.

(j) Stray Voltage Assessment and Requirements.

(1) An Application for a WEF Site Permit shall include reports of stray voltage analyses in accordance with this section. The Applicant shall conduct and include a report of a preconstruction stray voltage test on all commercial livestock facilities located within a one-mile radius of the Project Parcels. The tests shall be performed by an investigator, approved by the Planning Board, using a testing protocol which is approved by the Planning Board. A report of the tests shall be provided with the WEF Site Permit Application and shall be provided to the owners of all property included in the study area. Applicant shall seek written permission from property owners prior to conducting testing on such owners' property. Applicant shall not be required to perform testing on property where the owners have refused to grant permission to conduct the testing.

(2) Following construction of the WEF and within one year after commencing operation, the Applicant shall conduct a postconstruction stray voltage test on all commercial livestock facilities located within a one-mile radius of the Project Parcels. The tests shall be performed by an investigator approved by the Planning Board and shall be performed using a testing protocol which is approved by the Planning Board. A report of the tests

shall be provided to the Planning Board and to the owners of all property included in the study area. Applicant shall seek written permission from property owners prior to conducting testing on private property. Applicant shall not be required to perform testing on property where the owners have refused to grant permission to conduct the testing.

(3) The Applicant or subsequent holder of the Operational License shall provide neutral isolation devices to property owners where testing reveals neutral-to-earth voltages in excess of 0.5 volts caused by the WEF.

(k) Security Plan and Requirements

The Application shall include a security plan that contains the information and meets the requirements in this section.

(1) The outside of Wind Turbines shall not be climbable.

(2) All access doors to the towers and electrical equipment shall be locked.

(3) Warning signs shall be placed on each tower, all electrical equipment, and each entrance to the WEF.

(4) All motor vehicle access points to the WEF from public roads shall be gated.

(l) Fire Prevention and Emergency Response Plan and Requirements.

An Application for a WEF Site Permit shall include a fire prevention and emergency response plan containing the information and meeting the requirements in this section. The plan shall describe the potential fire and emergency scenarios that may require a response from fire, emergency medical services, police or other emergency responders. The plan shall designate the specific agencies that would respond to potential fire or other emergencies, shall describe all emergency response training and equipment needed to respond to a fire or other emergency, shall include an assessment of the training and equipment available to the designated agencies, and shall provide for any special training or emergency response equipment that the designated agencies need to use in responding to a potential fire or other emergency. The study shall be conducted at Applicant's cost and the Applicant shall pay for the cost of any training or equipment required by local fire and emergency responders.

Access to the WEF and construction area(s) shall be constructed and maintained following a detailed erosion control plan in a manner designed to control erosion and to provide maneuverability for service and emergency response vehicles.

(m) Emergency Shutdown Plan and Requirements.

An Application for a WEF Site Permit shall include an emergency shutdown plan. The plan shall describe the circumstances under which an emergency shutdown may be required to protect public safety, and shall describe the procedures that the Town and the Owner/operator and Licensee will follow in the event an emergency shutdown is required.

(n) Decommissioning and Site Restoration Plan and Requirements.

An Application for a WEF Site Permit shall include a decommissioning and site restoration plan containing the information and meeting the requirements in this section.

(1) The plan shall provide for the removal from the Project Parcels, and lawful disposal or disposition of, all Wind Turbines and other structures, hazardous materials, electrical facilities, and all foundations. The plan shall provide for the removal of all access roads. The plan shall provide for the restoration of the Project Parcels to a condition similar to that which existed before construction of the WEF.

(2) The plan shall provide for the decommissioning of the site upon the expiration or revocation of the WEF Permit, or upon the abandonment of the WEF. The WEF shall be deemed abandoned if its operation has ceased for twelve consecutive months.

(3) The plan shall include provisions for financial surety to ensure completion of decommissioning and site restoration, in form and amount satisfactory to the Planning Board. A performance bond or a cash escrow account held by the Town with 10% of the estimated cost of decommissioning to be added by the WEF on an annual basis shall be acceptable surety, the total amount to be based on the estimated cost of completing the decommissioning and site restoration in accordance with the approved plan, adjusted for inflation, and as approved by the Planning Board.

(4) The plan shall include written authorization from the WEF Permittee and all owners of all Project Parcels for the Town to access the Project Parcels and implement the decommissioning and site restoration plan, in the event that the WEF Permittee fails to implement the plan. The written authorization shall be in a form approved by the Planning Board and recorded in the Penobscot County Registry of Deeds.

(o) Mitigation Waiver Agreement

Non-participating Landowners may waive certain specified protections in this Ordinance using a written, legally enforceable Mitigation Waiver negotiated between the wind turbine Applicant and the Non-participating Landowner, who thereby becomes a Participating Landowner. Complete copies of executed Mitigation Waivers must be included with the submission of the WEF Application. The Mitigation Waiver must be recorded in the Penobscot County Registry of Deeds, and describe the benefited and burdened properties. Any subsequent deed must advise all subsequent owners of the burdened property.

(p) Inspections

Wind Turbines shall be inspected after construction is completed but before becoming operational, and at least every two years thereafter, for structural and operational integrity by a Maine licensed professional engineer, and the Owner/operator and/or Licensee shall submit a copy of the inspection report to the Planning Board. If such report recommends that repairs or maintenance are to be conducted, then the Owner/operator and/or Licensee shall provide the Planning Board with a written schedule for the repairs or maintenance. Failure to complete the repairs or maintenance in accordance with the schedule shall be deemed a violation of this Ordinance..

(q) Liability Insurance

The Applicant, Permittee, Owner/operator and Licensee, as applicable, shall maintain a current general liability policy for the WEF that covers bodily injury and property damage in an amount commensurate with the scope and scale of the WEF, and acceptable to the Planning Board, which acceptance shall not be unreasonably withheld. Certificates of insurance shall be provided to the Planning Board annually.

The policy must include the requirement that the Planning Board will be provided at least ten days notice by the policy provider in the case of cancellation or change to the policy. In addition, the Applicant, Permittee, Owner/operator and Licensee, as applicable, must inform the Planning Board of such changes.

(r) Construction Codes

(1) All wiring shall be installed underground according to

(a) The National Electrical Code, 2008 Edition, designated as "NFPA 70-2008" and published by the National Fire Protection Association, and any amendments and/or replacements thereof.

(b) The National Electrical Safety Code, 2007 Edition, published by IEEE, and any amendments and/or replacements thereof.

(c) IEEE Standard 142, "Grounding for Industrial and Commercial Power Systems", 2007 Edition, published by IEEE, and any amendments and/or replacements thereof.

(2) All construction shall be conducted in accordance with the International Building Code 2006, published by the International Code Council, Inc.

Section VI - Operational License

(a) Applications for a WEF Operational License shall be submitted to the Planning Board.

(1) Where an Applicant is applying for a new or amended WEF Site Permit, the application for a WEF Operational License, or amended license, shall be submitted to the Planning Board in conjunction with the Site Permit application, and shall include the application form and the separate fee specified in Section (VII).

(2) Where an Applicant is applying for a WEF Operational License renewal, a new License as the result of transfer of ownership or operation, or reinstatement or modification of an Operational License, the Applicant shall submit an application form, a copy of the existing WEF Site Permit, and the fee specified in Section (VII).

(b) The application for a WEF Operational License shall include the following items:

(1) The Applicant's name, address and phone number, and the name, address and phone number of the Owner/operator, if different;

(2) An emergency directory for the Owner/operator sufficient to allow the Town to contact the Owner/operator at any time;

(3) Evidence of the Applicant's technical and financial ability to operate the WEF in accordance with this Ordinance, the Site Permit, and the Operational License;

(4) For any Project Parcel that is not owned by the Applicant, a copy of any agreement(s) between the owner of the Project Parcel and the Applicant;

(5) An updated security plan in accordance the requirements of Section (V)(k);

(6) An updated fire prevention and emergency response plan in accordance with the requirements of Section (V)(l);

(7) An updated emergency shutdown plan in accordance with the requirements of Section (V)(m);

(8) An updated decommissioning and site restoration plan in accordance with the requirements of Section (V)(n), including a transfer of financial surety rights from prior License holder;

(9) Updated liability insurance information in accordance with the requirements of Section (V)(q); and

(10) A signed statement from the Applicant that the Applicant agrees to assume full responsibility for complying with the provisions of this Ordinance and the Site Permit, including agreeing to continue or complete any duties and obligations of the former Operational License holder under this Ordinance or former Operational License, including, but not limited to, the requirement for post-construction sound measurements, post-construction stray voltage testing, wind turbine inspections, and submission to inspections.

Items (3) through (9) do not need to be duplicated if the Operational License is submitted in conjunction with an application for a Site Permit.

(c) The Planning Board shall, with assistance from such staff, consultants, committees or commissions as it deems appropriate, determine whether the Application is complete. If an Application is not complete, then the Applicant shall be so advised, and no further action shall be taken by the Planning Board until a complete Application is received.

(d) After the Planning Board determines that an Application is complete, the Planning Board shall determine whether the Application meets all requirements of this Ordinance. In determining whether the Application meets the requirements of this Ordinance, the Planning Board may obtain assistance from such staff and consultants as it deems appropriate. The Planning Board shall process the Application as soon as reasonable and feasible, given the complexity of the Application, other business facing the Town, staff and other resources, questions that arise during the review process, and other matters affecting the time needed to complete the review process.

(e) If an Application is complete and meets all requirements of this Ordinance, and the Applicant has paid all fees and costs, then the Planning Board shall approve a WEF Operational License for the WEF. If an Application does not meet all requirements of this Ordinance or the Applicant has not paid all fees and costs, then the Planning Board may deny the Application or approve the Application with conditions that will assure compliance with this Ordinance. If an Application is approved with conditions, then a WEF Operational License for the WEF shall be issued when all

conditions of approval have been satisfied, or, when the Planning Board deems appropriate under the circumstances, the Planning Board may issue a Temporary Operational License for up to 90 days.

Section VII - Fees and Costs

(a) Preliminary Cost Agreement. At the time an Application for a WEF Site Permit is filed with the Town, the Applicant shall execute for the benefit of the Town an agreement to pay and provide adequate surety guaranteeing payment of the cost of the investigation, review and processing of the Application, including without limitation by way of enumeration, legal, engineering, acoustical, planning, environmental, and staff administrative costs as provided in this Ordinance. The agreement shall provide for the establishment of an escrow account and cash deposit to be provided by the Applicant in an amount deemed sufficient by the Planning Board to begin review under this Ordinance. The Town may use the funds in the escrow account in connection with the application review as allowed by this Ordinance. In the event that the cash deposit in escrow is insufficient to complete the review, the Town shall notify the Applicant that additional funds are necessary and of the amount reasonably believed necessary to complete the review, and the Applicant shall provide the additional funds. The Planning Board shall not begin processing, or in the case of where additional funds are requested, shall not continue processing, the Application until the preliminary cost agreement is approved and signed and until the required surety, or additional surety, and/or funds, are provided to the Town.

(b) The application fee for a Site Permit shall consist of a base application fee of $2,500.00, plus $100.00 for every WT included in the project.

(c) The application fee for an Operational License is $1,000.

(d) The annual fee for an Operational License is $250.00.

Section VIII - Expiration of Site Permit Approval and WEF Operational License

(a) If on-site construction of a WEF is not significantly commenced within one year of the date of issue of a Site Permit, the Site Permit shall automatically lapse and become null and void. If an approved WEF is not completed within 30 months after a Site Permit is issued, then the Site Permit shall expire, and the Applicant must reapply. The Planning Board may, for good cause shown, grant a one-time extension of up to six months for either start of construction or completion of construction provided such request is submitted prior to the lapse or expiration of the Site Permit.

(b) A WEF Operational License issued under this Ordinance shall expire twenty years after the date it is issued, unless earlier terminated.

(c) A WEF Operational License shall be deemed abandoned if its operation has ceased for twelve consecutive months. An Operational License expires immediately upon abandonment.

(d) A WEF Operational License shall automatically terminate upon transfer of ownership or operation of the WEF. The proposed new owner or operator shall be required to obtain a new Operational License, which must be in place prior to the transfer of ownership or operation of the WEF.

(e) A WEF Operational License shall automatically terminate upon any amendment to a Site Permit other than a minor change approved by the Planning Board in accordance with Section V(b)(2).

Section IX - Violations, Complaints and Penalties

(a) Violations of This Ordinance. It shall be unlawful to construct or operate any WEF or part thereof in violation of any provision of this Ordinance, a WEF Site Permit, or a WEF Operational License; any violation thereof is punishable, upon conviction, in accordance with 30-A M.R.S.A. § 4452(3), and shall include attorneys fees and a penalty to address economic benefit as provided in 30-A M.R.S.A. § 4452(3)(D) and (H). All fines assessed under this Ordinance shall inure to the benefit of the Town of Dixmont. Each day a violation exists or continues shall constitute a separate offense.

(b) Complaints and Modification, Revocation or Suspension. The Planning Board shall retain continuing jurisdiction to modify, suspend or revoke all WEF Operational Licenses in accordance with this section. Such authority shall be in addition to the Town's authority to prosecute violations and take other enforcement action.

(1) In this section, "violation" means a violation of this Ordinance, or a violation of a WEF Site Permit issued under this Ordinance, or a violation of a WEF Operational License.

(2) Any resident of the Town, real property tax-payer to the Town, or Town official may file a written complaint with the Town Clerk alleging that a WEF Permittee, Owner/operator or Licensee has committed or is committing a violation. Such complaints shall be forwarded to the Planning Board.

(3) The Planning Board shall preliminarily review the complaint. In connection with its preliminary review, the Planning Board may require the Code Enforcement Officer or other person or persons to conduct such investigations and make such reports as the Planning Board may direct. The Planning Board may request information from the WEF Permittee, Owner/operator and/or Licensee, the complainant, and any other person or entity to assist with its preliminary review.

(4) Following its preliminary review, the Planning Board may:

A. Dismiss the complaint;

B. Refer the complaint to the Town attorney for prosecution; or

C. Conduct a public meeting to determine whether the alleged violation(s) have occurred, and what remedial action should be taken. Prior to such meeting, notice of the meeting shall be given to the WEF Permitee, Owner/operator, Licensee, as applicable, and the complainant. The WEF Permittee, Owner/operator, Licensee, as applicable, and the complainant, and any other person, may appear at the meeting and may offer testimony and other relevant evidence, and may be represented by any attorney. If the Planning Board concludes that violations have occurred, the Planning Board shall:

i. Impose conditions on the WEF Site Permit, Owner/operator and/or Licensee to the extent reasonably necessary to discontinue the violation(s) or avoid any recurrence thereof; or

ii. Recommend to the Select Board that the matter be referred to the Town's attorney for prosecution seeking that the WEF Site Permit and/or Operational License be suspended until such time as the WEF Permitee, Owner/operator and/or Licensee presents and implements a plan, satisfactory to the Planning Board that will discontinue the violation(s) or prevent any recurrence thereof, and meets such further conditions as the Planning Board deems appropriate to discontinue and prevent further violations; or

iii. Recommend to the Select Board that the matter be referred to the Town's attorney for prosecution seeking that the WEF Site Permit and/or Operational License be revoked and that decommissioning of the WEF be directed, if the Planning Board concludes that no reasonable modification can be made to the WEF to discontinue or prevent violations; or

iv. Refer the matter to the Select Board and Town's attorney for prosecution, subject to Planning Board and Select Board approval; or

v. Take no action, if the Planning Board concludes that no further action is needed to discontinue or prevent violations, and that prosecution is unwarranted.

D. Following any such hearing, the Planning Board's written decision shall be furnished to the WEF Permitee, Owner/operator and/or Licensee, as applicable, and to the complainant.

E. An appeal from the decision of the Planning Board may be taken to the Appeals Board by the WEF Permittee, Owner/operator or Licensee, or a complainant. Such appeal must be in writing and must specify the grounds thereof, and must be filed with the Town Clerk within 30 days after the final action of the Planning Board. The Town Clerk shall provide any appeal to the Appeals Board. The Appeals Board shall fix a reasonable time for the hearing of the appeal, and shall give public notice thereof as well as due notice to the WEF Permitee, Owner/operator and/or Licensee, as applicable, and the complainant. The action of the Planning Board shall be sustained unless the Appeals Board, by a favorable vote of the majority of all members of the Appeals Board, reverses or modifies the Planning Board's determination.

F. An appeal from a decision of the Board of Appeals shall be made to Superior Court in accordance with M.R.Civ.P. 80B.

Section X - Maintenance, Amendments, and Miscellaneous Requirements

(a) A WEF shall be constructed, operated, and maintained, and repaired in accordance with the approved Site Permit, Operational License, and this Ordinance. Where a standard or requirement

is not provided by either this Ordinance, the WEF Site Permit or the WEF Operational License, the WEF Permittee and Licensee shall comply with Good Utility Practices.

(b) All components of the Wind Turbine Project shall conform to relevant and applicable local, state and national building codes.

(c) A WEF Permittee may apply to the Planning Board for changes to a WEF Site Permit or Operational License. The Application shall describe the requested change or changes. The Planning Board shall review the Application and determine what provisions of this Ordinance and Appendix will apply to the Application. The Application will then be processed in accordance with all provisions of this Ordinance deemed to be applicable by the Planning Board. The provisions of Section (VII), together with all other instances where this Ordinance outlines financial obligations of the Applicant, Permitee, Owner/operator and Licensee shall apply to any Application for changes to a WEF Site Permit or Operational License. An Application for changes will be required for any significant modification to the approved WEF Permit, including, but not limited to: any change in the number of WTs; any change in WT height, location, design, or specification; or any substantive change to any required plan or insurance coverage.

(d) The WEF Permitee, Owner/operator and/or Licensee, as applicable, shall notify the Town of any extraordinary event as soon as possible, and in no case more than 12 hours after the event. "Extraordinary events" shall include but not be limited to tower collapse, catastrophic turbine failure, fires, leakage of hazardous materials, unauthorized entry to the tower base, thrown blade or hub, any injury to a Facility worker or other person that requires emergency medical treatment, or other event that impacts the health and safety of the Town or its residents.

(e) Approval of a WEF Permit under this Ordinance does not exempt an Applicant from obtaining other applicable permits from the Town of Dixmont, such as building, electrical, plumbing and shoreland zoning permits, as applicable, or any applicable state or federal permit.

Section XI - Severability; Conflicts with Other Ordinances, Laws, and Regulations; Appeal

(a) If any section, subsection, sentence, clause or phrase of this Ordinance is for any reason held to be invalid or unconstitutional by reason of any decision of any court of competent jurisdiction, such decision shall not affect the validity of any other section, subsection, sentence, clause or phrase or part thereof. The Town hereby declares that it would have passed this Ordinance and each section, subsection, sentence, clause, phrase or part thereof even if any one or more sections, subsections, sentences, clauses, phrases or parts thereof may be declared invalid or unconstitutional.

(b) Whenever a provision of this Ordinance conflicts with or is inconsistent with another provision of this Ordinance or of any other Town Ordinance, or Federal or State of Maine rule, regulation or statute, the more restrictive provision shall apply.

(c) Except as provided in Section (IX)(b)(4)(E), an aggrieved party may appeal a decision of the Planning Board to Superior Court in accordance with M.R.Civ.P. 80B.

Section XII - Ethical Standards

(a) <u>Transparency, Public Participation and Highest Ethical Standards</u>

All public deliberations and decisions regarding Wind Energy Facilities shall be conducted in an open, transparent manner that encourages the broadest public participation and adherence to the highest ethical standards.

(b) Public Access

All deliberations concerning Wind Energy Facility Projects, whether in writing or conducted verbally, by the Planning Board, Selectman, Appeals Board, and any other subcommittees or working groups of the afore mentioned bodies shall fully comply with the letter and spirit of State law regarding Freedom of Access pursuant to Title 1; Chapter 13; Subchapter 1. Specifically, all deliberations regarding Wind Energy Facilities between members of the Planning Board, Selectmen, Appeals Boards and any subcommittees and working groups shall be conducted at public meetings for which notice has been duly given. Exceptions will be made only for: 1) appropriately recorded and executed executive sessions; and 2) communicating the minimal information necessary to set up and facilitate public meetings. Minutes of deliberations and decisions concerning Wind Energy Facilities will be maintained and filed in the Dixmont Town Office. Copies of all correspondence and e-mails will be made available to the public with the exception of those publically identified and disclosed as being subject to "attorney-client privilege" by the Town attorney. All documents, correspondence and e-mails generated by consultants on behalf of the Planning Board, the Selectmen, Appeals Board, their subcommittees and working groups shall be part of the public record.

(c) Conflicts of Interest

The process to develop and permit Wind Energy Facility Projects shall be governed by a strict ethical code for conflicts of interest. No elected or appointed Town official or Town employee, their immediate family members, or their employees, who has a conflict of interest shall be directly or indirectly involved in the planning process or decision-making process for Wind Energy Facility Projects. Conflicts of interest include, but are not limited to:

(1) having right, title or interest in a Project Parcel;

(2) having a financial arrangement with an individual or company which derives income from the development of wind energy, including a signed Mitigation Waiver with financial remuneration;

(3) serving as a paid representative of an individual or company which derives income from the development of wind energy, or a written or verbal promise for future employment or contracts from a wind development company;

(4) being directly or indirectly affiliated as an Applicant with a pending Application for a Wind Energy Facility Project;

(5) knowing that there is a substantial opportunity to accept bids, receive remuneration, or employment valued at greater than $1,000 on behalf a wind development company.

Individuals with a conflict of interest must identify the conflict of interest and recuse themselves from all direct and indirect planning and decision-making regarding Wind Energy Facility Projects, with the exception of voting and debating as a private citizen at any public meeting and public hearings.

Section XIII - Effective Date

This Ordinance shall take effect immediately upon passage.

Appendix

(a) Introduction

The purpose of this Appendix is to describe the requirements for pre-construction and post-construction sound and vibration monitoring. Determining the sound and vibration impacts is a highly technical undertaking and requires a serious effort in order to collect reliable and meaningful data for both the public and decision-makers.

This protocol is based in part on criteria published in American National Standards S12.9 - Quantities and Procedures for Description and Measurement of Environmental Sound, and S12.18 for the measurement of sound pressure level outdoors. Where there are differences between the procedures and definitions of this document and ANSI standards, this document shall apply. Where a standard's requirements may conflict with other standards or with this document, the most stringent requirements shall apply. IEC 61400-11 procedures are not suitable for enforcement of these requirements except for the presence of tones.

(b) Instrumentation

All instruments and other tools used to measure audible, inaudible and low frequency sound shall meet the requirements for ANSI or IEC Type 1 Integrating Averaging Sound Level Meter with one-third octave band analyzer with frequency range from 6.3 Hz to 20k Hz and capability to simultaneously measure dBA LN and dBC LN. The instrument must also be capable of measuring low level background sounds down to 20 dBA, and must conform, at a minimum, to the requirements of ANSI S1.43-1997. Measurements shall only be made with the instrument manufacturer's approved wind screen. A compatible acoustic field calibrator is required with certified $\pm$ 0.2 dB accuracy. Portable meteorological measurement requirements are outlined in ANSI S12.9 Part 3 and are required to be located within 5 meters of the sound measuring microphone. The microphone shall be located at a height of 1.2 to 1.5 meters for all tests unless circumstances require a different measurement position. In that case, the reasons shall be documented and include any adjustments needed to make the results correspond to the preferred measurement location.

(c) Pre-construction Sound Measurement and Study

An assessment of the sound environment in the area surrounding the proposed WEF is necessary in order to predict the impact of a proposed project. The following guidelines shall be used in developing an estimate of an area's pre-construction sound environment. All testing is to be performed by a Qualified Independent Acoustical Consultant chosen by the Planning Board. The Applicant may file objections detailing any concerns it may have with the Planning Board's

selection. These concerns will be addressed in the study. Objections must be filed prior to the start of the sound study. Test results and the study will be reported to the Planning Board.

(1) Location of Measurement Points for Pre-construction Sound Measurement

Sites to be used as Measurement Points shall be selected as follows.

A. Sites should not be located near large objects, such as buildings. The distance to buildings or other structures should be twice the largest dimension of the structure, if possible.

B. The sites shall include those locations anticipated to have the highest sound emissions of the proposed WEF.

C. The sites shall include those locations where the background soundscape is quietest.

D. The sites shall include locations along the property line(s) of Project Parcel(s) and Participating Parcel(s). The intent is to anticipate the locations along the property line(s) that will receive the highest sound emissions. The Applicant and the owner of relevant Project Parcel(s) and Participating Parcel(s) must provide access to allow measurements to be taken. The Permit will not be approved if such access is refused. Mitigation Waivers for any parcel(s) do not eliminate the requirement that access be provided.

E. The sites shall include locations selected to represent the sound level at all Sensitive Receptors located within 1.5 miles of the boundaries of the proposed WEF.

F. Sites shall be located with the assistance of the Planning Board and property owner(s).

G. Additional sites may be chosen by the Consultant conducting the study if these sites will improve the accuracy of the study's conclusions.

(2) Conditions under which Measurements are to be Taken

At each Measurement Point, information will be gathered under the conditions specified.

A. The duration of each measurement shall be ten continuous minutes for each quantity listed in Part c(3)A, below, at each location. Longer-term tests are not appropriate. In most cases, it should be possible to derive all values described in Part c(3)A from a single ten minute sample. The duration must include at least six minutes that are not affected by transient sounds from near-by and non-natural sources. Multiple ten minute samples over longer periods may be used to improve the reliability, in which case the quietest ten minute sample will be used.

B. Measurements shall be taken during the times of day and night expected to be have the quietest background sound level, as appropriate for the site. The preferred nighttime testing time for background sound levels is from 10 pm until 4 am. If circumstances indicate that samples should be taken at a different time, then the test may be conducted at an alternate time, if approved by the Planning Board.

C. Measurements must be made on a week-day of a non-holiday week. Week-end measurements may be taken at selected sites where there are weekend activities that may be affected by WT sound.

D. Measurements must be taken at 1.2 to 1.5 meters above the ground and at least 15 feet from any reflective surface, following ANSI S12.9 Part 3 protocol together with any other requirements found in this Ordinance.

E. Measurements taken when the wind speeds exceed two meters per second (4.5 miles per hour) at the microphone location are not valid. A windscreen of the type recommended by the monitoring instrument manufacturer must be used for all data collection.

F. All elements of any pre-existing WEF, whether operated by the current Applicant or some other party, must be turned off for the duration of background sound level measurements. Willingness of the Applicant to abide by this condition for any future Applicants is a requirement of Permit approval.

(3) Quantities to be Measured

At each Measurement Point, the following information will be gathered, at a minimum, and provided as part of the Study.

A. L_{eq}, L_{10} and L_{90}, each to be given in dBA and in dBC. L_{90} is the value for the quietest continuous minute of a continuous ten minute period, L_{10} is the value for the loudest continuous minute of a continuous ten minute period, and L_{eq} is the average value over the entire ten minute period. To distinguish these values from their post-construction counterparts, these values may be denoted L_{eq}(pre), L_{10}(pre) and L_{90}(pre), with an "A" or a "C", depending on the weight. For instance, L_{10}A(pre) means the A-weighted preconstruction measurement of L_{10}. The ten minute period shall be considered invalid if either

i. L_{10}A minus L_{90}A is greater than 10 dBA; or

ii. L_{10}C minus L_{90}C is greater than 15 dBC.

B. One-third octave band sound pressure levels, averaged over each ten minute sample.

C. A narrative description of any intermittent sounds registered during each measurement.

D. A narrative description of the steady sounds that form the background soundscape.

E. Digital recording of all data, sampled at a rate of at least 44,100 Hz with signed 16 bit Pulse Code Modulation, as described in IEC 60908, and measured using a recording instrument meeting ANSI S1.4. This may be augmented with video recordings.

F. Wind speed and direction, humidity and temperature, together with the corresponding information from the nearest ten meter weather reporting station.

(4) Information to be supplied by the Applicant

The Applicant must provide the following information.

A. The make and model of all WT units to be installed in the WEF.

B. The sound power of all WT units to be installed in the WEF, expressed in watts, and abbreviated as L_W. This information must have been determined for the WT manufacturer under laboratory conditions specified by IEC 61400-11, and provided to the Applicant. It cannot be assumed that these values represent the highest sound output for any operating condition; they reflect the operating conditions necessary to meet the IEC 614100-11 requirements. The lowest frequency for acoustic power (L_W) required in IEC 61400-11 is 50 Hz. This Ordinance requires wind turbine certified acoustic power (L_W) levels at rated load for the total frequency range from 6.3 Hz to 10,000 Hz, in one-third octave frequency bands tabulated to the nearest 0.1 dB.

C. Any additional information that the Consultant reasonably deems necessary to fulfill the requirements in Part c(5), below.

D. The burden is on the Applicant to provide sufficient information to establish that operation of the WEF will meet the requirements of this Ordinance.

(5) Required Elements of the Study

The purpose of the study is, first, to establish a consistent and scientifically sound procedure for evaluating existing background levels of audible and low-frequency sound; and, second, to determine whether the proposed WEF will meet the conditions set forth in Section (V) The characteristics of the proposed WEF and the features of the surrounding environment will influence the design of the study. Site layout, types of WES/WT

selected and the existence of other significant local audible and low frequency sound sources and Sensitive Receptors should be taken into consideration.

Determining whether the proposed WEF will meet the conditions set forth in this Ordinance requires that the Consultant predict the postconstruction sound level of the proposed WEF. At each Measurement Point, the Consultant must estimate values for L_{90}, L_{10} and L_{eq}, both A-weighted and C-weighted, for a total of six values at each Measurement Point. These pre-construction estimates of the post-construction sound level will be denoted L_{90}(post), L_{10}(post) and L_{eq}(post), each of which may have an "A" or a "C" to indicate the method of weighting.

In determining these post-construction values, the Consultant should assume worst-case conditions for producing sound emissions. The assumed wind speed shall be the speed that results in the worst-case (i.e., highest) dBA and dBC sound levels in the area surrounding the WEF. The wind direction shall be taken to be the dominant wind direction in each season. If other wind directions may cause levels to exceed those of the predominant wind direction at Sensitive Receptors, then these levels and conditions shall be considered in the Study. To accommodate enforcement under weather conditions where this is a significant difference between the wind speed at ground-level and at hub-height, any predictive model shall assume that the winds at hub-height are sufficient for the highest sound emission, even though the enforcement tests will be with ground-level wind speeds of ten miles per hour or less.

In the event that there are several pending Permit Applications, or preexisting WEF(s), the estimated post-construction values shall be the combined predicted output of all proposed or existing WEFs. All of these WEFs will be treated using the same methodology to arrive at combined value for the predicted post-construction sound level.

Each additional WEF adds to the sound-burden of a community. If the contribution to sound levels of a proposed WEF, together with the sound generated by pre-existing WEFs would raise sound levels beyond the limits of this Ordinance, then the proposed WEF will not be approved.

At a minimum, the study shall include the following information, and meet the following requirements.

A. The study shall address conditions in all four seasons, and it is required that measurements be taken at each Measurement Point at least once in each of the four seasons. The quietest period of each season should be chosen for measurement.

B. The study may be based on computer models, but shall include a description of all assumptions made in the model's construction and algorithms. This description must be sufficient to allow an independent third party to verify the conclusions of the study. If the model does not consider the effects of wind direction, worst-case weather, operating conditions, geography of the terrain, and/or the effect of

reinforcement from coherent sounds or tones from the turbines, then these shortcomings must be identified and other means used to adjust the model's output to account for these factors.

C. The minimum and maximum distance between any Measurement Points.

D. The distance between each Measurement Point and any significant local sound sources.

E. The predicted sound pressure levels for each of the 1/1 octave bands as un-weighted dB in tabular form from 6.3 Hz to 10,000 Hz. This should be given for a set of locations throughout the study area deemed by the Consultant and Planning Board to be representative.

F. Eight iso-contour maps shall be included, two for each season, showing the level of pre-construction background sound, as given by $L_{90}A$(pre) and $L_{90}C$(pre). These maps shall extend to a minimum of 1.5 miles beyond the perimeter of the project boundary, and may be extended to a distance of more than 1.5 miles at the discretion of the Planning Board. The scale shall be such as to allow individual Measurement Points and Sensitive Receptors to be distinguished.

G. Eight iso-contour maps shall be included, two for each season, showing the level of post-construction sound, as given by $L_{eq}A$(post) and $L_{eq}C$(post). These maps shall cover the same area and use the same scale as those in (F).

H. Eight iso-contour maps shall be included, two for each season. Four of these maps shall show the value of $L_{eq}A$(post) minus $L_{90}A$(pre), one map for each season; and four maps shall show $L_{eq}C$(post) minus $L_{90}A$(pre), one map for each season. These maps shall cover the same area and use the same scale as those in (F).

I. All maps shall use of contour interval of no more than 5 dB, and shall extend out, at a minimum, to distance sufficient to show the 30 dBA or 40 dBC boundary, whichever is greater.

J. Maps shall show the location of a Measurement Points, sources of any significant local non-WEF sound or vibration, and the location of all Sensitive Receptors, including, but not limited to, schools, daycare centers, hospitals, residences, places of worship, and elderly care facilities.

K. A map shall be included that shows the layout of the project area, including topography, the project boundary lines and property lines.

L. Any additional information that the Consultant and Planning Board reasonably believe will aid in making a more informed decision as to whether the proposed WEF will meet the requirements of this Ordinance.

(d) Post-construction Sound Measurement and Study

Post-construction sound studies require two sets of measurements. One set of measurements shall be gathered using the same methodology as outlined in Part (c), above. These measurements may be referred to as the "WEF-Off Measurements." The second set of measurements shall be gathered as set forth in this Part (d), and may be referred to as the "WEF-On Measurements". The WEF-On Measurement Points shall be the same as those used as WEF-On Measurement Points. All testing is to be performed by a Qualified Independent Acoustical Consultant chosen by the Planning Board.

At the discretion of the Planning Board, the pre-construction sound measurements, taken in Part (c), can be substituted for the WEF-Off Measurements if a random sampling of 10% of the pre-construction study sites shows that $L_{90}A$ and $L_{90}C$ levels have not changed by more than ± 5 dB when measured under the same meteorological conditions.

If there have been any complaints about WEF sound or low frequency sound by any resident of an occupied dwelling, then a location or locations on that property will be included in the WEF-Off and WEF-On Measurement Points.

This location(s) will be selected jointly by the complainant and Consultant. In addition, the Consultant and Planning Board may include additional Measurement Points where they reasonably believe that doing so will improve the accuracy of the study.

The WEF-On Measurements shall be taken under the conditions listed below, and the quantities measured shall be as specified in Part c(3), above.

(1) The duration of each measurement shall be ten continuous minutes for each quantity listed in Part c(3)A, above, at each location. The duration must include at least six minutes that are not affected by transient sounds from near-by, non-natural, non-WEF sources. Multiple ten minute samples over longer periods may be used to improve the reliability.

(2) Measurements must be taken at 1.2 to 1.5 meters above the ground and at least 15 feet from any reflective surface, following ANSI S12.9 Part 3 protocol together with any other requirements found in this Ordinance.

(3) Measurements must be taken with the wind speed at hub-height sufficient for full operating capacity, and at two meters per second (4.5 miles per hour) or less at the microphone location. Conditions should reflect the loudest sound emissions from the WEF. For purposes of enforcement, the wind speed and direction at the WT blade height shall be selected to reproduce the conditions leading to the enforcement action. A windscreen of the type recommended by the monitoring instrument manufacturer must be used for all data collection.

The Consultant shall provide a study including the same information and meeting the same requirements as the pre-construction sound study described in Part c(5), except that the values for L_{90}(post), L_{10}(post) and L_{eq}(post) (both A-weighted and C-weighted) shall be taken to be the measured WEF-On values.

For the purposes of enforcement, the post-construction values of L_{90}A(post), L_{90}C(post), L_{10}A(post), L_{10}C(post), L_{eq}A(post) and L_{eq}C(post) are defined to be equal to the measured WEF-On value of each quantity.

REFERENCES

ANSI/ASA S12.9-1993/Part 3 (R2008) - American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 3: Short-Term Measurements with an Observer Present.

This standard is the second in a series of parts concerning description and measurement of outdoor environmental sound. The standard describes recommended procedures for measurement of short-term, time-average environmental sound outdoors at one or more locations in a community for environmental assessment or planning for compatible land uses and for other purposes such as demonstrating compliance with a regulation. These measurements are distinguished by the requirement to have an observer present. Sound may be produced by one or more separate, distributed sources of sound such as a highway, factory, or airport. Methods are given to correct the measured levels for the influence of background sound. For the purposes of this Ordinance the options that are provided in ANSI S12.9-Part 3 (2008) shall be applied with the additional following requirements:

Wind Turbine Siting Acoustical Measurements ANSI S12.9 Part 3 Selection of options and other requirements

4.2 background sound: Use definition (1) 'long-term

4.3 long-term background sound: The L_{90} excludes short term background sounds

4.4 basic measurement period: Ten (10) minutes L_{90} (10 min)

4.5 Sound Measuring Instrument: Type 1 integrating meeting ANSI S1.43

6.5 Windscreen: Required

7.1 Long-term background sound

7.2 Data collection Methods: Second method Observed samples to avoid contamination by short term sounds (purpose: to avoid loss of statistical data)

8 Source(s) Data Collection: All requirements in ANSI S12.18 Method #2 precision to the extent possible while still permitting testing of the conditions that lead to complaints.

8.3(a) All meteorological observations required at both (not either) microphone and nearest 10m weather reporting station.

8.3(b) For a 10 minute sound measurement to be valid the wind velocity shall not exceed 2m/s (4.5 mph) measured less than 5m from the microphone. Compliance sound measurements shall not be taken when winds exceed 2m/s.

8.3(c) In addition to the required acoustic calibration checks the sound measuring instrument internal noise floor must also be checked at the end of each series of ten minute measurements and no less frequently than once per day. Insert the microphone into the acoustic calibrator with the calibrator signal off. Record the observed dBA and dBC reading from the sound level meter or other recording instrument to determine an approximation of the instrument self noise. This calibrator covered microphone must demonstrate that the results of this test are at least 5 dB below the immediately previous ten minute acoustic test results for the acoustic data to be valid. This test is necessary to detect undesired increase in the microphone and sound level meter internal self noise. As a precaution sound measuring instrumentation should be removed from any air conditioned space at least an hour before use. Nighttime measurements are often performed very near the dew point. Minor moisture condensation inside a microphone or sound level meter can increase the instrument self noise and void the data.

8.4 to the end: The remaining sections of ANSI S 12.9 Part 3 Standard do not apply.

ANSI S12.18-1994 (R2004) American National Standard Procedures for Outdoor Measurement of Sound Pressure Level

This American National Standard describes procedures for the measurement of sound pressure levels in the outdoor environment, considering the effects of the ground, the effects of refraction due to wind and temperature gradients, and the effects due to turbulence. This standard is focused on measurement of sound pressure levels produced by specific sources outdoors. The measured sound pressure levels can be used to calculate sound pressure levels at other distances from the source or to extrapolate to other environmental conditions or to assess compliance with regulation. This standard describes two methods to measure sound pressure levels outdoors. METHOD No. 1: general method; outlines conditions for routine measurements. METHOD No. 2: precision method; describes strict conditions for more accurate measurements. This standard assumes the measurement of A-weighted sound pressure level or time-averaged sound pressure level or octave, 1/3-octave or narrow-band sound pressure level, but does not preclude determination of other sound descriptors.

ANSI Sl.43-1997(R2007) American National Standard Specifications for Integrating Averaging Sound Level Meters

This Standard describes instruments for the measurement of frequency-weighted and time-average sound pressure levels. Optionally, sound exposure levels may be measured. This standard is consistent with the relevant requirements of ANSI Sl.4-1983(R 1997) American National Standard Specification for Sound Level Meters, but specifies additional characteristics that are necessary to measure the timeaverage sound pressure level of steady, intermittent, fluctuating, and impulsive sounds.

ANSI S1.11-2004 American National Standard 'Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters'

This standard provides performance requirements for analog, sampled-data, and digital implementations of bandpass filters that comprise a filter set or spectrum analyzer for acoustical measurements. It super-cedes ANSI S1.11-1986 (R1998) American National Standard Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters, and is a counterpart to International Standard IEC 61260:1995 Electroacoustics - Octave-Band and Fractional-Octave-Band Filters. Significant changes from ANSI S1.11-1986 have been adopted in order to conform to most of the specifications of IEC 61260:1995. This standard differs from IEC 61260:1995 in three ways: (1) the test methods of IEC 61260 clauses 5 is moved to an informative annex, (2) the term 'band number', not present in IEC 61260, is used as in ANSI S1.11-1986, (3) references to American National Standards are incorporated, and (4) minor editorial and style differences are incorporated.

ANSI S1.400-2006 American National Standard Specifications and Verification Procedures for Sound Calibrators

IEC 60908 Audio Recording – Compact disk digital audio system

Applies to a pre-recorded optical reflective digital audio disc system. Defines those parameters of compact discs that affect interchangeability between discs and players. Is also intended as a reference for manufacturers wishing to produce discs and/or players that conform to the system described.

IEC 61400-11

Second edition 2002-12, Amendment 1 2006-05

IEC 61400-11

Second edition 2002-12, Amendment 1 2006-0

Wind turbine generator systems -Part 11: Acoustic noise measurement techniques

The purpose of this part of IEC 61400 is to provide a uniform methodology that will ensure consistency and accuracy in the measurement and analysis of acoustical emissions by wind turbine generator systems. The standard has been prepared with the anticipation that it would be applied by:

- the wind turbine manufacturer striving to meet well defined acoustic emission performance requirements and/or a possible declaration system;

- the wind turbine purchaser in specifying such performance requirements;

- the wind turbine operator who may be required to verify that stated, or required, acoustic performance specifications are met for new or refurbished units;

- the wind turbine planner or regulator who must be able to accurately and fairly define acoustical emission characteristics of a wind turbine in response to environmental regulations or permit requirements for new or modified installations.

This standard provides guidance in the measurement, analysis and reporting of complex acoustic emissions from wind turbine generator systems. The standard will benefit those parties involved in the manufacture, installation, planning and permitting, operation, utilization, and regulation of wind turbines. The measurement and analysis techniques recommended in this document should be applied by all parties to insure that continuing development and operation of wind turbines is carried out in an atmosphere of consistent and accurate communication relative to environmental concerns. This standard presents measurement and reporting procedures expected to provide accurate results that can be replicated by others.

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Town of Jackson Wind Turbine Ordinance

TOWN OF JACKSON WIND TURBINE ORDINANCE

1.0 Title

This Ordinance shall be known as the Town of Jackson Wind Turbine Ordinance (Ordinance).

2.0 Purpose

The purpose and intent of this Ordinance is to protect the public safety, health and welfare of the residents and property owners of the Town of Jackson who may be affected by the development and operation of a Wind Turbine or Wind Turbine Project, and to support and promote appropriate wind energy development consistent with the goals of the Jackson Comprehensive Plan.

3.0 Authority

This Ordinance is adopted pursuant to the enabling provisions of Article VIII, Part 2, Section 1 of the Maine Constitution (Municipal Home Rule), the provisions of Title 30-A M.R.S.A. Section 3001 (Home Rule), and the provisions of the Planning and Land Use Regulation Act, Title 30-A M.R.S.A. Section 4312, etc. seq. (*Comprehensive Planning and Land Use Regulation, or "Growth Management Act"*)..

4.0 Conflicts with Other Ordinances, Laws and Regulations

Whenever a provision of this Ordinance conflicts with or is inconsistent with another provision of this Ordinance or of any other ordinance, regulation or statute from any jurisdiction, the more restrictive provision shall control.

5.0 Validity and Severability

Should any section or provision of this Ordinance be declared by the courts to be invalid, such decision shall not invalidate any other section or provision of the Ordinance.

6.0 Effective Date

This Ordinance shall become effective upon the date of its passage.

7.0 Applicability

7.1 This Ordinance applies to any wind turbine that is the subject of a permit or Operational License application pending before, or filed with the Town of Jackson after, the effective date of the Ordinance.

7.2 Wind turbines already constructed and in operation prior to the effective date of this Ordinance are exempt from this Ordinance, including upgrades or changes to the tower, nacelle, or rotors that would not otherwise affect the classification of the turbine under this Ordinance, and including minor changes to siting if the changes are in compliance with the setback provisions of this Ordinance.

8.0 Definitions

Abandonment of an Operational License means that the Owner/Operator has failed to operate a wind turbine or wind turbine project to convert wind to electricity for a period of twelve consecutive months, whether the reason for not producing electricity is within the Owner/Operator's control or not.

Abandonment of an Application means the Applicant has failed to provide the necessary information required for an application within the deadlines outlined in Section 17.0.

Ambient Noise means the all-encompassing sound associated with a given environment, at a specified time, being usually a composite of sounds from many sources at many directions, near and far, including the specific development of interest.

Applicant is the legal entity, including successors and assigns, that files an application under this Ordinance.

Blade Reflection - means the intermittent reflection of the sun off the surface of the blades of a Wind Turbine.

Community Owned Wind - means a Wind Turbine Project that meets any one of the following criteria: 1) Town of Jackson owning 51% or more of the project, 2) Town of Jackson owning less than 51% of the project but in which the Town of Jackson serves as the managing partner, 3) the majority of the direct financial benefits of the project accruing to all of the residents of the Town of Jackson, exclusive of any tax considerations. Community Owned Wind may include or incorporate consumer-owned transmission and distribution utilities, rural electric cooperatives, municipal electric districts, or other electrical generation and transmission models established by State law to facilitate and encourage local electrical generation. Community Owned Wind does not include partial or minority municipal ownership of Wind Turbine Projects without the Town of Jackson or Town of Jackson being the managing partner, and does not include Wind Turbine Projects located in Jackson having majority ownership or control by private individuals, private businesses, or non-profit organizations not under direct control of the Town of Jackson.

DEP Certification means a certification issued by the Department of Environmental Protection pursuant to Title 35-A M.R.S.A. §3456 for a Wind Turbine Project that is subject to this

Ordinance.

Enforcing Authority: means the individual delegated by the Town of Jackson to be responsible for enforcing the standards of this Ordinance after a permit is granted to a Wind Turbine Project.

Good Utility Practice means any of the practices, methods and acts with respect to the safe operation of the Wind Turbine or Wind Turbine Project engaged in or approved by a significant portion of the electric utility industry and, in particular, those portions of the industry with experience in the construction, operation, and maintenance of wind turbines during the relevant period; or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability and safety.

Ice Throw - means accumulated ice buildup on the blades of a Wind Turbine that is or can be thrown during normal spinning or rotation.

Meteorological Tower (MET Tower) means a meteorological tower used for the measurement of wind speed.

Mitigation Waiver means a legally enforceable, written agreement between the Applicant and a Non-participating Landowner in which the non-participating landowner waives certain setback, noise or other protections afforded in the Ordinance.

Nacelle means the frame and housing at the top of the tower that encloses the gearbox and generator.

Nameplate Capacity means the electrical power rating of an individual wind turbine as certified by the manufacturer and normally expressed in watts, kilowatts (kW), or megawatts (MW).

Noise means any sound produced by a Wind Turbine Project. Noise does need to be loud to constitute an interference with the health and well-being of residents.

Non-participating Landowner means any landowner other than a Participating Landowner.

Occupied Building means any structure that is, or is likely to be, occupied by persons or livestock. This includes, but is not limited to dwellings, places of business, places of worship, schools, and barns.

Operational License means a license or a license renewal issued by the Enforcing Authority to operate a Type 3, or Type 4 Wind Turbine Project in accordance with this Ordinance.

Owner/operator means the person or entity with legal ownership of the Wind Turbine Project, including successors and assigns, that has the authority and responsibility to operate the Wind Turbine Project on a day-to-day basis. An Owner/operator must have the legal authority to represent and bind.

Participating Landowner means one or more persons that hold title in fee to the property on

which the Wind Turbine Project is proposed to be located pursuant to an agreement with the development Owner/operator.

Permit means a permit granted by the Planning Board to construct a Wind Turbine Project. A permit does not authorize operation of a Type 3 or Type 4 Wind Turbine Project. For Type 3 and Type 4 Wind Turbine Projects, an Operational License must be obtained after completion of construction.

Permitting Authority means the Code Enforcement Officer or Planning Board, designated as responsible for conducting the review of a particular Wind Turbine application

Person means an individual, corporation, partnership, firm, organization or other legal entity.

Scenic or Special Resource means a scenic resource of state or national significance, as defined in Title 35-A M.R.S.A. §3451(9), any site registered in the National Registry of Historic Places, or a scenic or special resource of local significance identified as such in the Jackson Comprehensive Plan, or listed on the Visual Resource Inventory of the Jackson Comprehensive Plan.

Setback means the minimal allowable horizontal distance as measured from the center of a Wind Turbine to a defined point (i.e., a property line or an Occupied Building).

Setback Area means the entire land base that falls within a specified setback.

Shadow Flicker means alternating changes in light intensity caused by the movement of wind turbine blades casting shadows on the ground or a stationary object.

Shadow Flicker Receptor means any Occupied Building on a Non-participating Landowner's property plus an additional 100 foot boundary surrounding the exterior of the Occupied Building, the entire outdoor public area surrounding schools, churches and public buildings, and public roads with a posted speed limit greater than 25 mph.

Sight Line Representation means a line depicted in profile extending from an observer's eye to the lowest point of a viewed tower.

Significant adverse effect, with regard to wildlife protection, means an increase in species morbidity or mortality, or habitat fragmentation, which is deemed by a qualified wildlife biologist to be of concern for a particular species.

Sound is a fluctuation of air pressure which is a propagation as a wave through air

Structure has the same meaning as in 38 MRSA § 482.

Tower means the freestanding structure on which the wind measuring or energy conversion system is mounted.

Turbine Height means the distance measured from the surface of the tower foundation to the highest point of any turbine rotor blade measured at the highest arc of the blade.

Wind Turbine means a wind energy conversion system that converts wind energy into electricity through the use of a wind turbine generator, and includes the nacelle, rotor, tower and pad transformer if any.

Wind Turbine Project means one or more Wind Turbines and all related and supporting items including but not limited to all buildings, structures, electrical equipment, substations, transmission lines, access roads, parking lots, areas to be stripped or graded, and areas to be landscaped or screened.

9.0 Classification of Wind Turbines and Meteorological Towers

For the purpose of administering the permitting process, all Wind Turbines and Wind Turbine Projects will be classified and permitted according to the following definitions:

9.1 Wind Turbine Classifications:

Type 1 - Small Wind Turbine means a single wind turbine with a nameplate capacity less than 10 kW, and a turbine height less than 150 feet.

Type 2 - Intermediate Wind Turbine means a single wind turbine with a nameplate capacity less than 100 kW, and a turbine height less than 150', and not requiring a Site Location of Development permit from the Maine Department of Environmental Protection (DEP) pursuant to Title 35-A M.R.S.A. §3456.

Type 3 - Large Wind Turbine means up to three wind turbines with a nameplate capacity less than 1 MW, and a turbine height less than 300', regardless of whether approval is required by the Department of Environmental Protection under 35-A M.R.S.A. §3451, et seq. (Expedited Permitting of Grid-Scale Wind Energy) or Title 38 M.R.S.A § 481, et seq. (Site Location of Development Act).

Type 4 - Industrial Wind Turbine means one or more wind turbines with a nameplate capacity of greater than or equal to 1 MW, or a turbine height greater than or equal to 300', regardless of whether approval is required by the Department of Environmental Protection under 35-A M.R.S.A. §3451, et seq. (Expedited Permitting of Grid-Scale Wind Energy) or Title 38 M.R.S.A § 481, et seq. (Site Location of Development Act).

Multiple Wind Turbines within the same Classification shall be referred to as a Type 1, 2, 3, or 4 Wind Turbine Project.

9.2 Meteorological Towers (MET Towers)

MET towers shall be permitted under the same standards as a Type 1 Wind Turbine for MET towers less than 100 feet and Type 2 for MET towers greater than or equal to 100 feet. A permit for a temporary MET tower shall be valid for a maximum of one year after which a single extension of up to one year may be granted. The MET tower shall be removed within 90 days of the expiration of the permit.

These classifications are summarized in Table 1 below.

Table 1: Classification of Wind Turbines

Type/Scale	Nameplate Capacity	Turbine Height	Maximum No. of Turbines	Special Conditions
Type 1, Small Wind Turbine	<= 10 kW	and <150'	1	N/A
Type 2, Intermediate Wind Turbine/	<= 100 kW	and < 150'	1	N/A
Type 3, Large Wind Turbine/ Development	< 1 MW	and < 300'	<= 3	N/A
Type 4, Industrial Wind Turbine/ Development	>=1 MW	or <= 300'	N/A	Or > 3 Large Wind Turbines

10.0 Permit Requirement

10.1 A permit is required for all Wind Turbines and Wind Turbine Projects built in the Town of Jackson after the effective date of this Ordinance.

10.2 The Planning Board will aggregate, to the fullest and most practical extent possible, and pursuant to Section 27.0, all Wind Turbines held under common or related ownership into a single Wind Turbine Project. With the exception of Projects owned by the Town of Jackson, separate corporate legal structures under common or joint ownership or under common or joint control will be deemed to be a single project for purposes of permit and licensing notwithstanding separate corporate legal ownership.

10.3 Receipt of a permit under this Ordinance does not relieve the Owner/operator from the responsibility to obtain any other such permits or approvals as required under the Town of Jackson Land Use Ordinance or pursuant to other State or Federal law.

11.0 Permitting Authority

11.1 The Town of Jackson Code Enforcement Officer (CEO) is authorized to review all Type 1 Wind Turbine applications and may approve, reject or approve such applications with conditions in accordance with the standards of the Ordinance.

11.2 The Town of Jackson Planning Board (Planning Board, or "PB") is authorized to review all Type 2, 3 and 4 Wind Turbine applications and may approve, reject or approve such applications with conditions in accordance with the standards of the Ordinance.

11.3 Maine Department of Environmental Protection (DEP) approval may be required for a Wind Turbine Project. The Planning Board shall consider, at a minimum and to the extent applicable, pertinent findings in the DEP certification when making its

determination.

11.4 The applicant is to provide evidence of Town approval to use Town property and evidence of approval of the Town:

- Any Wind Turbine or Wind Turbine Project to be built on property owned by the Town
- Any Type 2, 3 or 4 Wind Turbine to be partially or totally owned by the Town.

Table 2: Summary of Permitting Review and Authority

Type	CEO	PB	Town
1	Yes	N/A	If Town Property or Ownership
2	N/A	Yes	If Town Property or Ownership
3	N/A	Yes	If Town Property or Ownership
4	N/A	Yes	If Town Property or Ownership

12.0 Operational License

12.1 An Operational License is required for the operation of all Type 3 and Type 4 Wind Turbine Projects.

12.2 Applications for an Operational License shall be submitted to the Enforcing Authority.

12.3 An Operational License shall be valid for five years.

12.4 The granting of an Operational License is conditional upon the following criteria:

12.4.1 For the initial Operational License, the Wind Turbine Project must successfully pass an inspection for structural and operational integrity conducted by a Maine licensed professional engineer. The inspection shall be conducted after construction is completed but before operations begin. Success will be demonstrated by submission of a copy of the engineer's inspection report to the Enforcing Authority. If the report specifies that repairs, maintenance or changes to safety procedures are necessary, the owner shall provide the Enforcing Authority with proof that the repairs have been completed, a written schedule for any recommended maintenance, and documentation of any updated safety procedures.

12.4.2 For a renewal of an Operational License, the inspection procedure and criteria

specified in Section 12.4.1 shall be completed six months prior to the expiration of the current Operational License.

12.5 Applications for Operational License renewals shall be submitted to the Enforcing Authority 6 months prior to their expiration.

12.6 Failure to comply with the provisions of this Ordinance may result in the suspension or revocation of the Operational License pursuant to Section 23.

12.7 An Operational License shall be deemed abandoned if its operation has ceased for twelve consecutive months. An Operational License expires immediately upon abandonment.

12.8 An Operational License shall automatically transfer upon transfer of ownership of the Wind Turbine Project.

12.9 An Operational License shall automatically terminate upon any amendment to a permit.

12.10 Fees

12.10.1 The application fee for an Operational License is $1,000.

12.10.2 The annual fee for an existing Operational License is $250.00.

13.0 Standards for Setbacks, Noise, Shadow Flicker, and Mitigation Waivers

13.1 Setback Standards

13.1.1 Setback standards for Type 1 Wind Turbines:

a. Non-participating Landowner Property Lines -Type 1 Wind Turbines less than or equal to 100' will be set back from the property line of any Nonparticipating Landowner a distance of no less than 1.5 times the turbine height. Type 1 Wind Turbines greater than 100' and less than 150' will be set back from the property line of any Non-participating Landowner a distance of no less than 3 times the turbine height. Non-participating property owners may waive this setback with a written Mitigation Waiver. (See Section 13.4 -Mitigation Waiver).

b. Public Roads - Type 1 Wind Turbines will be set back from any public road a distance no less than 1.5 times the turbine height.

13.1.2 Setback standards for Type 2,3,and 4 wind turbines:

a. Non-participating Landowner Property Lines - Type 2, 3 and 4 Wind Turbines will be set back from the property line of any non-participating landowner a distance of no less than 13 times the turbine height. Non-participating property owners may waive this setback with a written

Mitigation Waiver (see Section 13.4 - Mitigation Waiver).

b. Public Roads - Type 2, 3 and 4 Wind Turbines will be set back from any public road a distance no less than 4 times the turbine height.

13.1.3 Setbacks from Scenic or Special Resources

All Wind Turbines exceeding 80 feet or tree height on site, whichever is greater, must be set back a minimum of 2,500 feet from any Scenic or Special Resource as defined in Section 8.

Table 3: Summary of Setback Standards

Turbine Type	Non-participating Property Line	Public Roads	Scenic or Special Resources
Type 1 <=100'	1.5x Turbine Height	1.5x Turbine Height	2500' if greater than 80' or tree height
Type 1 >100' and < 150'	3x Turbine Height	3x Turbine Height	2500' if greater than 80' or tree height
Type 2,3&4	13x Turbine Height	4x Turbine Height	2500' if greater than 80' or tree height

13.2 Noise Standards

13.2.1 Noise Limits at Non-participating Property Lines

For Type 1and Type 2 Wind Turbines , audible noise levels (dBA)at the property line due to wind turbine operations shall not exceed 35 dB(A) from 6 AM (8 AM on Sundays) to 8:30 PM and 30 dB(A) from 8:30 PM to 6 AM (8 AM on Sundays). Property owners may waive this noise restriction with a written Mitigation Waiver. (see Section 13.4 -Mitigation Waiver).

13.2.2 Noise Standards for Type 3 and 4 wind turbines:

a. Audible noise levels (dBA) due to wind turbine operation will not exceed:

The pre-construction ambient noise level by more than 5dBA as measured at any property line. Pre-construction ambient noise studies shall be conducted, by the applicant, for all properties located within 2 times the setback of proposed wind turbine site.

Non-participating property owners may waive these noise restrictions with a

written Mitigation Waiver. (see Section 13.4 -Mitigation Waiver).

b. Low frequency noise levels (dBC) due to wind turbine operation as measured inside an occupied building or at any property line will not exceed:

i. 20 decibels (measured as dBC) above the pre-construction ambient noise level (measured as dBA). Pre-construction ambient noise studies shall be conducted, by the applicant, for all properties located within 2 times the setback of proposed wind turbine site.

ii. 50 dBC.

Property owners may waive these noise restrictions with a written Mitigation Waiver. (see Section 13.4 Mitigation Waiver)

c. Noise measurement standards and procedures that must be used are contained in Appendix A.

13.2.3 Violations and Enforcement

13.2.3.1 A serious noise violation is defined as three (3) verified noise complaints as defined by a written or verbal complaint receivedby the Enforcing Authority attributed to the operation of a Wind Turbine within a period of one month or less with a measurable noise level greater than:1) 10 dBA above the noise limits listed in section 13.2.1 for Type 1 and Type 2 Turbines; or 2)10 dBA above pre-construction ambient noise levels or 50 dBC inside or at an Occupied Building. For serious violations the Owner/operator will respond within five (5) days of the complaint. Testing, if necessary, will be paid for by the Owner/operator and hired independently by the Town, and will commence within ten working days of the complaint. Testing will be conducted for a minimum of a one-month period according to the measurement standards and procedures in Appendix A. The Owner/operator is responsible for mitigating the problem within ten (10) days from a final determination of any cause attributed to the operation of the Wind Turbine. Failure to mitigate the problem will result in the Wind Turbine being declared unsafe and emergency shutdown procedures will be implemented per Section 22.5 of this Ordinance.

13.2.3.2 Noise violations not determined to be an emergency pursuant to Sections 22.5, or not determined to be a serious violation pursuant to Section 13.2.3.1, shall be managed pursuant to Section 22.7. Testing, if necessary, will be hired by the Enforcing Authority and will be paid for from the testing escrow account. Testing will be conducted for an appropriate period of time and conducted according to the measurement standards and procedures set forth in Appendix A. The Owner/operator is responsible for mitigating the problem within 30 days from a final

determination of any cause attributed to the operation of the Wind Turbine Project. Mitigation involving significant construction or physical modification may have up to 90 days to be completed pursuant to Section 16.4.1.

13.3 Shadow Flicker and Blade Reflection

13.3.1 Wind Turbines shall be designed and sited so that shadow flicker and/or blade reflection will not fall on a shadow flicker receptor as defined in Section 8. The flicker or reflection shall not exceed 10 hours per year for any given shadow flicker receptor.

13.3.2 Violations and Enforcement

13.3.2.1 A serious shadow flicker or blade reflection violation is defined as: 1) three (3) days of shadow flicker or blade reflection, in any one month falling on an Occupied Building receptor that, if annualized, will be estimated to be more than 20 hours per year. The predictive annualized calculation for Occupied Buildings shall assume clear weather, but take into account seasonal tracking of the sun. For serious violations the Owner/operator will respond within five (5) days of the complaint. The Owner/operator is responsible for mitigating the problem within ten (10) days from a final determination of any cause attributed to the operation of the Wind Turbine. Failure to mitigate the problem will result in the Wind Turbine being declared unsafe and emergency shutdown procedures will be implemented per Section 22.5 of this Ordinance.

13.3.2.2 Shadow flicker and blade reflection not determined to be a serious violation pursuant to Section 13.3.3.1, shall be managed pursuant to Section 22.7. Field verification and modeling, if necessary, will be hired by the Enforcing Authority and paid for from the testing escrow account. The Owner/operator is responsible for mitigating the problem within 30 days from a final determination of any cause attributed to the operation of the Wind Turbine Project. Mitigation involving significant construction or physical modification may have up to 90 days to be completed pursuant to Section 16.4.1.

13.4 Mitigation Waiver

Non-participating Landowners may waive specified protections of setbacks, noise and shadow flicker in this Ordinance using the Mitigation Waiver format in Appendix F, as negotiated between the wind turbine Applicant and the Non-participating Landowner. Copies of executed Mitigation Waivers must be included with the submission of the wind turbine application. The Mitigation Waiver must be recorded in the Waldo County Register of Deeds, describe the benefited and burdened properties and run with the land. The deed must advise all subsequent owners of the burdened property.

14.0 Standards for all Wind Turbines (Type 1, 2, 3, and 4)

14.1 Building Codes

All components of the Wind Turbine Project shall conform to relevant and applicable local, state and national building codes.

14.2 Electrical Components and Interconnections

All electrical components of the Wind Turbine and Wind Turbine Project shall conform to relevant and applicable local, state, and national codes.

14.3 Signal Interference

Wind Turbine Projects will be designed and sited to prevent the disruption or loss of radio, telephone, television, or similar signals. Additional standards must be met for Type 3 and 4 Wind Turbines (See section 16.7)

14.4 Guide wires

Bird flight diverters must be installed on any tower with guide wires.

15.0 Additional Standards for Type 2, 3 and 4 Wind Turbines

15.1 Appearance and Visibility Standards

15.1.1 Wind Turbines shall be a non-reflective, non-obtrusive color such as white, off-white or gray, or as may otherwise be required by another governmental agency with jurisdiction over the Wind Turbine Project.

15.1.2 The design of the buildings and related structures shall, to the extent possible, use materials, colors, textures, screening and landscaping that will blend the site to the natural setting and existing environment.

15.1.3 Wind Turbines shall not be artificially lighted, except to the extent consistent with Federal Aviation Administration recommendations or other applicable authority that regulates air safety or as is otherwise required by another governmental agency with jurisdiction over the Wind Turbine Project. Additional lighting standards must be met for Type 3 and Type 4 Wind Turbines (see Section 16.2.6).

15.1.4 Wind Turbines shall not be used to support signs and shall not display advertising except for reasonable and incidental identification of the turbine manufacturer, facility owner and operator, and for any appropriate warnings.

15.2 Safety Standards

15.2.1 Design

The design of the Wind Turbines and Wind Turbine Project shall conform to applicable industry standards, including those of the American National

Standards Institute, and shall comply with standards promulgated by Underwriters Laboratories, Det Norske Veritas, Germanishcer Lloyd Wind Energies or other similar certifying organizations appropriate for the turbines' size and classification. If two standards are in conflict, then the most restrictive would apply.

15.2.2 Access

All ground-mounted electrical and control equipment and all access doors to a Wind Turbine shall be labeled and secured to prevent unauthorized access. A Wind Tower shall not be climbable up to fifteen (15) feet above ground surface.

15.2.3 Warnings

A clearly visible warning sign concerning voltage must be placed at the base of all pad-mounted transformers and substations.

15.2.4 Controls and Brakes

Each Wind Turbine shall be equipped with a redundant braking system that includes both aerodynamic over-speed controls (including variable pitch, tip, and other similar systems) and mechanical brakes. Mechanical brakes shall operate in fail-safe mode. Stall regulation shall not be considered a sufficient braking system for over-speed protection.

15.2.5 Blade Clearance

The minimum distance between the ground and all blades of a Wind Turbine shall be 25 feet as measured at the lowest arc of the blades.

15.3 Liability Insurance

The Applicant shall submit proof of a current general liability policy for the Wind Turbine and/or Wind Turbine Project that covers bodily injury and property damage with limits in an amount commensurate with the scope and scale of the Turbine or Project as determined by the Planning Board, as part of the application. The Planning Board amount may not be unreasonable as determined by industry standards.

16.0 Additional Standards for Type 3 and 4 Turbines

16.1 Financial Performance Standards

The Applicant must demonstrate that the Wind Turbine Project is financially viable and that the Owner/operator has the financial ability to complete the project. Proof of financial viability shall include proof of financing.

16.2 Environmental Impact Standards

16.2.1 Environmentally Sensitive Area

The plan for the Wind Turbine Project will reflect the natural capabilities of the site to support development. Environmentally sensitive areas, including but not limited to wetlands, steep slopes, watersheds, floodplains, significant wildlife

habitats, fisheries, habitat for rare or endangered plants and animals, unique natural communities and natural areas, sand and gravel aquifers will be maintained and preserved to the maximum extent. The Applicant shall demonstrate appropriate measures for protecting these resources, including both during construction and post construction.

16.2.2 Wildlife Protection

16.2.2.1 The Applicant will demonstrate that the Wind Turbine or Wind Turbine Project will not have a significant adverse effect on area wildlife and wildlife habitat. Such analysis shall include adverse effects to birds, bats, game animals, and habitat fragmentation. In addition, the Applicant must demonstrate that the Wind Turbine Project will have no significant adverse effect on rare, threatened or endangered wildlife. The wildlife and habitat analysis must include appropriate pre-construction field studies and at least three sets of corresponding post-construction field studies conducted at periodic intervals within 3 years after the Wind Turbines become operational as outlined in Section 16.5.6. These studies will be conducted by a qualified wildlife biologist hired by the Town of Jackson and paid for by the Applicant. In making its determination under this section the Planning Board shall also consider the written comments and/or recommendations, if any, of the Maine Department of Inland Fisheries and Wildlife (MDIFW) and the Maine Natural Areas Program (MNAP).

16.2.2.2 If the post-construction field studies demonstrate significant adverse effect to birds, bats, game animals or habitat fragmentation, the Town, and the Owner/operator shall develop an appropriate mitigation plan. The Owner/operator will be responsible for the full cost of implementing the mitigation plan.

16.2.3 Raptor Habitat

To the extent practicable, the creation of artificial habitat for raptors or raptor prey shall be minimized. In making its determination under this subsection the Planning Board shall consider comments and recommendations, if any, provided by the Maine Department of Inland Fisheries and Wildlife.

16.2.4 Erosion Control

The Wind Turbine Project will be designed, constructed and maintained in accordance with accepted erosion and sedimentation control methods. The acceptability of the proposed methods will be reviewed utilizing the "Maine Erosion Control Handbook for Construction: Best Management Practices", March 2003, as amended. Whenever sedimentation is caused by stripping vegetation or grading it shall be the responsibility of the Owner/operator to remove it from all adjoining surfaces, drainage systems and watercourses and to repair any damage at the Owner/operator's expense as quickly as possible.

16.2.5 Groundwater Protection

The Wind Turbine Project will not adversely affect the quality or quantity of groundwater. The Applicant shall have to demonstrate to the Planning Board's satisfaction that there are no unusual risks to the groundwater created by the project. The Board may require as a condition of permit approval, that spill prevention and control measures be installed, and that all activities involving potentially permeable pollutants, including at delivery and transfer points, be conducted under cover and over an impervious surface surrounded by dikes. If a Wind Turbine foundation is proposed in a bedrock area, a baseline of all wells, springs and certified public water sources within a half-mile radius of the foundation shall be established. If degradation or contamination occurs, permanent remedies shall be the responsibility of the Owner/operator.

16.2.6 Light Pollution

The Wind Turbine Project shall be designed to minimize the amount of nighttime light pollution. The Applicant shall provide a plan showing lighting on and around all Wind Turbines and Associated Facilities. Lighting on Wind Turbines shall be illuminated to Federal Aviation Administration (FAA) minimal standards using only red rather than white lights, if possible. The minimum number of Wind Turbines will be illuminated, per FAA rules. Lighting shall be shielded from ground view to FAA maximum standards.

16.2.7 Relation to DEP Certification and Permitting

If DEP has issued a Site Location of Development Act permit for a Type 3 Wind Turbine or Wind Turbine Project there is a rebuttable presumption that the development meets the requirements of section 16.2.1 and 16.2.2. If a DEP Site Location of Development permit is required for a Type 4 Wind Turbine or Wind Turbine Project, the Planning Board may take the recommendations under advisement to determine compliance with Section 16.2.1 and 16.2.2.

16.3 Scenic or Special Resource Standards

16.3.1 Except as otherwise provided in this subsection, if a Type 3 or Type 4 Wind turbine is proposed for location in, or is visible from, a Scenic or Special Resource, the Applicant shall provide the Planning Board with a visual impact assessment that addresses the evaluation criteria in subsection 16.3.3. There is a rebuttable presumption that a visual impact assessment is not required for those portions of a Type 3 or Type 4 Wind Turbine that are located more than 3 miles, measured horizontally, from a Scenic or Special Resource. The Planning Board may require a visual impact assessment for portions of the Type 3 or Type 4 Wind Turbine located more than 3 miles and up to 8 miles from a Scenic Resource if it finds that a visual impact assessment is needed to determine if there is the potential for significant adverse effects on the Scenic or Special Resource. Any interested Person must submit information intended to rebut the presumption to the Planning Board within 30 days of acceptance of the application as complete. The Planning Board shall determine if the presumption is rebutted based on a preponderance of evidence in the record.

16.3.2 The Planning Board shall determine, based on consideration of the evaluation criteria in subsection 16.3.3, whether the Type 3 or Type 4 Wind Turbine has a significant adverse effect on the scenic character or existing uses related to scenic character of that Scenic or Special Resource.

16.3.3 In making its determination pursuant to subsection 16.3.2, and in determining whether an Applicant for a Type 3 or 4 Wind Turbine located more than 3 miles from a Scenic Resource must provide a visual impact assessment in accordance with subsection 16.3.1, the Planning Board shall consider:

a. The significance of the potentially affected Scenic or Special Resource;

b. The existing character of the surrounding area;

c. The Type 3 or Type 4 Wind Turbine Project's purpose and the context of the proposed activity;

d. The extent, nature and duration of potentially affected public uses of the Scenic or Special Resource and the potential effect on the public's continued use and enjoyment of the Scenic or Special Resource; and

e. The scope and scale of the potential effect of views of the Wind Turbine Project on the Scenic or Special Resource, including but not limited to issues related to the number and extent of Wind Turbines visible from the Scenic or Special Resource, the distance from the Scenic or Special Resource and the effect of prominent features of the Wind Turbine Project on the landscape.

16.3.4 Relation to DEP Certification and Permitting

If DEP has issued a Site Location of Development Act permit for a Type 3 Wind Turbine or Wind Turbine Project, there is a rebuttable presumption that the development meets the requirements of Sections 16.3.1, 16.3.2 and 16.3.3. If a DEP Site Location of Development permit is required for a Type 4 Wind Turbine or Wind Turbine Project, the Planning Board may take the recommendations under advisement to determine compliance with Sections 16.3.1, 16.3.2 and 16.3.3.

16.4 Construction/Design Standards

16.4.1 General Construction Standards

All Wind Turbines shall be constructed in compliance with Good Utility Practice for Wind Turbines. In the event that, after inspection by a qualified expert in Good Utility Practice, the Town concludes that any of the Wind Turbines were not constructed in compliance with Good Utility Practice or constitutes a danger to persons or property, then upon notice being provided, Owner/operator shall have 90 days to bring the non-compliant Wind Turbine(s) into compliance with such standards. If 90 days is insufficient time to cure the non-compliance, the Owner/operator shall present a plan to the Town describing the reason for the delay and the time frame for the cure to be put in place.

16.4.2 Electrical Design Standards

On-site power and transmission lines shall be placed underground. Wind Turbines shall be engineered according to Good Utility Practice to absolutely prevent transient ground currents and stray voltage. The Applicant shall demonstrate how these standards will be met prior to permit approval.

16.4.3 Transmission Line Standards

The Applicant must, after consultation with the Maine Public Utility Commission (PUC), prepare a written report documenting all anticipated changes, modifications or upgrades to the public utility grid within the Town of Jackson due to the Wind Turbine Project. The consultation shall include any needed modifications or changes to the utility grid, regulatory approvals necessary, and alternatives available. The written report must include necessary approvals from the PUC, proof of leases or required right of ways for transmission lines, and any alternatives to the final plan considered. The report must document the residual capacity remaining in the local utility grid that is available for use by other local electrical generating projects.

16.4.4 Geological Stability

Wind Turbines shall not be constructed on areas of geological instability. The Applicant shall demonstrate that this standard is met.

16.5 Operational Performance Standards

16.5.1 General Performance Standards

All Wind Turbines shall be operated and maintained consistent with Good Utility Practice for comparable facilities.

16.5.2 Repairs and Maintenance

The Owner/operator shall be required to repair and replace the wind turbine generator and associated equipment consistent with Good Utility Practice as needed to keep the Wind Turbine and Associated Facilities in good repair and operating condition.

16.5.3 Inspections

Wind Turbines shall be inspected after construction is completed but before becoming operational, and at least every five years thereafter, for structural and operational integrity by an independent Maine licensed professional engineer not employed by the Owner/operator and approved by the Enforcing Authority. The Owner/operator shall submit a copy of the inspection report to the Enforcing Authority. If such report recommends that repairs or maintenance are to be conducted, the owner shall provide the Enforcing Authority a written schedule

for the repairs or maintenance. Failure to complete the repairs or maintenance in accordance with the schedule shall be deemed a violation of this Ordinance.

16.5.4 Operational License

All Type 3 and Type 4 Wind Turbine Projects require a valid Operational License to operate as per Section 12.

16.5.5 Liability Insurance

The Applicant or its designee shall annually provide certificates of insurance to the Town of Jackson, with the Town of Jackson named as additional insured. The amount of the liability policy shall be set by the Town of Jackson in an amount commensurate with the scope and scale of the Wind Turbine Project and may not be unreasonable as determined by industry standards.

16.5.6 Wildlife Protection

The wildlife and habitat analysis outlines in Section 16.2.2.1 must have at least three sets of corresponding post-construction field studies conducted at periodic intervals within 3 years after the Wind Turbines become operational. These studies will be conducted by a qualified wildlife biologist hired by the Town of Jackson and paid for by the Applicant.

16.6 Public Safety and Health Standards

16.6.1 Fire Protection

The Applicant shall prepare a plan in consultation with the Town of Jackson fire department as part of the permitting process. The plan shall address all activities at the Wind Turbine Project from the start of construction through the end of power generation and the final removal and restoration of the site, and shall describe a response plan to address all identified potential fire, rescue and hazardous materials scenarios. The Owner/operator shall ensure that the Wind Turbine Project complies with the following control and prevention measures and assumes responsibility for all associated incremental costs:

a. Use of fire proof or fire resistant building materials and buffers or fire retardant landscaping around Wind Turbines and Wind Turbine Projects as appropriate.

b. Incorporation of a self contained fire protection system to address nacelle fires or a written explanation of why this standard would create an undue hardship.

c. Maintenance of firebreak areas as appropriate, cleared of vegetation and maintained as a fire/fuel break as long as the Wind Turbine is in operation.

d. All private road access to the Wind Turbine Project shall be brought up to Town

of Jackson minor roads standards, as per the Jackson Land Use Ordinance Section 7, to accommodate fire and rescue vehicles and paid for by the Owner/Operator

e. Provision for any additional fire fighting or rescue personnel, services, training, materials, or vehicles as may be required to address any emergency related to the Wind Turbine Project that is beyond the current capabilities and duties of the local fire department.

16.6.2 Hazardous Wastes:

The Owner/operator shall be responsible for compliance with all ordinances, state regulations and laws applicable to the generation, storage, cleanup, and disposal of hazardous wastes generated during any phase of the project's life.

16.6.3 Blasting

Owner/operator shall not undertake any blasting in connection with the construction of the Wind Turbine Project unless Applicant has notified the Town and submitted a blasting plan consistent with applicable laws and regulations. The plan must be reviewed and approved by the Enforcing Authority before any blasting may take place.

16.7 Communications and Electromagnetic Interference Standards

16.7.1 Wind Turbine Projects shall be sited and operated so that they do not interfere with emergency (fire, police/sheriff, ambulance) radio two way communications (base stations, mobile, and hand held radios, including digital) and/or paging, television, telephone (including cellular and digital), microwave, satellite (dish), navigational, internet or radio reception to neighboring areas. The Owner/operator of the project shall be responsible for the full cost of any remediation necessary to provide equivalent alternate service or correct any problems, including relocation or removal of the Wind Turbine, and any and all related transmission lines, transformers, and other components related to the interference.

16.7.2 The Owner/operator of the Wind Turbine Project shall respond within one day to any request for communications interference investigation by any emergency agency (fire, police/sheriff, ambulance). Testing will commence within two days of the request. The Owner/operator is responsible for mitigating within two days from the determination of interference attributed to the operation of the Wind Turbine.

16.7.3 The Owner/operator of the Wind Turbine Project shall respond within five business days to any request for communications interference investigation by a property owner or resident within a three-mile radius of the Wind Turbine Project. Testing will commence within ten business days of the request. The owner/operator is responsible for mitigating within ten business days from the

determination of interference attributed to the operation of the Wind Turbine.

16.8 Ground Transportation Standards

16.8.1 The Applicant shall identify all public ways to be used within the Town of Jackson to transport equipment and parts for construction, operation or maintenance of the Wind Turbines.

16.8.2 A qualified third party engineer, hired by the Planning Board and paid for by the Applicant, shall document road conditions prior to construction. The engineer shall document road conditions again thirty (30) days after construction is complete or as weather permits.

16.8.3 The Town of Jackson may bond the road(s) in compliance within state regulations, and the bond is to be paid for by the applicant prior to transport of the wind turbine project components.

16.8.4 Any road damage caused by the Applicant or its contractors shall be promptly repaired at the Owner/operators expense.

16.8.5 The Applicant shall demonstrate that it has appropriate financial resources to ensure the prompt repair of damaged roads.

16.9 Reporting Requirements:

16.9.1 Extraordinary Events.

The Owner/operator shall notify the Enforcing Authority of any extraordinary event within 24 hours of that event. "Extraordinary events" shall include but not be limited to tower collapse, catastrophic turbine failure, fires, leakage of hazardous materials, unauthorized entry to the tower base, thrown blade or hub, any serious injury to a Facility worker or other person that requires emergency medical treatment, or other event that impacts the public health and safety of the Town or its residents.

16.9.2 Change of Owner/operator

The Owner/operator will notify the Town of Jackson of a pending change of ownership in writing 90 days before the effective change.

16.9.3 The Owner/operator must provide copies of reports from safety inspections required by Section 16.5.3 within 30 days of each inspection.

16.9.4 The Owner/operator must provide copies of liability insurance required by Section 15.3 annually prior to relicensing .

17.0 Application Submission Requirements and Procedural Time Frames for Type 1, 2, 3, & 4

17.1 Type 1 Application

17.1.1 Pre-application Meeting

The Applicant will schedule a pre-application meeting with the CEO. The meeting will be used to review the scope of the proposed project and submission requirements. The meeting may be scheduled up to six months prior to submission of the application.

17.1.2 Application Submission

The Applicant will submit an application to the CEO. The CEO will conduct an on site inspection and collect any required fees associated with the application. Submission requirements and fees for a Type 1 Application are outlined in Appendix B. The Town Clerk will establish a file for the application. The Town Clerk will notify, in writing, all abutters .

17.1.3 Completeness Review

The CEO will notify the Applicant within 30 days from the date of submission whether the application is complete. If the application is deemed to be incomplete the CEO shall indicate the additional information needed. The application shall be deemed abandoned unless the Applicant provides the information requested, or submits in writing the reason for any delay within 30 days from the date of notice indicating the application is incomplete.

17.1.4 Final Determination:

A decision to approve or reject the application, or to approve the application with conditions, will be made by the CEO within 30 days from the date of completion. The CEO's decision must be based on whether the application complies with the requirements of the Ordinance.

17.1.5 Public Hearings

Public hearings for Type 1 Wind Turbines are not required. Non-participating landowners within 1.5x Turbine Height may request a meeting with the CEO to review compliance with the applicable standards.

17.2 Type 2 Applications

17.2.1 Pre-application Meeting

A pre-application meeting with the Planning Board will be scheduled at a regularly scheduled public Planning Board meeting. At the meeting the Applicant will review the type and scope of the project and the Planning Board will review

Ordinance Standards and submission requirements. The Planning Board will establish an application file at this time.

17.2.2 Site Inspection

The Planning Board and Applicant will set a mutually agreeable time for the Planning Board to inspect the site. The inspection will be scheduled within 30 days of the pre-application meeting unless rendered impractical due to seasonal conditions. Site visits will normally be postponed if there is more than one foot of snow on the ground. The site inspection is a public meeting of the Planning Board with appropriate notices given to the community. The Applicant shall, at minimum, flag the location of the proposed Wind Turbine, relevant property boundaries, and locations for power lines. The Applicant or a representative will accompany the Planning Board on the site inspection to describe the project and answer any questions.

17.2.3 Notice to Abutters

In addition to any required public notices, the Planning Board will prepare a notice to abutting property owners and property owners within a distance of 2x the setback of the Wind Turbine. The notice will briefly describe the proposed Wind Turbine Project and notify the recipient of the date, time and place of the site inspection. The notice will be sent by certified mail with mailing costs paid for by the Applicant.

17.2.4 Determine Submission Requirements

Within 30 days of the site inspection the Planning Board shall inform the Applicant in writing of the submission requirements for the application. The submission requirements for Type 2 Wind Turbine Projects are listed in Appendix C. The Planning Board may add to or modify any of the submission requirements if additional information is needed to protect the general health, safety, and welfare of the Town or its residents. The Planning Board may, independently and without influence or petition from the Applicant or Applicants representative, modify or waive submission requirements that would not be applicable and would not adversely affect abutting property owners or the general health, safety and welfare of the Town or its residents. The reasoning supporting changes to submission requirements must be substantiated in Board minutes and filed with the Applicant.

17.2.5 Application Submission

The Applicant has up to 120 days after the determination of submission requirements to submit a completed application with the required fees to the Town Clerk. The application shall be deemed abandoned unless the application has been received within 120 days of the determination of submission requirements. The Town Clerk will forward the application to the Planning Board.

17.2.6 Completeness Review

The Planning Board will notify the Applicant within 30 days from the date of submission whether the application is complete. If the application is deemed to be incomplete the Planning Board shall indicate the additional information needed. The application shall be deemed abandoned unless the Applicant provides the information requested, or submits in writing the reason for any delay within 30 days from the date of notice indicating the application is incomplete.

17.2.7 Public Hearing

The Planning Board will schedule a public hearing to be held within 30 days of the determination of completeness on the Wind Turbine Project.

17.2.8 Final Planning Board Determination

A decision to approve or reject the application, or to approve the application with conditions, will be made by the Planning Board within 30 days from the date of the public hearing.

17.3 Type 3 Applications

17.3.1 Pre-application Meeting

A pre-application meeting with the Planning Board will be scheduled at a regularly scheduled public Planning Board meeting. At the meeting the Applicant will review the type and scope of the project and the Planning Board will review Ordinance Standards and submission requirements. The Planning Board will establish an application file at this time.

17.3.2 Site Inspection

Planning Board and Applicant will set a mutually agreeable time for the Planning Board to inspect the site. The inspection will be scheduled within 30 days of the pre-application meeting unless rendered impractical due to seasonal conditions. Site visits will normally be postponed if there is more than one foot of snow on the ground. The site inspection is a public meeting of the Planning Board with appropriate notices given to the community. While the Planning Board may set additional requirements related to the ordinance for the site inspection at the pre-application meeting, the Applicant shall, at minimum, flag the location of the proposed Wind Turbine(s) and relevant property boundaries. The Applicant or a representative will accompany the Planning Board to describe the project and answer any questions.

17.3.3 First Public Hearing

The Planning Board will schedule a public hearing to be held within 30 days of

the site inspection on the Wind Turbine Project.

17.3.4 Notice to Abutters

In addition to any required public notices for the site inspection and first public hearing, the Planning Board will prepare a notice to abutting property owners and property owners within a distance of 2x the setback of the Wind Turbine Project. The notice will briefly describe the proposed Wind Turbine Project and notify the recipient of the dates, times and places of the site inspection and first public hearing. The notice will be sent by certified mail with mailing costs paid for by the Applicant.

17.3.5 Determine Submission Requirements

Within 30 days of the site inspection the Planning Board shall inform the Applicant in writing of the submission requirements for the application. The submission requirements for Type 3 Wind Turbine Projects are listed in Appendix D. The Planning Board may add to, or modify any of the submission requirements if additional information is needed to protect the general health, safety, and welfare of the Town or its residents. The Planning Board may, independently and without influence or petition from the Applicant, modify or waive submission requirements that would not be applicable and would not adversely affect abutting property owners or the general health, safety and welfare of the Town or its residents. The reasoning supporting changes to submission requirements must be substantiated in Board minutes and filed with the Applicant.

17.3.6 Application Submission

The Applicant has up to 180 days after the determination of submission requirements to submit a completed application with the required fees to the Town clerk. The application shall be deemed abandoned unless the application has been received within 180 days of the determination of submission requirements. The Town Clerk will forward the application to the Planning Board.

17.3.7 Completeness Review

The Planning Board will notify the Applicant within 60 days from the date of submission whether the application is complete. Specific studies may be required for a consideration of completeness including but not limited to noise studies, DEP certification and permitting, and environmental impact studies. If the application is deemed to be incomplete the Planning Board shall indicate the additional information needed. The application shall be deemed abandoned unless the Applicant provides the information requested, demonstrates that additional time is need to complete required studies, or submits in writing the reason for any delay within 30 days from the date of notice indicating the application is incomplete.

17.3.8 Second Public Hearing

The Planning Board will schedule a second public hearing to be held within 60 days of the determination of completeness on the Wind Turbine Project.

17.3.9 Notice to Town of Jackson

In addition to any required public notices for the second public hearing, the Planning Board will prepare a notice to all residents and property owners in the Town of Jackson. The notice will briefly describe the proposed Wind Turbine Project and notify the recipient of the date, time and place of the second public hearing. The notice will be sent by certified mail with mailing costs paid for by the Applicant.

17.3.10 Final Planning Board Determination

A decision to approve or reject the application in accordance with the provisions of this Ordinance, or to approve the application with conditions, will be made by the Planning Board within 60 days from the date of the public hearing.

17.4 Type 4 Applications

17.4.1 Pre-application Meeting

A pre-application meeting with the Planning Board will be scheduled at a regularly scheduled public Planning Board meeting. At the meeting the Applicant will review the type and scope of the project and the Planning Board will review Ordinance Standards and submission requirements. The Planning Board will start a Project File at this time.

17.4.2 Site Inspection

Planning Board and Applicant will set a mutually agreeable time for the Planning Board to inspect the site. The inspection will be scheduled within 30 days of the pre-application meeting unless rendered impractical due to seasonal conditions. Site visits will normally be postponed if there is more than one foot of snow on the ground. The site inspection will be treated as a public meeting of the Planning Board with appropriate notices given to the community. While the Planning Board may set additional requirements for the site inspection at the pre-application meeting, the Applicant shall, at minimum, flag the location of the proposed Wind Turbine and relevant property boundaries. The Applicant or a representative will accompany the Planning Board to describe the project and answer any questions.

17.4.3 First Public Hearing

The Planning Board will schedule a public hearing to be held within 30 days of the site inspection on the Wind Turbine Project.

17.4.4 Public Notice

In addition to any required public notices for the site inspection and first public hearing, the Planning Board will prepare a notice to all Jackson residents and to all property owners within a distance of 2x the required setback distance of the proposed Wind Turbines which will offer a brief description of the proposed Wind Turbine Project and notify the recipient of the dates, times and places of the site inspection and first public hearing. The notice will be sent by certified mail with mailing costs paid for by the Applicant.

17.4.5 Determine Submission Requirements

Within 30 days of the site inspection the Planning Board shall inform the Applicant in writing of the submission requirements for the application. The submission requirements for Type 4 Wind Turbine Projects are listed in Appendix E. The Planning Board may add to, or modify any of the submission requirements if additional information is needed to protect the general health, safety, and welfare of the Town. The reasoning supporting changes to submission requirements must be substantiated in Board minutes and filed with the Applicant.

17.4.6 Application Submission

The Applicant has up to 180 days after the determination of submission requirements to submit a completed application with the required fees to the Town clerk. The application shall be deemed abandoned unless the application has been received within 180 days of the determination of submission requirements. The Town Clerk will forward the application to the Planning Board.

17.4.7 Completeness Review

The Planning Board will notify the Applicant within 60 days from the date of submission whether the application is complete. Specific studies may be required for a consideration of completeness including but not limited to noise studies, DEP certification and permitting, and environmental impact studies. If the application is deemed to be incomplete the Planning Board shall indicate the additional information needed. The application shall be deemed abandoned unless the Applicant provides the information requested, demonstrates that additional time is need to complete required studies, or submits in writing the reason for any delay within 30 days from the date of notice indicating the application is incomplete.

17.4.8 Second Public Hearing

Within 60 days of the determination of completeness the Planning Board will schedule a second public hearing on the Wind Turbine Project.

17.4.9 Public Notice

In addition to any required public notices for the second public hearing, the Planning Board will prepare a notice to all residents and property owners in the Town of Jackson and to all property owners within a distance of 2x the required setback distance of the proposed Wind Turbines in neighboring communities. The notice will briefly describe the proposed Wind Turbine Project and notify the recipient of the date, time and place of the second public hearing. The notice will be sent by certified mail with mailing costs paid for by the Applicant.

17.4.10 Final Planning Board Determination

A decision to approve or reject the application in accordance with the provisions of this Ordinance, or to approve the application with conditions, will be made by the Planning Board within 60 days from the date of the public hearing.

18.0 Professional Services

18.1 In reviewing an application for compliance with this Ordinance for Type 3 or Type 4, the Permitting Authority may retain professional services as necessary to assist with its review, including but not limited to those of an attorney, engineer, biologist, or land use planner. Within fourteen (14) days of filing an application the Applicant shall deposit in a joint escrow account with the Town an amount equal to one half of one percent of the estimated cost of the project. If the amount drops below 25% of the initial escrow amount, the Applicant upon notice shall submit an additional one half of one percent of the estimated cost of the project, as partial payment for the appropriate Town expenses in hiring consultants and experts, as the Permitting Authority shall, at its discretion, deem necessary. If at any time the balance of this fund falls below 25% of the initial escrow amount for a period of 30 days after notification the application shall be considered to have been withdrawn. The balance of the escrow account shall be returned to the Owner/operator after all expenses have been paid, and after a permit is granted or the Applicant has withdrawn.

18.2 After construction, the Applicant shall deposit in a joint escrow account with the Town an amount equal to one quarter of one percent of the estimated cost of the project. This shall be known as the testing escrow account. The funds in this account are available to the Enforcing Authority to use testing mandated by this ordinance. After three years, the balance of the escrow account shall be returned to the Applicant.

19.0 Application Changes

19.1 Throughout the permit process, the Applicant shall promptly notify the Permitting Authority of any changes to the information contained in the permit application.

19.2 Material changes may not be made to a Wind Turbine Project after an application is determined to be complete, without initiating a new application process. Material changes include, but are not limited to, increasing the number of Wind Turbines, increasing Turbine Height, changes to the location of Wind Turbines, or material

changes to Associated Facilities. Non-material changes require a permit modification as determined by the Permitting Authority. The Permitting Authority shall have sole discretion for determining what is a material or non-material change.

20.0 Cumulative Effect of Multiple Permits

The Town of Jackson reserves the right to limit the total number of Type 3 and Type 4 applications that are under review for approval at any given time. As a guideline:

1. The Permitting Authority will process no more than 2 Type 3 or Type 4 applications at the same time, or the deadline for submission and review may be modified correspondingly to reflect the increased workload of multiple permits.

21.0 Appeals

21.1 The Board of Appeals shall have the power to hear and decide administrative appeals 30 days from a decision, on an appellate basis, where it is alleged by an aggrieved party that there is a clear error in any order, requirement, decision, or determination made by, or failure to act by, the Reviewing Authority.

21.2 The Board of Appeals may reverse the decision of the Permitting Authority only upon finding that the Permitting Authority committed a clear error. The Board of Appeals may only review the record of the proceedings before the Permitting Authority. The Board Appeals shall not receive or consider any evidence that was not presented to the Permitting Authority, but the Board of Appeals may receive and consider written or oral arguments. If the Board of Appeals determines that the record of the Permitting Authority's proceedings is inadequate, the Board of Appeals may remand the matter to the Permitting Authority for additional fact finding.

21.3 For the purposes of hearing appeals for Type 1 and Type 2 permits, at a minimum, all property owners and residents within the maximum setback standard shall be deemed to have interested party standing and be granted a reasonable and appropriate amount of time to present information and rebuttals. For Type 3 and Type 4 permits, all property owners and residents of the Town shall be deemed to have interested party standings and be granted a reasonable and appropriate amount of time to present information and rebuttals..

22.0 Complaints/ Violations/ Enforcement

22.1 General Standard

It shall be unlawful for any person, firm or corporation to violate or fail to comply with or take any action that is contrary to the terms of this Ordinance, or any permit or Operational License issued under this Ordinance, or cause another to violate or fail to comply or take any action which is contrary to the terms of this Ordinance or any permit issued under this Ordinance.

22.2 Enforcing Authority

The CEO will serve as the Enforcing Authority for all Wind Turbine Projects.

22.2.1. It shall be the duty of the Code Enforcement Officer to enforce the provisions of this ordinance. If the Code Enforcement Officer shall find that any provision of this Ordinance is being violated, he or she shall notify in writing the person or entity responsible for such violation, indicating the nature of the violation and order the action necessary to correct it, including discontinuance or unlawful use of land, buildings, structures, or work being done. A copy of such notices shall be filed with the Town Clerk, to be maintained as a permanent record.

22.2.2. The Code Enforcement Officer shall conduct on-site inspections to ensure compliance with all applicable laws and conditions attached to permit or license approvals. The Code Enforcement Officer shall investigate all complaints in a timely manner.

22.2.3. The Code Enforcement Officer shall issue all Operational Licenses and renewals, consistent with the terms and conditions as provided herein.

22.2.4. The Municipal Officers are hereby authorized to enter into consent agreements for the purpose of eliminating violations of this Ordinance and recovery of appropriate fines prior to or during Court actions.

22.2.5. The Code Enforcement Officer shall appoint qualified representatives to investigate complaints. The reasonable costs and fees for the qualified representative will be paid by the Owner/operator and as a condition of licensing and may include engineers, consultants, and other professionals.

22.4 Enforcement & Penalties

22.4.1 Standards in this Ordinance will be enforced through a series of enforcement options including but not limited to 1) Emergency shutdown; 2) 5 day response to serious violations with a 10 day mitigation period; 3) 30 day complaint resolution with a 30 day mitigation period; 4) suspension or revocation of Operational License; and 5) 30-A M.R.S.A. § 4452.

22.4.2 Any person or entity that violates the terms or conditions of this Ordinance, or the terms and conditions of any permit or license issued pursuant to this Ordinance shall pay the reasonable attorney fees incurred by the Town of Jackson to prosecute said violation, including filing fees, expert fees and costs.

22.4.3 Each day of violation shall be a separate violation, for which penalties pursuant to 30-A MRSA 4452, as amended, may be assessed.

22.4.4 The Code Enforcement Officer may seek temporary and/or permanent injunctive relief as he or she deems appropriate, consistent with Maine law, in any prosecution for unlawful use of property, or for violation of the terms and conditions of a permit or license, or for any violation of the terms and conditions of this Ordinance.

22.5 Emergencies and Emergency Shutdown

The Owner/operator shall be required to immediately cease operations for the duration of any Emergency. Emergency shall mean a proven condition or situation as determined by the Enforcing Authority caused by the Wind Turbine or Wind Turbine Project that present an imminent physical threat of danger to life or significant threat to property. A Wind Turbine Project that is found to present an imminent physical threat of danger to life or significant threat of damage to property shall be immediately shut down and repaired or otherwise made safe and certified so by a professional engineer prior to resumption of operation. The Enforcing Authority shall have the right to access all Wind Turbines to verify conditions and/or repair progress with reasonable notice to the Wind Turbine owner/operator. Within 24 hours of an occurrence of a tower collapse, turbine failure, property damage or contamination, fires, thrown blade or hub, collector or feeder line failure, injured Wind Turbine worker or private person, the Owner/operator shall notify the Enforcing Authority of the occurrence and proposed remedial action.

22.6 Serious Violations of Standards

The Owner/operator of the Wind Turbine Project shall respond within five business days to any complaints of serious violations of standards, deemed by the Enforcing Authority to have merit. Serious violations shall include but not be limited to: 1) 3 verified noise complaints within a period of 1 month or less with a measurable noise level greater than a.) for Type 1 and Type 2, greater than 45 dBA daytime and 40 dBA nighttime; b.) for Type 3 and Type 4,10 dBA above pre-construction ambient noise at an Occupied building or 50 dBC at an Occupied Building; 2) serious violations of Shadow Flicker or Blade Reflection standards projected to be in excess of 20 hours annually at an Occupied Building; 3) any Shadow Flicker or Blade Reflection complaints effecting vehicles on Route 7; 4) contamination of potable groundwater sources used for domestic or livestock water supplies, 5) complaints of communication/electromagnetic interference; and 6) any complaints of hazardous waste spills. Testing, paid for by the Owner/operator, will commence within ten working days of the complaint. Except as noted for interference with emergency communications, the Owner/operator is responsible for mitigating the problem within ten business days from the final determination of any cause attributed to the operation of the Wind Turbine Project. Pursuant to Section 16.7.2, interference with emergency communications must be responded to in one day and mitigated within 2 days.

22.7 Other Violations

If the Enforcing Authority determines that a violation of the Ordinance or the permit has occurred, and the violation is determined neither to be an emergency pursuant to Section 22.5, nor a serious violation pursuant to Section 22.6, the Enforcing Authority shall provide written notice to the Owner/operator alleged to be in violation of this Ordinance or permit. The Enforcing Authority and the involved parties shall engage in good faith attempts to resolve the issues. Such attempts shall be conducted within thirty (30) days of the written notice of violation. The Owner/operator shall pay for any necessary testing if the Owner/operator is subsequently determined to be in non-compliance. The Owner/operator is responsible for mitigating the problem within 30 days from the final determination of

any cause attributed to the operation of the Wind Turbine Project. Mitigation involving significant construction or physical modification may have up to 90 days to be completed pursuant to Section 16.4.1.

22.8 Suspension or revocation of Operational License

Any Person or Applicant who fails to comply with any provision of this Ordinance by failing to reach agreement to resolve a violation with the Enforcing Authority after the expiration of the mitigation periods defined in Section 22.6 and Section 22.7, the Enforcing Authority may suspend or revoke the Operational License. The Person or Applicant has the right to appeal the suspension or revocation of the Operational License as per Section 21.0.

22.9 Other Remedies

The Enforcing Authority may require other remedies as it deems necessary to assure the safe operation of the Wind Turbine Project.

22.10 Identifying Violations and Registering Complaints

22.10.1 Pursuant to Section 16.9.1, the Owner/operator will report to the Enforcing Authority all extraordinary events within 24 hours of their occurrence.

22.10.2 For Type 1 and 2 Wind Turbines the CEO will receive complaints. Complaints will be forwarded to the CEO in a timely manner.

22.10.3 For Type 3 and Type 4 Wind Turbines the Town will maintain, at the Owner/operator's expense, a system for recording and investigating all complaints related to the Wind Turbine Project. The system must be able to receive complaints 24 hours a day, 365 days a year. A permanent record of all complaints, investigations and outcomes will be maintained. The Owner/operator will designate a representative and method to receive and respond to complaints from the Town 24 hours a day, 365 days a year. Complaints for Type 3 and 4 Wind Turbine Projects will be referred to the Code Enforcement Officer in a timely manner.

23.0 Decommissioning Standards:

23.1 The Owner/operator shall, at its expense, complete decommissioning of the Wind Turbine Project within: 1) twelve months (12) after the end of the useful life of the Wind Turbine as determined by the Owner/operator or; 2) as specified in the materials provided at the time of application or; 3) pursuant to remedies described in Section 22.9. The Wind Turbine or Wind Turbine Project will be presumed to be at the end of its useful life if no electricity is generated for a continuous period of twelve (12) months.

23.2 Decommissioning shall include removal of wind turbines and foundations to a depth of 36 inches. All buildings, cabling, electrical components, roads, and any other associated facilities shall be removed unless, at the end of the Turbine or

Wind Turbine Project's useful life, as determined in accordance with section 23.1, the Applicant provides written evidence of plans for continued beneficial use of these components of the Wind Turbine Project.

23.3 Except as otherwise provided by section 23.2, disturbed earth shall be graded and re-seeded, unless the Participating Landowner of the affected land requests otherwise in writing. Any alterations to Town roads or property during decommissioning must be approved by the Town.

23.4 Special Decommissioning Standards for Type, 3 and 4 Wind Turbine Projects

23.4.1 An independent and certified Professional Engineer shall be retained to estimate the total cost of decommissioning ("Decommissioning Costs" without regard to salvage value of the equipment, and the cost of decommissioning net salvage value of the equipment ("Net Decommissioning Costs"). Said estimates shall be submitted to the Town of Jackson after the first year of operation and every fifth year thereafter.

23.4.2 The Owner /operator shall post and maintain decommissioning funds in an amount equal to Net Decommissioning Costs; provided that at no point shall decommissioning funds be less than twenty five percent (25%) of Decommissioning Costs. The decommissioning funds shall be posted and maintained with a bonding company or Federal or State-chartered lending institution chosen by the Owner/operator and Participating Landowner posting the financial security, provided that the bonding company or lending institution is authorized to conduct such business within the State and is approved by the Town of Jackson, whose approval shall not be unreasonably withheld.

23.4.3 Decommissioning funds may be in the form of a performance bond, surety bond or other similar form of financial assurance as may be acceptable to the Town of Jackson, whose approval shall not be unreasonably withheld.

23.4.4 If the Owner/operator fails to complete decommissioning within the period prescribed by Section 23.1, then the Participating Landowner shall have an additional six (6) months to complete decommissioning.

23.4.5 If neither the Owner/operator, nor the Participating Landowner completes decommissioning within the periods prescribed by Sections 23.4.1 and 23.4.4 the Wind Turbine or Wind Turbine Project shall be deemed to be in violation of this Ordinance and the Town of Jackson may take such measures as necessary, including court action, to ensure the completion of decommissioning.

23.4.6 The escrow agent shall release the decommissioning funds when the Owner/operator has demonstrated and the Enforcement Authority concurs that the decommissioning has been satisfactorily completed, or upon written approval of the Town in order to implement the decommissioning

plan.

24.0 Community Owned Wind

24.1 Pursuant to Title 35-A M.R.S.A. §3402, the Town of Jackson encourages the development of appropriately sited Community Owned Wind Turbine Projects.

24.2 Pursuant to Title 35-A M.R.S.A. §3402 and 35-A M.R.S.A.§3451 the Town of Jackson has identified the Town property located on Common Hill, map number 008 and lot number 011, as a potential location for a Community Owned Wind Project. Other locations may also be considered.

24.3 Section 24.0 is governed by the definition of Community Owned Wind pursuant to Section 8 of this Ordinance. Nothing in this definition or in Section 24.0 precludes the Town from entering into Wind Turbine Projects in which the Town is a minority owner or general partner. However, by definition, these types of business models are not considered Community Owned Wind.

24.4 A request to pursue a Community Owned Wind Project can be initiated by:

1. The Planning Board, provided a majority of the Board has so voted;
2. Request of the municipal officers;
3. Written petition of at least 25 voters registered to vote in Jackson; or
4. The majority of the voters at a Town meeting.

24.5 A request or decision to lease Town property to a wind company as part of a Type 4 Industrial Wind Turbine application shall automatically trigger a feasibility study, unless the Town specifically votes to forgo the study.

24.6 After a request is initiated or triggered by Section 24.5, the Planning Board shall be authorized to conduct a feasibility study for the Community Owned Wind Project. Pursuant to Section B "Duties and Powers" of the Jackson Planning Board Ordinance, the Planning Board will establish a steering committee to conduct the feasibility study and will encourage non-board members to participate on the committee. The steering committee shall be authorized to hire appropriate professional consultants to assist with the feasibility study, within financial guidelines established in the Town budget or, if possible, through outside grant funding. The feasibility study shall include but not be limited to:

1. Measuring local wind resources through the use of MET towers or using other methods to identify wind resources
2. Identifying best options for Wind Turbine technology consistent with project scale and local ordinances
3. Identifying best options for financial performance and financial risk management
4. Identifying best options for ownership and legal structure
5. Identifying best options for financing including but not limited to state funding, municipal bonds, equity partners, bank financing, state and federal grants
6. Identifying best options for daily management and governance of the project

7. Identifying opportunities to maximize local financial benefit to both the Town and Town residents, including but not limited to: profit sharing, net metering, tax incentives, and local ownership and investment

8. Identifying opportunities for public-private partnerships and methods for competitive bidding and issuing requests for proposals (RFP)

9. Identifying a project time line and recommended next steps to be taken.

24.7 The feasibility study, including collection of 12 months of wind data, must be completed within 18 months from the date of request. During the feasibility study the Planning Board may vote to place competing Type 3 or Type 4 applications on hold, or suspend taking applications for competing Type 3 or Type 4 Wind Turbines until the study is completed and acted upon by the Town.

24.8 The final feasibility study shall be approved by the full Planning Board and presented to the Town at a special Town meeting and made available to all Town residents.

24.9 Action to pursue a Community Owned Wind Project shall require approval of the Selectmen, ongoing communication with Town residents through newsletters and mailings, appropriate public hearings, and final Community Owned Wind Project approval by majority vote at a Town meeting. The process shall do everything reasonable to maximize open, transparent public participation.

24.10 A Community Owned Wind Project, if adopted, shall strongly encourage and give preference to local bidding, local contracts and local employment. The Town reserves the right to accept and or reject any or all bids.

24.11 The Town of Jackson may partner with other municipalities in creating a Community Owned Wind Turbine Project, if together the municipalities create a legal structure giving the combined municipalities majority ownership or control and that the majority of the direct financial benefits accrue to all of the residents of the municipalities.

25.0 Jurisdiction Across Multiple Municipalities

Section 25.0 addresses issues unique to the geography of the Town of Jackson. Certain prominent ridges in the Town of Jackson share a common boundary with the neighboring Towns of Thorndike and Dixmont and have been identified as potential sites for Type 4 Industrial Wind Turbine Project. Permits for Wind Turbine Projects that share multiple municipal jurisdictions should be coordinated to the fullest extent possible across town boundaries, while at the same time maintaining each individual Town's right to individual Home Rule.

25.1 This Ordinance applies to Wind Turbine Projects located wholly or partially in the Town of Jackson to the fullest extent allowable by municipal, state, and federal law.

25.2 Approval to build or operate a Wind Turbine or Wind Turbine Project applies only to that portion of the Wind Turbine Project located within the boundaries of the Town of Jackson. However, the application must take into account the entire Wind Turbine Project across municipal boundaries, including but not limited to the total number of Wind Turbines, Turbine Height, Wind Turbine location and all other relevant facts and data that may directly or indirectly effect the operation and viability of that portion of the Wind Turbine Project located in the Town of Jackson.

25.3 Setback, Noise, Shadow Flicker and Mitigation Waiver standards for Wind Turbines and Wind Turbine Projects located and operated in the Town of Jackson shall apply to Occupied Buildings, property lines, and roads irrespective of Town boundaries. For the purpose of this section a resident of Dixmont or Thorndike is afforded the same protections as a resident of Jackson.

25.4 The Town Clerk shall forward notice of Wind Turbine permit applications within 10 days of receipt, and notice of hearings and public meetings 10 days in advance, to the Selectmen and Planning Boards of adjacent communities for all Type 2, 3 and 4 Wind Turbine or Wind Turbine Projects if the neighboring community, or an Occupied Building within the neighboring community, is located within a defined Setback of this Ordinance.

26.0 Ethical Standards

26.1 Transparency, Public Participation and Highest Ethical Standards

All public deliberations and decisions regarding Wind Turbine Projects and Community Owned Wind shall be conducted in an open, transparent manner that encourages the broadest public participation and adherence to the highest ethical standards.

26.2 Public Access

All deliberations concerning Wind Turbine Projects and Community Owned Wind, whether in writing or conducted verbally, by the Planning Board, Selectmen, Appeals Board, and any subcommittees or working groups of the afore mentions bodies shall fully comply with the letter and spirit of State law regarding Freedom of Access pursuant to Title1; Chapter 13; Subchapter 1. Specifically, all deliberations regarding Wind Turbine Projects between members of the Planning Board, Selectmen, Appeals Boards and any subcommittees and working groups shall be conducted at public meetings, which have been duly posted. Exceptions will be made only for: 1) appropriately recorded and executed executive sessions; and 2) communicating the minimal information necessary to set up and facilitate public meetings. Detailed minutes of deliberations and decisions concerning Wind Turbines and Community Owned Wind will be recorded and posted. Copies of all correspondence and e-mails will be made available to the public with the exception of those publically identified and disclosed as being subject to "attorney-client privilege" by the Town attorney. All documents, correspondence and e-mails generated by consultants on behalf of the Planning Board, the Selectmen, Appeals Board, their subcommittees and working groups shall be part of the public record.

26.3 Conflicts of Interest

The process to develop, permit and administer Wind Turbine or Community Owned Wind Projects shall be governed by a strict ethical code for conflicts of interest. No elected or appointed Town official or Town employee, their immediate family members, or their employees, who has a conflict of interest shall be directly or indirectly involved in the planning process or decision-making process for Wind Turbine Projects. Conflicts of interest include but are not limited to: 1) having a lease as a Participating Landowner for a Wind Turbine or transmission right-of-way; 2) having an identified financial arrangement with a wind development company including a signed Mitigation Waiver with financial remuneration, 3) serving as a paid representative of a wind development company, or a written or verbal promise for future employment or contracts from a wind development

company; 4) being directly or indirectly affiliated as an Applicant with a pending application for Type 3 or Type 4 Wind Turbine Project; 5) knowing there is a substantial opportunity to accept bids, receive remuneration, or employment valued at greater than $10,000 on behalf a wind development company or as a subcontractor or employee of the Community Owned Wind Project; Individuals with a conflict of interest must identify the conflict of interest and recuse themselves from all direct and indirect planning and decision-making regarding Wind Turbine Projects or Community Owned Wind, with the exception of voting and debating as a private citizen at any public meeting and public hearings.

26.4 Bidding and Contracting

All bidding, contracts and employment for Community Owned Wind Projects must be awarded through a process of public notice and competitive bidding. The Town of Jackson reserves the right to accept or reject any or all bids.

27.0 Comprehensive Energy Plan

The Planning Board shall develop a Comprehensive Energy Plan as part of the Jackson Comprehensive Plan. The Comprehensive Energy Plan shall make recommendations for local energy conservation and strategies to promote local energy generation, independence, security, and sustainability.

Appendix A - Noise Measurement Standards and Procedures

1. A qualified independent acoustical consultant shall conduct all noise studies. The acoustical consultant shall be hired by and report to the Planning Board or Enforcing Authority.
2. Sound level meters and calibration equipment must comply with the latest version of the American National Standards Institute " American Standard Specifications for General Purpose Sound Level Meters" (ANSI Standard S1.4) and shall have been calibrated at a recognized laboratory within one month prior to the initiation of the study.
3. Except as specifically noted otherwise, measurements shall be conducted in compliance with ANSI Standard S12.18-1994 "Outdoor Measurements of Sound Pressure.
4. Prior to permit application approval, a pre-construction ambient noise level study shall be conducted at each Occupied Building within 2 miles of any proposed wind turbine.
5. The tests shall be conducted using both an A-weighting scale (dBA) and low frequency C-weighting scale (dBC).
6. Tests shall be reflective of seasonal changes to vegetation and atmospheric conditions. At a minimum one set of tests should be performed during each of the four (4) calendar seasons of the year.
7. All measuring points shall be located in consultation with the property owners and such that no significant obstruction blocks noise and vibration to the site.
8. Outdoor noise level measurements must be taken at 6 feet above the ground and at least 15 feet from any reflective surface.
9. Duration of measurements shall be a minimum of ten continuous minutes for each criteria at each location.
10. Measurements must be made when the wind levels are less than 4.5 mph and with appropriate wind screening for the recording device.
11. Measurements should be obtained during representative weather conditions when the Wind Turbine noise is most noticeable, including periods of temperature inversion most commonly occurring at night.
12. Measurements shall be taken at each of the following three time periods:
    - Day (10 a.m. - 2p.m.)
    - Evening (7p.m. -11 p.m.)
    - Night (12 midnight - 4 a.m.)
13. Each measurement shall be replicated during the same time period over three different days within the same season for a total of 9 measurements per location per season (i.e., three daytime measurements in the winter, three evening measurements in the winter, three night time measurements in the winter). The lowest of the three measurements per time period, per season, will be used to determine the pre-construction ambient noise for that time period and season.

14. For each measurement the following minimum criteria will be recorded:

- L_{max}, L_{eq}, L_{10} and L_{90} in dBA[1]
- L_{max}, L_{eq}, L_{10} and L_{90} in dBC
- A narrative description of any intermittent noises registered during each measurement •

Wind speed and direction at time of measurement

- Description of weather conditions at time of measurement
- Description of topography and contours relative to proposed or actual Wind Turbines

15. A 5 dBA and/or a 5 dBC penalty shall be applied for short duration repetitive noise or repetitive impulse noise. This is a characteristic "thumping" or "whooshing" sometimes exhibited by larger Wind Turbines. Per Maine TA Bulletin #4, intermittent noise is a more serious nuisance than constant noise.

16. A 5 dBA penalty shall be applied for tonal noise. This is a single or limited frequency noise (vs. broadband noise) associated with mechanical noise artifacts (i.e. high pitched whining, screeching, buzzing). Per Maine TA Bulletin #4, noise over a narrow frequency is a more serious nuisance than broadband noise.

17. For sites being measured with existing Wind Turbines two sets of measurements are required: 1) one set with the Wind Turbine(s) off and; 2) one set with the Wind Turbine(s) running.

18. For nuisance complaints after the Wind Turbines are operational, the measurement points, season, time, and duration of measurements shall be selected in consultation with the affected property owner. If requested by the property owner, continuous measurements may be taken for longer periods of time to capture intermittent nuisance noise patterns.

19. When conducting their pre-construction noise prediction analysis, the Applicant shall make specific reference to: 1) the unique aspects of the mountainous contours and terrain of the area and its effect on noise predictability and; 2) line source noise predictions (emanating from a line of Wind Turbines) in addition to the traditional single point source predictions.

20. Any noise level falling between two (2) whole decibels shall be deemed the higher of the two.

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[1] L_{max} - the maximum noise level measured; L_{eq} - average noise level for a given period of time; L_{10} - Sound level exceeded 10% of the time; L_{90} Sound level exceeded 90 % of the time, generally equivalent to ambient noise.

Appendix B - Type 1 Small Wind Turbine Submission Standards and Fees

Application Fee: $25

The Applicant shall submit a written application, which shall include:

1. The Applicant's name, contact information and designation of Owner/operator if different from Applicant.
2. Location of the proposed Wind Turbine including tax map lot number.
3. General description of the proposed Wind Turbine Project including nameplate capacity of turbine, turbine height, manufacturer's specifications for turbine and tower, and proposed use of electricity to be generated (i.e., on-site use, net metering, etc.)
4. Written description and map demonstrating that the Wind Turbine meets the setback requirements of this Ordinance. Include a plot sketch showing Wind Turbine, all nearby structures in the Setback Area , all adjacent Occupied Buildings, property lines and public roads.
5. Written description of how the Wind Turbine Project will comply with noise standards. Manufacturer's noise specifications or similar documentation are adequate.
6. Line drawing of electrical components and description of how project will comply with applicable electrical codes.
7. Design of tower, anchoring system and wind rating. If guide wires will be used, provide a declaration that bird diverters will be used (these are inexpensive colored plastic flags that clip to guide wires to increase the wires' visibility to birds).
8. Description of blade clearance and any potential hazards from blade throw or tower collapse.
9. Written description of Wind Turbine braking system.
10. Written description of how Wind Turbine will be designed and/or sited to prevent shadow flicker and electromagnetic interference to adjacent properties.
11. For owner designed, owner built, or owner modified systems the CEO may require field testing to measure Wind Turbine noise, additional electrical design review or tower construction review.
12. Attach executed Mitigation Waiver agreements, if any.
13. Other documentation identified by the Code Enforcement Officer during the pre-application meeting.
14. Signed affidavit that Applicant has read and is familiar with the Town of Jackson Wind Turbine Ordinance and agrees to abide by its provisions, as may be amended from time to time.

Appendix C - Type 2 Intermediate Wind Turbine Submission Standards and Fees

Application Fee: $100
Decommissioning Funds Required: one half of one percent of the estimated cost of the project The Applicant shall submit a written application, which shall include:

1. The Applicant's name, contact information and designation of Owner/operator.
2. Location of the proposed Wind Turbine including tax map lot number.
3. General description of the proposed Wind Turbine Project including nameplate capacity of turbine, turbine height, manufacturer's specifications for turbine and tower, and proposed use of electricity to be generated (i.e., on-site use, net metering, etc.).
4. Written description and map demonstrating that the Wind Turbine meets setback requirements. Include a plot sketch showing Wind Turbine, all nearby structures in Setback Area, all adjacent Occupied Buildings, property lines and public roads.
5. Written description of how Wind Turbine Project will comply with noise standards. Manufacturer's noise specifications or similar documentation are adequate.
6. Line drawing of electrical components and description of how project will comply with applicable electrical codes.
7. Design of tower, anchoring system and stability rating. If guide wires will be used, provide a declaration that bird diverters will be used (these are inexpensive colored plastic flags that clip to guide wires to increase the wires' visibility to birds).
8. Description of blade clearance and any potential hazards from blade throw or tower collapse.
9. Written description of Wind Turbine braking system.
10. Written description of how Wind Turbine will be designed and/or sited to prevent shadow flicker and electromagnetic interference to adjacent properties.
11. Written description of how the Wind Turbine Project will comply with Section 15.0 "Appearance and Visibility Standards".
12. Written description of how Wind Turbine Project meets or will meet Section 15.2 "Safety Standards".
13. For owner designed, owner built, or owner modified systems the Permitting Authority may require field-testing to measure Wind Turbine noise, additional electrical design review by a certified electrician, or tower construction review by a certified engineer.
14. Proof of Liability Insurance
15. Contract with Maine licensed professional engineer to conduct post construction structural and operational inspection and written agreement by Applicant to submit proof of successful inspection as a condition of permitting before operating Wind Turbine Project.
16. Other documentation identified by the Permitting Authority during the pre-application meeting.
17. Attach executed Mitigation Waiver agreements, if any.
18. Signed affidavit that Applicant has read and is familiar with the Town of Jackson Wind Turbine Ordinance and agrees to abide by its provisions as may be amended from time to time.

Appendix D - Type 3 Large Wind Turbine Submission Standards and Fees

Application Fee*: $1000

Professional Fees Escrow*: one half of one percent of the estimated cost of the project

Road Damage Bond*: The value of the bond will be determined by the Planning Board.

Decommissioning Fund*: A performance bond or a cash escrow account held by the Town with 5% of the estimated cost of decommissioning to be added by the Owner/Operator on an annual basis shall be acceptable surety, the total amount to be based on the estimated cost of completing the decommissioning and site restoration in accordance with the approved plan, adjusted for inflation, and as approved by the Planning Board.

Other:

All information in this application, unless specified, will become part of the public record. Information submitted by the Applicant must be continuously updated throughout the application process as changes are made or new information becomes available.
The Applicant shall include a written application, which shall include:

1. Applicant's name and contact information.
2. Legal Owner/operator and contact information.
3. Description of the legal structure of the Wind Turbine Project including a corporate organizational chart, ownership and equity structure, and all investors.
4. Description of the proposed Wind Turbine Project that includes the number of Wind Turbines, the nameplate capacity, Turbine Height and manufacturer's specifications for each Wind Turbine, the aggregate generating capacity of the entire project, and a description of associated facilities.
5. Location map of the project showing the location of the each Wind Turbine, associated facilities, all property under partial or total control of the Applicant including easements and those under lease with Participating Landowners, roads, municipal boundaries, proximity to all Scenic or Special Resource features in the Town of Jackson and major geographical features.
6. Detailed site plan showing the location of each Wind Turbine and Associated Facility and any of the following features located within 1.5 x the required setback: property boundaries, required setbacks, topographic contour lines (maximum 20-foot interval), buildings (identify use), roads, driveways, right-of-ways, overhead utility lines, Scenic or Special Resources, tree cover, wetlands, streams, water bodies, areas proposed to be cleared of vegetation or re-graded, and areas proposed to be significantly excavated or blasted.
7. Copies of all Participating Landowner agreements and easement agreements. Only dollar amounts may remain confidential.
8. Copies of any deeds or purchase agreements for land owned or under option by the Owner/operator.
9. Receipt showing payment of application fees and escrow for professional and public hearing fees.*

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* May be waived for Community Owned Wind Turbine Projects

10. Proof of financing.
11. Reference list of all previous Wind Turbine Projects with which the Owner/operator has been affiliated.*
12. Proof of compliance with all required setbacks. The Applicant shall work with the Permitting Authority to complete a pre-construction noise study per Appendix A. This study must be completed before the permit can be approved.
13. A detailed noise prediction model for worst-case noise scenarios based on wind speed and wind direction for the Wind Turbine Projected. The study shall be projected onto a contour map for a minimum of two miles from each Wind Turbine. Worst-case scenarios for each Occupied Building within the 2-mile radius shall be reported in table form. The model will address the unique mountainous terrain of the area. Noise predictions will include both single source and line source origination. All underlying assumptions and algorithms in the model will be documented.
14. The Wind Turbine manufacturer's noise emission specifications for each Wind Turbine model.
15. A shadow flicker and blade reflection model for the proposed Wind Turbine Project. The model will provide a worst-case scenario (100%) seasonal representation for each Occupied Building within two miles of any Wind Turbine. The model will calculate maximum hours of shadow flicker and blade reflection in table form for each Occupied Building. A worst-case scenario shall also be constructed for vehicle traffic on Route 7.
16. Copies of all executed Mitigation Waiver agreements concerning Setbacks, Noise and Shadow Flicker/Blade Reflection. Only dollar amounts may remain confidential.
17. Written demonstration that the Wind Turbine Plan is consistent with the Jackson Land Use Ordinance.
18. Documentation showing compliance with Section 16.2.1 "Environmentally Sensitive Areas", both during construction and post construction.**
19. Documentation showing compliance with Section 16.2.2 "Wildlife Protection" and with Section 16.2.3 "Raptor Habitat".
20. Documentation showing compliance with Section 16.2.4 "Erosion Control" Documentation must include a construction site erosion plan and storm water runoff control plan that minimizes potential adverse impacts on streams and wetlands.
21. Documentation showing compliance with Section 16.2.5 " Groundwater Protection".
22. Documentation showing compliance with Section 16.2.6 "Light Pollution".
23. Written evidence that the Environmental Coordinator of the Maine Department of Inland Fisheries and Wildlife and the Maine Natural Areas Program have both been notified of the pending application and the location and Turbine Height of all proposed Wind Turbines.
24. A Location of Development permit from the Maine Department of Environmental Protection (DEP) pursuant to Title 35-A M.R.S.A. §3451, Title 35-A M.R.S.A. § 3456 and Title 38 M.R.S.A § 482 if required unless the Wind Turbine: 1) does not sell or convert electricity for off site use including net metering; and, 2) does not qualify as a Structure with a total land area in excess of 3 acres for the entire Wind Turbine Project.

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* □ May be waived by the Permitting Authority if a DEP Certification is received.

25. A visual impact assessment pursuant to Section 16.3.**

26. Photographs of existing conditions of each Wind Turbine and associated facility site.

27. Sight line, photographic, and elevation information shall be provided from: 1) each Occupied Building within the Setback; 2) from Route 7 two miles south of the Dixmont/ Jackson Town line looking north; 3) from Route 7 two miles south of the Dixmont/ Jackson Town line looking north; 4) from Route 7 two miles north of the Dixmont/Jackson Town line looking to the southeast; and 5) from any Scenic or Special Resource location.

    - A Sight Line Representation shall be drawn that shows the lowest point to the Wind Turbine visible from each location. Each sight line shall be depicted in profile, drawn at one-inch equals 40 feet. The profiles shall show all intervening trees and physical structures.
    - Each Sight Line shall be illustrated by one four-inch by six-inch color photograph of the current view.
    - Each of the existing condition photographs shall have the proposed Wind Turbines superimposed on it to accurately simulate the Wind Turbine Project when built.
    - Elevations of the tops of any structures on the subject property relative to the elevation of the Wind Turbines(s)
    - The height and elevation relative to the Wind Turbine(s) of trees, both existing and proposed, that are to provide visual buffering. In the case of trees to be planted, the proposed height at the time of planting as well as the projected mature height is to be provided. [State Model Ordinance]

28. Demonstrates compliance with 15.1 "Appearance and Visibility Standards".

29. Demonstrates compliance with 15.2 "Safety Standards". Provide a written description of emergency and normal shutdown operations.

30. Submit contract with Maine licensed professional engineer to conduct post construction structural and operational inspection and written agreement by Applicant to submit proof of successful inspection as a condition of permitting before operating Wind Turbine Project

31. Proof of Liability Insurance as established by the Permitting Authority.

32. Timeline showing all aspects of the construction.

33. Photographs and detailed drawings of each Wind Turbine, including foundation design. Details must be provided of all significant excavation and blasting.

34. Demonstrate compliance with Section 16.4.3 "Transmission Line Standards". A map shall be provided showing all transmission lines and rights-of-way that will need to be built or upgraded to accommodate the Wind Turbine Project. Applicant shall submit copies of signed letters of intent to grant easements, long-term leases or other property rights from involved landowners and any governmental unit responsible for access, approval or construction of electric transmission and distribution lines, whether part of the Wind Turbine Project or part of the local electrical distribution grid. The Applicant shall submit an affidavit stating that no property will need to be taken by eminent domain to facilitate transmission lines necessary to support the project.

35. A geological report from a registered geotechnical engineer demonstrating that the soils can support the Wind Turbines and the underlying ground is geologically stable. The report shall include a slope stability analysis and any underlying fault zones.

36. A written summary of all routine operation and maintenance procedures for the Wind Turbine Project.

37. Demonstrate compliance with Section 16.6 " Public Safety and Health Standards". Provide an estimate of required new equipment and training to be provided.

38. Document all potential hazardous wastes that will be used on the Wind Turbine Project, and how these wastes will be transported, handled, stored, cleaned up if spilled, and disposed of during any phase of the project's life.

39. A communication/electromagnetic interference study prepared by a registered professional engineer showing that the proposed Wind Turbine Project will comply with Section 16.7 "Communication/Electromagnetic Interference Standards". The Owner/operator will sign an affidavit stating that the Owner/operator shall be responsible for the full cost remediation to remain in compliance with this Section.

40. Demonstrate compliance with Standard 16.8 "Ground Transportation Standards" Before and after photographs or videos of the roadways, in a format approved by the Permitting Authority, shall be submitted as part of the documentation process.

41. An affidavit agreeing to comply with all provisions in Section 16.9 "Reporting Requirements".*

42. An affidavit agreeing to comply with all provisions in Section 22.0 "Complaints/Violations/and Standards".*

43. A decommissioning plan in compliance with Section 23.0 "Decommissioning Standards".

44. If the Wind Turbine Project crosses multiple municipal jurisdictions the Applicant shall demonstrate compliance with Section 25.0.

45. Copies of all written agreements and disclosure of all verbal promises, for contracts, subcontracts, employment, consulting fees, gifts or other remuneration in excess of $50 (cash or in-kind) to residents or businesses in Jackson, either previously made or contingent on permitting of this project.

46. Applicant shall deliver a letter by certified mail to the owner of any property that the Applicant proposes to be restricted by the permit. The letter will state that the Applicant has filed an application, list future development that will be restricted, and to what extent it will be restricted, on abutting properties by virtue of the permit being granted. Examples of restrictions include, but are not limited to, building Occupied Buildings within the setback area without a Mitigation Waiver, building structures (i.e. Wind Turbines or cell towers that the Wind Turbine Project would interfere with), zones in which future telecommunication installations can expect interference from the Wind Turbine Project.

47. Proof that the Applicant has notified the following agencies via certified mail and received any necessary permits or permissions for the project:

    - Federal Aviation Administration.
    - U.S. Department of Defense facilities located within 50 miles from the proposed Wind Turbine Project.

48. Other relevant studies, reports, certifications and approvals as may be reasonably requested by the Permitting Authority to ensure compliance with this Ordinance.

49. Signed affidavit from the Owner/operator that Applicant has read the Town of Jackson Wind Turbine Ordinance and agrees to abide by its provisions, as may be amended from time to time.

Appendix E - Type 4 Industrial Wind Turbine Submission Standards and Fees

Application Fee: $5000

Professional Fees Escrow: one half of one percent of the estimated cost of the project

Road Damage Bond: The value of the bond will be determined by the Planning Board

Decommissioning Fund: A performance bond or a cash escrow account held by the Town with 5% of the estimated cost of decommissioning to be added by the Owner/Operator on an annual basis shall be acceptable surety, the total amount to be based on the estimated cost of completing the decommissioning and site restoration in accordance with the approved plan, adjusted for inflation, and as approved by the Planning Board.

Other:

All information in this application, unless specified, will become part of the public record. Information submitted by the Applicant must be continuously updated throughout the application process as changes are made or new information becomes available.

The Applicant shall include a written application, which shall include:

1. Applicant's name and contact information.
2. Legal Owner/operator and contact information.
3. Description of the legal structure of the Wind Turbine Project including a corporate organizational chart, ownership and equity structure, and all investors.
4. Description of the proposed Wind Turbine Project that includes the number of Wind Turbines, the nameplate capacity, Turbine Height and manufacturer's specifications for each Wind Turbine, the aggregate generating capacity of the entire project, and a description of Associated Facilities.
5. Location map of the project showing the location of the each Wind Turbine, Associated Facilities, all property under partial or total control of the Applicant including easements and those under lease with Participating Landowners, roads, municipal boundaries, proximity to all scenic or special resource features in the Town of Jackson and major geographical features.
6. Detailed site plan showing the location of each Wind Turbine and Associated Facility and any of the following features located within 1.5 x the required setback: property boundaries, required setbacks, topographic contour lines (maximum 20-foot interval), buildings (identify use), roads, driveways, right-of-ways, overhead utility lines, scenic or special resources, tree cover, wetlands, streams, water bodies, areas proposed to be cleared of vegetation or regraded, and areas proposed to be significantly excavated or blasted.
7. Copies of all Participating Landowner agreements and easement agreements. Only dollar amounts may remain confidential.
8. Copies of any deeds or purchase agreements for land owned or under option by the Owner/operator.
9. Receipt showing payment of application fees and escrow for professional and public hearing fees.
10. Proof of financing.
11. Reference list of all previous Wind Turbine Projects with which the Owner/operator has been affiliated.

12. Proof of compliance with all required setbacks. The Applicant shall work with the Permitting Authority to complete a pre-construction noise study per Appendix A. This study must be completed before the permit can be approved.

13. A detailed noise prediction model for worst-case noise scenarios based on wind speed and wind direction for the Wind Turbine Projected. The study shall be projected onto a contour map for a minimum of two miles from each Wind Turbine. Worst-case scenarios for each Occupied Building within the 2-mile radius shall be reported in table form. The model will address the unique mountainous terrain of the area. Noise predictions will include both single source and line source origination. All underlying assumptions and algorithms in the model will be documented.

14. The Wind Turbine manufacturer's noise emission specifications for each Wind Turbine model.

15. A shadow flicker and blade reflection model for the proposed Wind Turbine Project. The model will provide a worst-case scenario (100%) seasonal representation for each Occupied Building within two miles of any Wind Turbine. The model will calculate maximum hours of shadow flicker and blade reflection in table form for each Occupied Building. A worst-case scenario shall also be constructed for vehicle traffic on Route 7.

16. Copies of all executed Mitigation Waiver agreements concerning Setbacks, Noise and Shadow Flicker/Blade Reflection. Only dollar amounts may remain confidential.

17. Written demonstration that the Wind Turbine Plan is consistent with the Jackson Land Use Ordinance and Comprehensive Plan.

18. Documentation showing compliance with Section 16.2.1 "Environmentally Sensitive Areas", both during construction and post construction.

19. Documentation showing compliance with Section 16.2.2 "Wildlife Protection" and with Section 16.2.3 "Raptor Habitat".

20. Documentation showing compliance with Section 16.2.4 "Erosion Control". Documentation must include a construction site erosion plan and storm water runoff control plan that minimizes potential adverse impacts on streams and wetlands.

21. Documentation showing compliance with Section 16.2.5 " Groundwater Protection".

22. Documentation showing compliance with Section 16.2.6 "Light Pollution"

23. Written evidence that the Environmental Coordinator of the Maine Department of Inland Fisheries and Wildlife and the Maine Natural Areas Program have both been notified of the pending application and the location and Turbine Height of all proposed Wind Turbines.

24. A Location of Development permit from the Maine Department of Environmental Protection (DEP) pursuant to Title 35-A M.R.S.A. §3451, Title 35-A M.R.S.A. § 3456 and Title 38 M.R.S.A § 482 if required unless the Wind Turbine: 1) does not sell or convert electricity for off site use including net metering; and, 2) does not qualify as a Structure with a total land area in excess of 3 acres for the entire Wind Turbine Project.

25. A visual impact assessment shall be completed pursuant to Section 16.3.

26. Photographs of existing conditions of each Wind Turbine and associated facility site.

27. Sight line, photographic, and elevation information shall be provided from: 1) each Occupied Building within the Setback; 2) from Route 7 two miles south of the Dixmont/ Jackson Town line looking north; 3) from Route 7 two miles south of the Dixmont/ Jackson Town line

looking north; 4) from Route 7 two miles north of the Dixmont/Jackson Town line looking to the southeast; and 5) from any Scenic or Special Resource location.

- A Sight Line Representation shall be drawn that shows the lowest point to the Wind Turbine visible from each location. Each sight line shall be depicted in profile, drawn at oneinch equals 40 feet. The profiles shall show all intervening trees and physical structures.
- Each Sight Line shall be illustrated by one four-inch by six-inch color photograph of the current view.
- Each of the existing condition photographs shall have the proposed Wind Turbines superimposed on it to accurately simulate the Wind Turbine Project when built.
- Elevations of the tops of any structures on the subject property relative to the elevation of the Wind Turbines(s)
- The height and elevation relative to the Wind Turbine(s) of trees, both existing and proposed, that are to provide visual buffering. In the case of trees to be planted, the proposed height at the time of planting as well as the projected mature height is to be provided. [State Model Ordinance]

28. Demonstrates compliance with 15.1 "Appearance and Visibility Standards". Submit required permits from the Federal Aviation Administration.
29. Demonstrates compliance with 15.2 "Safety Standards". Provide a written description of emergency and normal shutdown operations.
30. Submit contract with Maine licensed professional engineer to conduct post construction structural and operational inspection and written agreement by Applicant to submit proof of successful inspection as a condition of permitting before operating Wind Turbine Project
31. Proof of Liability Insurance is established by the Permitting Authority.
32. Timeline showing all aspects of the construction
33. Photographs and detailed drawings of each Wind Turbine, including foundation design. Details must be provided of all significant excavation and blasting.
34. Demonstrate compliance with Section 16.4.3 "Transmission Line Standards". A map shall be provided showing all transmission lines and rights-of-way that will need to be built or upgraded to accommodate the Wind Turbine Project. Applicant shall submit copies of signed letters of intent to grant easements, long-term leases or other property rights from involved landowners and any governmental unit responsible for access, approval or construction of electric transmission and distribution lines, whether part of the Wind Turbine Project or part of the local electrical distribution grid. The Applicant shall submit an affidavit stating that no property will need to be taken by eminent domain to facilitate transmission lines necessary to support the project.
35. A geological report from a registered geotechnical engineer demonstrating that the soils can support the Wind Turbines and the underlying ground is geologically stable. The report shall include a slope stability analysis
36. A written summary of all operation and maintenance procedures for the Wind Turbine Project.
37. Demonstrate compliance with Section 16.6 " Public Safety and Health Standards". Provide an estimate of required new equipment and training to be provided.

38. Document all potential hazardous wastes that will be used on the Wind Turbine Project, and how these wastes will be transported, handled, stored, cleaned up if spilled, and disposed of during any phase of the project's life.

39. A communication/electromagnetic interference study prepared by a registered professional engineer showing that the proposed Wind Turbine Project will comply with Section 16.7 "Communication/Electromagnetic Interference Standards". The Owner/operator will sign an affidavit stating that the Owner/operator shall be responsible for the full cost remediation to remain in compliance with this section.

40. Demonstrate compliance with Standard 16.8 "Ground Transportation Standards" Before and after photographs or videos of the roadways, in a format approved by the Permitting Authority, shall be submitted as part of the documentation process.

41. An affidavit agreeing to comply with all provisions in Section 16.9 "Reporting Requirements".

42. An affidavit agreeing to comply with all provisions in Section 22.0 "Complaints/Violations/and Standards".

43. A decommissioning plan in compliance with Section 23.0 "Decommissioning Standards".

44. If the Wind Turbine Project crosses multiple municipal jurisdictions the Applicant shall demonstrate compliance with Section 25.0.

45. Copies of all written agreements and disclosure of all verbal promises, for contracts, subcontracts, employment, consulting fees, gifts or other remuneration in excess of $50 (cash or in-kind) to residents or businesses in Jackson, either previously made or contingent on permitting of this project.

46. Applicant shall deliver a letter by certified mail to the owner of any property that the Applicant proposes to be restricted by the permit. The letter will state that the Applicant has filed an application, list future development that will be restricted, and to what extent it will be restricted, on abutting properties by virtue of the permit being granted. Examples of restrictions include, but are not limited to, building Occupied Buildings within the setback area without a Mitigation Waiver, building structures (i.e. Wind Turbines or cell towers that the Wind Turbine Project would interfere with), zones in which future telecommunication installations can expect interference from the Wind Turbine Project.

47. Proof that the Applicant has notified the following agencies via certified mail and received any necessary permits or permissions for the project:

- Federal Aviation Administration.
- U.S. Department of Defense facilities located within 50 miles from the proposed Wind Turbine Project.

48. Other relevant studies, reports, certifications and approvals as may be reasonably requested by the Permitting Authority to ensure compliance with this Ordinance.

49. Signed affidavit from the Owner/operator that Applicant has read the Town of Jackson Wind Turbine Ordinance and agrees to abide by its provisions, as may be amended.

Appendix F - Mitigation Waiver Form

Subject to review and edit by Town Attorney.

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Chapter 21

21.01 Title: Wind Generator and Wind Generating Facility Ordinance for Trempealeau County

21.02 Purpose: This chapter of County ordinances provides a regulatory framework for the construction and operation of Wind Energy Facilities in Trempealeau County, subject to reasonable restrictions, which will preserve the public health and safety.

21.03 Definitions: As used in this Chapter, the following terms have the meanings indicated:

Affected Property: Property impacted by personal or Commercial Wind Turbine.

Applicant: The person or entity filing an application under this Ordinance.

Commercial Wind Turbine: A wind energy conversion system which converts wind energy into electricity through the use of a wind driven turbine generator when the total height exceeds 150 feet or the nameplate capacity exceeds 100 kilowatts. Such wind turbine includes the turbine, blade, tower, base and pad transformer, if any.

Committee: The Zoning and Planning Committee of the County Board or any successor committee established by the Board for the oversight and supervision of Trempealeau County Zoning.

County: Trempealeau County, Wisconsin.

DNR: Department of Natural Resources

DOT: Department of Transportation

FAA: Federal Aviation Administration.

Farmstead: A farmstead is a place of employment and includes all buildings and structures on a farm that are used primarily for agricultural purposes such as housing animals, or storing supplies, production, or machinery.

Hobbyist Wind Turbine: A wind energy conversion system which converts wind energy into electricity through the use of a wind driven turbine generator when the total height is less than 50 feet and a prop diameter of 12 feet or less.

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

MET Tower: A meteorological tower used for the measurement of wind speed.

Owner/Operator: The person or entity responsible for the day-to-day operation and maintenance of a wind turbine or Wind Energy Facility.

Personal Wind Turbine: A wind energy conversion system which converts wind energy into electricity through the use of a wind driven turbine generator when the Total Height is 150 feet or less.

Total Height: The distance measured from ground level to the blade of a wind turbine extended at its highest point.

Shadow Flicker: The moving shadows or shaded areas which are cast by rotating turbine blades.

Wind Energy Facility: An electricity generating facility consisting of one or more Wind Turbines under common ownership or operating 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 customer(s).

Wind Energy Facility Siting Permit or Wind Turbine Permit: A construction and operating permit granted in accordance with the provisions of this Ordinance.

21.04 Regulatory Framework

(1) Zoning

(a) Wind Energy Facilities and commercial wind turbines may only be constructed as Conditional Uses in areas that are zoned Exclusive Agriculture, Exclusive Agriculture – 2 and Primary Agriculture.

(b) Personal Wind Turbines may be constructed as a conditional use in areas that are zoned Exclusive Agriculture, Exclusive Agriculture – 2, Primary Agriculture and Rural Residential. They are limited to one wind turbine per contiguous parcels under common ownership.

(c) Hobbyist Wind Turbines may be constructed as a permitted use in areas that are zoned Exclusive Agriculture, Exclusive Agriculture – 2, Primary Agriculture and Rural Residential.

21.05 Applicability

(1) The requirements of this Ordinance shall apply to all wind turbines for which a permit was not issued prior to the effective date of this Ordinance. Wind turbines for which a required permit has been properly issued, or for which a permit was not required, prior to the effective date of this Ordinance shall not be required to meet the requirements of this Ordinance. However, any such pre-existing wind turbine which does not provide energy for a continuous period of twelve (12) months shall meet the requirements of this Ordinance prior to recommencing production of energy. No modification or alteration to an existing wind turbine shall be allowed without full compliance with this Ordinance.

21.06 General Requirements for Wind Energy Facilities

(1) Wind Turbines shall be painted a non-reflective, non-obtrusive color which shall be pre-approved through the conditional use process.

(2) At Wind Energy Facility sites, the design of the buildings and related structures shall, to the extent reasonably possible, use materials, colors, textures, screening and landscaping that will blend the Wind Energy Facility to the natural setting and then existing environment.

(3) Wind Energy Facilities shall not be artificially lighted, except to the extent required by the FAA or other applicable authority.

(4) Wind Turbines shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the Wind Energy Facility. Any such identification shall not appear on the blades or other moving parts or exceed six square feet per Wind Turbine.

(5) Electrical controls and control wiring and power-lines shall be wireless or not above ground except where wind farm collector wiring is brought together for connection to the transmission or distribution network, adjacent to that network.

(6) Routes of public travel to be used during the construction phase shall be documented by the Owner/Operator, and reviewed and approved by the Trempealeau County Highway Department, Town Chairman and Trempealeau County Zoning prior to construction. At the Committee's request a qualified independent third party, agreed to by the applicable entity(s), and paid for by the applicant, shall be hired to pre-inspect the roadways to be used during construction and an appropriate bond amount set. The public travel route will be re-inspected 30 days after project completion; any and all repairs will be completed within 90 days of end of construction project paid by the developer. The bond can be used by Trempealeau County for any degradation or damage caused by heavy machinery associated with the construction and demolition phases of a Wind Energy Facility.

(7) An appropriate continuous renewal bond amount will be set for each Wind Turbine for decommissioning should the Owner/Operator fail to comply with the Ordinance requirements or the Wind Turbine does not operate for a period of twelve (12) consecutive months.

(8) A signed statement by the landowner acknowledging that the landowner is financially responsible if the owner/operator fails to reclaim the site as required and that any removal and reclamation costs incurred by the county will become a lien on the property and may be collected from the landowner in the same manner as property taxes.

(9) Proof of continuous liability insurance in the minimum amount of five million dollars ($5,000,000.00) per occurrence shall be submitted to Trempealeau County indicating coverage for potential damages or injury to landowners, occupants, or other third parties.

(10) There shall be a timeline set prior to the construction phase of the project with a starting and ending date when the construction project will be completed.

(11) Evidence of compliance with FAA, DNR, DOT, United States Fish and Wildlife Service requirements and Signal Interference and Microwave Frequency Interference requirements must be submitted by the Applicant to Trempealeau County.

(12) A map shall be provided showing a proposed grid of any future Wind Energy Facilities being developed by the applicant to be located in Trempealeau County and surrounding counties.

(13) A document for each Wind Turbine including an accompanying diagram or maps showing the shadow flicker projection for a calendar year, in relation to affected property, roads and residences shall be submitted with the permit application.

(14) Access to a Facility and construction area shall be constructed and maintained following a detailed Erosion Control Plan in a manner designed to control erosion and provide maneuverability for service and emergency response vehicles.

(15) If a Wind Turbine foundation is proposed in a bedrock area, a baseline of all wells and certified public drinking sources in a ½ mile radius shall be established and permanent remedies shall be the responsibility of the developer if contamination occurs.

(16) If an area where Wind Turbines are planned is identified by the Fish and Wildlife Service to house a significant population of Bald or Golden Eagles a monopole tubular type tower shall be used instead of Lattice type towers.

(17) Setbacks: The following setbacks and separation requirements shall apply to Commercial Wind Turbines.

(a) Public Roads: Each Wind Turbine shall be set back from the nearest public road and its right of way a distance no less than two (2) times its Total Height.

(b) Railroads: Each Wind Turbine shall be set back from all railroads and their right of way a distance of no less than two (2) times its Total Height.

(c) Wind Turbine spacing: Each Wind Turbine shall have a separation distance from other Wind Turbines equal to one and two-tenths (1.2) times the total height of the tallest Wind Turbine.

(d) Communication and electrical lines: Each Wind Turbine shall be set back from the nearest above-ground public electric power line or telephone line a distance no less than two (2) times its Total Height.

(e) Inhabited structures: Each Wind Turbine shall be set back from the nearest structure used as a residence, school, hospital, church, place of employment or public library, a distance no less than one (1) mile, unless mitigation has taken place and agreed by owner/operator and affected property owners involved and recorded in the Trempealeau County Register of Deeds office which describes the benefited and burdened properties and which advises all subsequent owners of the burdened property.

(f) Property lines: Each Wind Turbine shall be set back from the nearest property line a distance no less than one-half (½) mile, unless mitigation has taken place and agreed by owner/operator and affected property owners involved, and recorded in the Trempealeau County Register of Deeds office which describes the benefited and burdened properties and which advises all subsequent owners of the burdened property.

(g) From any wetland, water body, environmental significant or scenic area, each Wind Turbine total height shall have a minimum setback of two (2) times its total height or one thousand (1,000) feet which ever is greater.

(h) From any historical, cultural and archeological resource area, each Wind Turbine shall have a minimum setback of two (2) times its Total Height or one thousand (1,000) feet which ever is greater.

(i) Any new proposed residences, schools, hospitals, churches, public libraries, or place of employment, shall apply for a conditional use permit if they are to be located in the required set back area stated in section 17 (e) Inhabited structures.

(j) Unless owned by the applicant, no parcel of real estate shall be subject to shadow flicker from a Wind Turbine unless mitigation has taken place and agreed by the owner/operator and affected property owners involved and recorded in the Trempealeau County Register of Deeds office which describes the benefited and burdened properties and which advises all subsequent owners of the burdened property that shadow flicker may exist at times on or at the burdened property.

(k) There shall be a two (2) mile Setback from any recognized U.S. Fish and Wildlife Refuge located in Trempealeau County.

(18) Noise: Audible Sound (Audible Noise) emitted during the operation of any Wind Energy Facility or individual Wind Turbine (includes Commercial Wind Turbines, Personal Wind Turbines and Hobbyist Wind Turbines) is limited to the standards set forth in this provision. Testing procedures are provided in Appendix A of this Ordinance.

a) Audible Noise due to Wind Energy Facility or Wind Turbine operations shall not exceed the lesser of five (5) decibels (dBA) increase over the existing background noise level (L_{90}) or exceed forty (40) decibels (dBA) for any period of time, when measured at any structure used as a residence, school, hospital, church, place of employment, or public library existing on the date of approval of any Wind Energy Facility Siting Permit or Wind Turbine permit. All measurements shall be taken using procedures meeting American National Standard Institute Standards including: ANSI S12.18-1994 (R 2004) American National Standard Procedures for Outdoor Measurement of Sound Pressure Level, and (ANSI) S12.9-Parts 1-5:

Part 1: American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound
Part 2: Measurement of Long-Term, Wide-Area Sound
Part 3: Short-Term Measurements with an Observer Present
Part 4: Noise Assessment and Prediction of Long-Term Community Response
Part 5: Sound Level Descriptors for Determination of Compatible Land Use

Measurements must be taken with qualified acoustical testing instruments meeting ANSI Type 1 standards, and Class 1 filters. The windscreen recommended by the instrument's manufacturer must be used and measurements conducted only when wind speeds are ten (10) miles per hour (mph) or less. The microphone must be located at a height of one and two-tenths (1.2) to one and one-half (1.5) meters from the ground.

b) In the event Audible Noise due to Wind Energy Facility or Wind Turbine operations contains a steady Pure Tone, including, but not limited to, a whine, screech, or hum, the standards for audible noise set forth in subparagraph (a) of this subsection shall be reduced by five (5) dBA. A Pure Tone is defined to exist when the one-third (1/3) octave band sound pressure level in the band, including the tone, exceeds the arithmetic average of the sound pressure levels on the two (2) contiguous one-third (1/3) octave bands by five (5) dBA for center frequencies of five hundred (500) Hz and above, and eight (8) dBA for center frequencies between one hundred sixty (160) Hz and four hundred (400) Hz, or by fifteen (15) dBA for center frequencies less than or equal to one hundred twenty-five (125) Hz.

c) In the event the Audible Noise due to Wind Energy Facility or Wind Turbine operations contains Repetitive Impulsive Sounds, the permitted sound pressure level for Audible Noise in 19(a) shall be reduced by five (5) dBA.

d) In the event the Audible Noise due to Wind Energy Facility or Wind Turbine operations contains both a Pure Tone and Repetitive Impulsive Sounds, the permitted sound pressure level for Audible Noise in 19(a) shall be reduced by seven (7) dBA.

e) No low frequency sound or infrasound due to Wind Energy Facilities or Wind Turbine Operations shall be created which causes the sound pressure level at any existing residence, school, hospital, church, place of employment, or public library within a one (1) mile radius from any Wind Turbine to exceed the following limits:

TABLE 19.e.1

Band No.	1/3 Octave Band Center Frequency (HZ)	Limits for 1/3 Octave Bands	Limits for 1/1 Octave Bands
1	1.25 and below	65	
2	1.6	65	
3	2	65	70
4	2.5	65	
5	3.15	65	
6	4	65	70
7	5	65	
8	6.3	65	
9	8	65	70

10	10	65	
11	12.5	61	
12	16	61	65
13	20	61	
14	25	60	
15	31.5	58	63
16	40	58	
17	50	58	
18	63	55	61
19	80	53	
20	100	52	
21	125	50	55

f) A Wind Energy Facility or Wind Turbine operation that emits sound or causes structural or human body vibration with strong low-frequency content where the time-average C-weighted sound level exceeds the A-weighted sound level by at least 20 dB when measured inside a structure and adversely affects the subjective habitability or use of any existing residence, school, hospital, church, place of employment, or public library or other sensitive noise receptor shall be deemed unsafe and shall be shut down immediately. Exceeding any of the limits in Table 19.e.1 shall also be evidence that the Wind Energy Facility or Wind Turbine operation is unsafe and shall be shut down immediately.

g) Prior to approval, developers of a Commercial Wind Turbine operation or Commercial Wind Energy Facility shall submit a Pre-construction Background Noise Survey with measurements for each residence, school, hospital, church, place of employment, or public library within one (1) mile of the proposed development. The Background Noise Survey shall be conducted in accordance with the procedures provided in Appendix A of this Ordinance, showing background sound levels (L_{90}) and 1/1 or 1/3 octave band sound pressure levels (L_{90}) during the quietest periods of the day and night over a reasonable period of time (not less than 10 minutes of sampling). The Pre-construction Background Noise Survey shall be conducted at the Applicant's expense by an independent noise consultant contractor acceptable to the Trempealeau County Zoning Department.

h) Prior to approval, developers of a Commercial Wind Energy Facility or Commercial Wind Turbine operation shall provide additional information regarding the make and model of the turbines, Sound Power Levels (L_W) for each octave band from the Blade Passage Frequency up through 10,000 Hz, and a Sound Impact Study with results reported on a contour map projection showing the predicted sound pressure levels in each of those octave bands for all areas up to one (1) mile from any Commercial Wind Turbine or Commercial Wind Energy Facility for the wind speed and direction that would result in the worst case Wind Energy Facility sound emissions. The Sound Impact Study may be made by a computer modeling, but shall include a description of the assumptions made in the model's construction and algorithms. If the model does not consider the effects of

wind direction, geography of the terrain, and the effects of reinforcement from coherent sounds or tones from the turbines, these shall be identified and other means shall be used to adjust the model's output to account for these factors. The Sound Impact Study results shall be displayed as a contour map of the predicted levels, but shall also include a data table showing the predicted levels at any existing residence, school, hospital, church, public library, or place of employment within the model's boundaries. The predicted values shall include dBA values and shall also include the non-weighted octave band levels in the data tables. The Sound Impact Study shall be conducted at the Applicant's expense by an independent noise consultant contractor acceptable to the Trempealeau County Zoning Department.

i) Operators of a Commercial Wind Energy Facility or Commercial Wind Turbine operation shall submit a Post-construction Sound and Vibration Measurement Study conducted for each Commercial Wind Turbine or Commercial Wind Energy Facility according to the procedures provided in Appendix A of this Ordinance within twelve (12) months of the date that the project is fully operational to demonstrate compliance with the noise limitations in Section 19(a). The study shall be conducted at the wind energy facility owner/operator's expense by a noise consultant contractor acceptable to the Trempealeau County Zoning Department.

j) The Committee may impose a noise setback that exceeds the other setbacks set out in this Ordinance or require waivers from affected property owners and persons in legal possession acceptable to the Committee if it deems that greater setbacks are necessary to protect the public health and safety, or if the proposed wind energy facility is anticipated to exceed the levels set forth in Section 19(a) at any existing residence, school, hospital, church, place of employment, or public library.

k) Any noise level falling between two (2) whole decibels shall be deemed the higher of the two.

l) If the noise levels resulting from the Commercial Wind Turbine or Commercial Wind Energy Facility exceed the criteria listed above, a waiver to said levels may be granted by the Committee provided that express written consent from all affected property owners and persons in legal possession has been obtained stating that they are aware of the noise limitations imposed by this Ordinance, and that consent is granted to allow noise levels to exceed the maximum limits otherwise allowed. If the applicant wishes the waiver to apply to succeeding owners of the property, either a permanent noise impact easement or easement for the life of the wind turbine shall be recorded in the Trempealeau County Register of Deeds' office which describes the benefited and burdened properties and which advises all subsequent owners of the burdened property that noise levels in excess of those permitted by this Ordinance may exist at the burdened property.

m) A Noise Study may be conducted at the expense of a Commercial Wind Energy Facility or a Wind Turbine (Commercial, Personal or Hobbyist) Owner/Operator by an independent noise consultant contractor acceptable to the Trempealeau County Zoning Department if two (2) or more complaints are received and documented at a particular site. The study shall be conducted according to the procedures provided in Appendix A of this Ordinance for any sites where the complaints were documented. The Operator shall reimburse the County for the Noise Study expense within ten (10) days of billing. Failing to reimburse may be a basis for revoking a permit.

(19) Minimum Ground Clearance: The blade tip of a Commercial Wind Turbine shall, at its lowest point, have ground clearance of no less than seventy-five (75) feet. The blade tip of a personal and hobbyist Wind Turbine shall, at its lowest point, have ground clearance of no less than fifteen (15) feet.

(20) Signal Interference and Microwave Frequency Interference: The owner/operator shall minimize any interference with electromagnetic communications, such as radio, telephone or television signals caused by any Wind Energy Facility or Turbine. (If the applicant is a public utility, s. PSC 113.0707 also applies).

(a) A one thousand (1,000) feet microwave communication corridor between turbines must be maintained if the turbine facility is located between transmission towers.

(b) Communication tower – Wind turbine setback shall be at least one (1) mile to prevent signal interference.

(c) Emergency communication towers will be located on a Geographical Information System (GIS) map so turbine facilities can be properly planned to avoid conflict with Trempealeau County Emergency Services.

21.07 Setbacks: The following setbacks and separation requirements shall apply to Hobbyist and Personal Wind Turbines.

(a) Public Roads: Each Wind Turbine shall be set back from the nearest public road and its right of way a distance no less than two (2) times its Total Height.

(b) Railroads: Each Wind Turbine shall be set back from all railroads and their right of way a distance of no less than two (2) times its Total Height.

(c) Wind Turbine spacing: Each Wind Turbine shall have a separation distance from other Wind Turbines equal to one and two-tenths (1.2) times the total height of the tallest wind turbine.

(d) Communication and electrical lines: Each Wind Turbine shall be set back from the nearest above-ground public electric power line or telephone line a distance no less than two (2) times its Total Height.

(e) Property lines: Each Wind Turbine shall be set back from the nearest property line a distance no less than three (3) times its Total Height, unless mitigation has taken place and agreed by owner/operator and affected property owners involved and recorded in the Trempealeau County Register of Deeds office which describes the benefited and burdened properties and which advises all subsequent owners of the burdened property.

21.08 Miscellaneous Safety Requirements for Commercial and Personal Wind Turbines

(1) All wiring between Wind Turbines and the Wind Energy Facility substation shall be underground.

(a) All neutral grounding connectors from Commercial Wind Turbines shall be insulated from the earth and shall be sized to accommodate at least twice the peak load of the highest phase conductor, to absolutely prevent transient ground currents, in order to comply with the **National Electric Safety Code** and the **IEEE Standard 519-1992, approved by the American National Standards Institute,** as follows:

Grounding of both the electrical transmission lines and the supply lines to the internal electrical systems of the turbines themselves, shall comply with **Rule 92D, Current in Ground Conductors:** "Ground connector shall be so arranged that under normal circumstances, there will be no objectionable flow of current over the grounding conductor."

Rule 215B: [It is not permissible] "to use the earth as a part of a supply circuit."

Under no circumstances shall any Wind Turbine be connected directly to the grid; connection must be made through a substation or transformer properly grounded and filtered to keep harmonic distortion within recommended limits.

Bare, concentric neutrals are specifically prohibited in buried lines between turbines and in underground transmission lines to substations.

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

(3) All access doors to Wind Turbine towers and electrical equipment shall be lockable and locked when unattended.

(4) Appropriate warning signage shall be placed on Wind Turbine towers, electrical equipment, and Wind Energy Facility entrances.

21.09 Fee Schedule

(1) The permit application is required for a Hobbyist Wind Turbine. No fee or bond amount is required.

(2) The Conditional Use Permit application fee for a Personal Wind Turbine shall be two hundred twenty-five dollars ($225.00). No bond amount is required.

(3) For a Wind Energy Facility the application fee is five hundred dollars ($500.00) per turbine. The amount of the bond required will be based on the number of turbines and the estimated cost to remove the Wind Turbine, including to a point three (3) feet below grade.

21.10 Validity

Should any section, clause or provision of this chapter be declared by the courts to be invalid, the same shall not affect the validity of the chapter as a whole or any part thereof, other than the part so declared.

Chapter 21 - Appendix A

Trempealeau County Measurement Protocol for Sound and Vibration Assessment of Proposed and Existing Wind Energy Conversion Systems

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Introduction

The potential sound and vibration impact associated with the operation of wind powered electric generators, including Wind Energy Facilities and Wind Turbine operations, is a primary concern for citizens living near proposed Wind Energy Conversion Systems ("WECS"). This is especially true of projects located near homes, residential neighborhoods, schools, hospitals, churches, places of employment and public libraries. Determining the likely sound and vibration impacts is a highly technical undertaking and requires a serious effort in order to collect reliable and meaningful data for both the public and decision makers.

This protocol is based in part on criteria published in the Standard Guide for Selection of Environmental Noise Measurements and Criteria.[1] and the Public Service Commission of Wisconsin publication Measurement Protocol for Sound and Vibration Assessment of Proposed and Existing Electric Power Plants (February 2002).[2] The purpose is to first establish a consistent and scientifically sound procedure for estimating existing ambient (background) sound and vibration levels in a project area, and second to determine the likely impact that operation of a new wind energy conversion system project will have on the existing sound and vibration environment.

The characteristics of the proposed WECS project and the features of the surrounding environment will influence the design of the sound and vibration study. Site layout, types of wind energy conversion units ("WECU") selected and the existence of the significant local sound and vibration sources and sensitive receptors shall be taken into consideration when designing a sound and vibration study. An independent, qualified consultant shall be required to conduct the sound and vibration study.

Note: Trempealeau County Zoning Department Administration shall be consulted prior to conducting any sound and vibration measurements. These guidelines may be modified (with express written approval of the County Zoning Department) to accommodate unique site characteristics. Consult with Zoning Department staff assigned to the project for guidance on study design before beginning any sound and vibration study. During consultation, good quality maps or diagrams of the site are necessary. Maps and diagrams shall show the proposed project area layout and boundaries[5], and identify important landscape features as well as significant local sound and vibration sources and sensitive receptors including, but not limited to, a residence, school, hospital, church, place of employment, or public library.

Measurement of the Existing Sound and Vibration Environment

An assessment of the proposed WECS project area's existing sound and vibration environment is necessary to predict the likely impact resulting from a proposed project. The following guidelines shall be used in developing a reasonable estimate of an area's existing sound and vibration environment. All testing shall be performed by an independent acoustical testing engineer approved by the Trempealeau County Zoning Department. All measurements shall be conducted with industry certified testing equipment.[4] All test results shall be reported to the Trempealeau County Zoning Department.

Sites with No Existing Wind Energy Conversion Units

Sound level measurements shall be taken as follows:

1. At all properties within the proposed WECS project boundaries[5]

2. At all properties within a one mile radius of the proposed WECS project boundaries[5].

3. One test must be performed during each season of the year.
   a. Spring (March 15 – May 15)
   b. Summer (June 1 – September 1)
   c. Fall (September 15- November 15)
   d. Winter (December 1- March 1)

4. All measurement points (MPs) shall be located in consultation with the property owner(s) and such that no significant obstruction (building, trees, etc.) blocks sound and vibration from the site.

5. Duration of measurements shall be a minimum of ten continuous minutes for each criterion (See Item 9 below) at each location.

6. One set of measurements shall be taken during each of the following four periods:
   a. Morning (6 - 8 a.m.)
   b. Midday (12 noon – 2 p.m.)
   c. Evening (6 – 8 p.m.)
   d. Night (10 p.m. – 12 midnight)

7. Sound level measurements must be made on a weekday of a non-holiday week.

8. Measurements must be taken at 6 feet above the ground and at least 15 feet from any reflective surface[3].

9. For each MP and for each measurement period, provide each of the following measurement criteria:
   a. Unweighted octave-band analysis (16^2, 31.5, 63, 125, 250, 500, 1K, 2K, 4K, and 8K Hz)
   b. L_{ave}, L_{10}, L_{50}, and L_{90}, in dBA
   c. L_{ave}, L_{10}, L_{50}, and L_{90}, in dBC
   d. A narrative description of any intermittent sounds registered during each measurement
   e. Wind speed at time of measurement
   f. Wind direction at time of measurement
   g. Description of the weather conditions during the measurement

10. Provide a map and/or diagram clearly showing:
    a. The layout of the project area, including topography, the project boundary lines[5], and property lines
    b. The locations of the MPs
    c. The minimum and maximum distance between any MPs
    d. The location of significant local sound and vibration sources
    e. The distance between all MPs and significant local sound and vibration sources
    f. The location of all sensitive receptors including but not limited to, a residence, school, hospital, church, place of employment, or public library.

Sites with Existing Wind Energy Conversion Units

Two complete sets of sound level measurements must be taken as defined below:

One set of measurements with the wind generator(s) off.

One set of measurements with the wind generator(s) running.

Sound level measurements shall be taken as follows:

1. At all properties within the proposed WECS project boundaries[5]
2. At all properties within a one mile radius of the proposed WECS project boundaries[5].
3. One test must be performed during each season of the year.
    a. Spring (March 15 – May 15)
    b. Summer (June 1 – September 1)
    c. Fall (September 15- November 15)
    d. Winter (December 1- March 1)

4. All measurement points (MPs) shall be located in consultation with the property owner(s) and such that no significant obstruction (building, trees, etc.) blocks sound and vibration from the site.

5. Duration of measurements shall be a minimum of ten continuous minutes for each criterion (See Item 9 below) at each location.

6. One set of measurements shall be taken during each of the following four periods:
    a. Morning (6 - 8 a.m.)
    b. Midday (12 noon – 2 p.m.)
    c. Evening (6 – 8 p.m.)
    d. Night (10 p.m. – 12 midnight)

7. Sound level measurements must be made on a weekday of a non-holiday week.
8. Measurements must be taken at 6 feet above the ground and at least 15 feet from any reflective surface[3].
9. For each MP and for each measurement period, provide each of the following measurement criteria:
    a. Unweighted octave-band analysis (16^2, 31.5, 63, 125, 250, 500, 1K, 2K, 4K, and 8K Hz)
    b. L_{ave}, L_{10}, L_{50}, and L_{90}, in dBA
    c. L_{ave}, L_{10}, L_{50}, and L_{90}, in dBC
    d. A narrative description of any intermittent sounds registered during each measurement

e. Wind speed at time of measurement
f. Wind direction at time of measurement
g. Description of the weather conditions during the measurement

10. Provide a map and/or diagram clearly showing:
    a. The layout of the project area, including topography, the project boundary lines[5], and property lines
    b. The locations of the MPs
    c. The minimum and maximum distance between any MPs
    d. The location of significant local sound and vibration sources
    e. The distance between all MPs and significant local sound and vibration sources
    f. The location of all sensitive receptors including but not limited to, a residence, school, hospital, church, place of employment, or public library.

Sound Level Estimate for Proposed Wind Energy Conversion System

In order to estimate the sound and vibration impact of the proposed WECS project on the existing environment an estimate of the sound and vibration produced by the proposed WECU(s) must be provided.

1. The manufacturer's sound level characteristics for the proposed WECU(s) operating at full load. Include an unweighted octave-band (16^4, 31.5, 63, 125, 250, 500, 1K, 2K, 4K, and 8K Hz) analysis for the WECU(s) at full operation for distances of 500, 1000, 1500, 2000, 2500 feet from the WECU(s).

2. Estimate the sound levels for the proposed WECU(s) in dBA and dBC at distances of 500, 1000, 1500, 2000, 2500 feet from the WECU(s). For projects with multiple WECU's, the combined sound level impact for all WECU's operating at full load must be estimated.

3. Provide a contour map of the expected sound level from the new WECU(s), using 5dBA increments created by the proposed WECU(s) extending out to a distance of at least 5,280 feet (one mile).

4. Determine the impact of the new sound and vibration source on the existing environment. For each MP used in the ambient study (note the sensitive receptor MPs):
    a. Report expected changes to existing sound levels for L_{ave}, L_{10}, L_{50}, and L_{90}, in dBA
    b. Report expected changes to existing sound levels for L_{ave}, L_{10}, L_{50}, and L_{90}, in dBC
    c. Report all assumptions made in arriving at the estimate of impact and any conclusions reached regarding the potential effects on people living near the project area.

5. Include an estimate of the number of hours of operation expected from the proposed WECU(s) and under what conditions the WECU(s) would be expected to run.

Post-Construction Measurements

1. Within twelve months of the date when the project is fully operational, and within two weeks of the anniversary date of the Pre-construction ambient noise measurements, repeat the existing sound and vibration environment measurements taken before the project approval. Post-construction sound level measurements shall be taken both with all WECU running and generating power, and with all WECU off.
2. Report post-construction measurements to the Trempealeau County Zoning Department (available for public review) using the same format as used for the Pre-approval sound and vibration studies.

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[1] Standard Guide for Selection of Environmental Noise Measurements and Criteria (Designation E 1686-96). July 1996. American Society for Testing and Measurements.

[2] Measurement Protocol for Sound and Vibration Assessment of Proposed and Existing Electric Power Plants. February 2002. Public Service Commission of Wisconsin.

[3] Environmental Noise Guidelines: Wind Farms. (ISBN 1 876562 43 9). February 2003. Environment Protection Authority, Adelaide SA.

[4] The Trempealeau County Zoning staff acknowledges that few sound level meters are capable of measurement of the 16 Hz center frequency octave band. However, because noise complaints from the public most likely involve low frequency noise associate with proposed WECS, we encourage applicants to pursue the collection of this important background noise data. If obtaining the 16 Hz data presents a problem contact Trempealeau County Zoning staff prior to collection of any field ambient measurement data.

[5] Project Boundary: A continuous line encompassing all WECU's and related equipment associated with the WECS project.

Thorndike Wind Energy Facility Ordinance *(Proposed for Enactment on 3/20/10)*

Section I. Purpose and Intent

1.1 This Ordinance is adopted pursuant to 30-A M.R.S.A. § 3001, to protect the health, safety, welfare, and quality of life of the Town of Thorndike and its residents. This Ordinance shall be known as the "Thorndike Wind Energy Facility Ordinance."

Section II. Applicability; Site Permit and Operational License Required

2.1 This Ordinance applies to all Wind Energy Facilities (see definition) proposed to be constructed or operated after the effective date of the Ordinance.

2.2 It shall be unlawful and a violation of this Ordinance to begin construction and/or operation of a Wind Energy Facility without a Site Permit and Operational License.

2.3 The burden of compliance with all aspects of this Ordinance is on the Applicant and the Owner/operator of a Wind Energy Facility. Approval of a Site Permit and Operational License by the Planning Board does not abrogate or reduce the responsibility of the Applicant or the Owner/operator to comply with this Ordinance. Consistent violations, particularly of the sound limits, may lead to decommissioning and removal of the Wind Energy Facility.

2.4 This Ordinance includes Sections (I) through (XII), together with the Appendix and References Section. Decisions regarding compliance or approval of an Applicant's Site Permit and Operational License must be made in light of the entire Ordinance.

Section III. Definitions

3.1 The following terms are defined as follows.

A) Ambient Sound includes all sound present in a given environment. It includes intermittent sounds, such as aircraft, barking dogs, wind gusts, mobile farm or construction machinery, and vehicles traveling along a nearby road. It also includes insect and other nearby sounds from birds, animals or people.

B) Applicant means the individual or business entity that seeks to secure a Permit or License under this Ordinance.

C) A-Weighted Sound Level (dBA) is one measure of the overall sound level. This measure is designed to reflect the response of the human ear, which does not respond equally to all frequencies. Lower frequency sounds are given less weight than those in the mid-range of human perception. The resulting measure is said to be A-weighted and the units are dBA.

D) Background Sound (L_{90}) is defined over a continuous ten minute period to be the average sound level during the quietest one continuous minute of the ten minutes. L_{90} may be measured relative to A-weighting or C-weighting, in which case it may be denoted $L_{90}A$ or $L_{90}C$. It refers to sound that is normally present at least 90% of the time, and excludes any sound generated by a WEF. It also excludes intermittent sounds from flora, fauna, wind and human activity. Background sound levels vary during different times of the day and night. Because wind turbines operate continuously, the background sound levels of interest are those during quieter periods which are often the evening and night.

E) C-Weighted Sound Level (dBC) is similar to the A-weighted sound level (dBA), but it does not de-emphasize low frequencies to the extent that A-weighting does. For sounds with a significant low-frequency component, dBC is a more accurate measure of the energy of the sound waves than dBA.

F) Decibel (dB) refers to a dimensionless quantity which is proportional to the logarithm (base 10) of a ratio of two quantities that are proportional to the power, energy or intensity of sound. One of these quantities is a reference level relative to which all other levels are measured.

G) Frequency is the number of complete oscillations or cycles per unit of time. See Hertz, below.

H) Good Utility Practice means any of the practices, methods and acts with respect to the safe operation of a WEF engaged in or approved by a significant portion of the electric utility industry and, in particular, those portions of the industry with experience in the construction, operation and maintenance of wind turbines during the relevant time period; or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision is made, could be expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method or act to the exclusion of all others, but rather to be acceptable practices, methods or acts generally accepted in the region.

I) Height means the total distance measured from the grade of the property as it existed prior to the construction of the wind energy system, facility, tower, turbine, or related facility at the base to its highest point. In the case of a wind turbine, this includes the length of the blade at its highest possible point.

J) Hertz (Hz) is a unit of cycles per second. A process that repeats itself a given number of times in one second is said to occur at that many Hertz.

K) Measurement Point (MP) refers to a location where sound and/or vibration are measured.

L) Mitigation Waiver means a legally enforceable, written agreement between the Applicant and a Non-participating Landowner in which the landowner waives certain setback, noise or other protections afforded in the Ordinance. A Parcel in which the landowner has entered into such an agreement becomes a Participating Parcel. A complete copy of any such agreement must be provided to the Planning Board and recorded in the Waldo County Registry of Deeds.

M) Noise means any unwanted sound produced by a WEF. Noise does not need to be loud to constitute an interference with the health and well-being of residents

N) Non-Participating Parcel means a parcel of real estate that is neither a Project Parcel nor a Participating Parcel.

O) Occupied Structure means any structure that is, or is likely to be, occupied by persons or livestock. This includes, but is not limited to dwellings, places of business, places of worship, schools, and barns.

P) Owner/operator means the person or entity with legal ownership of a WEF or WES, including successors and assigns, that has the authority and responsibility to operate the WEF on a day-to-day basis. An Owner/operator must have the legal authority to represent and bind.

Q) Participating Parcel means a parcel of real estate that is not a Project Parcel, but is subject to a Mitigation Waiver. A complete copy of the Mitigation Waiver must be provided to the Planning Board, and filed with the Waldo Country Registry of Deeds.

R) Project Boundary means the boundaries of the WEF as shown on the site plan submitted to and approved by the Planning Board in accordance with this Ordinance.

S) Project Parcel means any parcel(s) of real estate on which all or any part of a WEF will be constructed.

T) Property Line means the recognized and mapped property boundary line.

U) Public Way means any road capable of carrying motor vehicles, including, but not limited to, any state highway, municipal road, county road, unincorporated territory road or other road dedicated to the public.

V) Qualified Independent Acoustical Consultant. Qualifications for persons conducting baseline and other measurements and reviews related to the Application for a WEF or for enforcement actions against an operating WEF include, at a minimum, demonstration of competence in the specialty of community noise testing and Board Certified Membership in the Institute of Noise Control Engineers (INCE). Certifications such as Professional Engineer (P.E.) do not test for competence in acoustical principles and measurement and are thus not, without further qualification, appropriate for work under this Ordinance. The Independent Qualified Acoustical Consultant can have no direct or indirect financial or other relationship to an Applicant.

W) Scenic or Special Resource means a scenic resource of state or national significance, as defined in Title 35-A M.R.S.A. § 3451(9), any site registered in the National Registry of Historic Places, or a scenic or special resource of local significance identified as such in the Thorndike Comprehensive Plan, or listed on the Visual Resource Inventory of the Thorndike Comprehensive Plan.

X) Sensitive Receptor means places or structures intended for human habitation, whether inhabited or not, public parks, state and federal wildlife areas, the manicured areas of recreational establishments designed for public use, including but not limited to golf courses, camp grounds and other nonagricultural businesses. These areas are more likely to be sensitive to the exposure of the noise, vibration, shadow or flicker generated by a WEF. These areas include, but are not limited to: schools, daycare centers, elder care facilities, hospitals, places of seated assemblage, nonagricultural businesses and residences.

Y) Sound. A fluctuation of air pressure which is propagated as a wave through air.

Z) Sound Level (L_{10}) refers to the sound level exceeded 10% of the time. During any continuous ten minute period, L_{10} is defined to be the average sound level during the loudest one continuous minute of the ten minutes. L_{10} may be measured relative to A-weighting or C-weighting, in which case it may be denoted $L_{10}A$ or $L_{10}C$.

AA) Sound Level (L_{90}) refers to Background Sound (see above).

BB) Sound Level (L_{eq}) is the frequency-weighted equivalent sound level. It is defined to be the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound. L_{eq} may be measured relative to A-weighting or C-weighting, in which case it may be denoted $L_{eq}A$ or $L_{eq}C$.

CC) Sound Level (pre/post). Each of the Sound Levels defined above, L_{90}, L_{10} and L_{eq}, whether A-weighted or C-weighted, may be followed by "(pre)" or "(post)'". Post-construction Sound Levels measured with all elements of the WEF turned on will be denoted with "(post)". During the application process, before the WEF has been constructed, "(post)" will be used to denote the pre-construction estimate of the post-construction Sound Level. Pre-construction Sound Levels, or Sound Levels measured with all elements of the WEF turned off will be denoted with "(pre)". See the Appendix, particularly Parts c(3)A, c5 and d.

DD) Turbine Height- the distance measured from the surface of the tower foundation to the highest point of any turbine rotor blade measured at the highest arc of the blade.

EE) Wind Energy System (WES) means equipment that converts and then transfers energy from the wind into usable forms of energy on a large, industrial scale using one or more turbines with combined nameplate capacity of over 100 kW for commercial or utility purposes with sale off premises or onto the utility grid.

FF) Wind Energy Facility (WEF) means all of the land and equipment used by the Wind Energy System and its support facilities including the wind turbine(s), tower, access roads, control facilities, meteorological towers, maintenance and all power collection and transmission systems.

GG) Wind Energy Facility Operational License or WEF Operational License means a license to operate a Wind Energy System issued by the Planning Board in accordance with this Ordinance

HH) Wind Energy Facility Site Permit or WEF Site Permit means a Permit to construct a Wind Energy System issued by the Planning Board in accordance with this Ordinance.

II) Wind Turbine or Turbine (WT) means a mechanical device which captures the energy of the wind and converts it into usable forms of energy. The primary components of a wind turbine are the blade assembly, electrical generator and tower.

Section IV. Site Permit Application Procedures

4.1 Applications for a WEF Site Permit shall be submitted to the Planning Board. The application for a WEF Site Permit shall include all of the information, documents, plans, deposits and other items required to be submitted with an application under Section V, a preliminary cost agreement and the fees specified in Section VII, along with any costs outlined in the Appendix. At least ten (10) copies of all written materials, including maps or drawings, shall be provided. Written materials shall be contained in a bound report. Digital copies of this information may be required as well.

4.2 The Planning Board shall, with assistance from such staff, consultants, committees or commissions as it deems appropriate, determine whether the Application is complete and contains all of the materials, information, agreements, deposits and payments required to be submitted with an Application under Sections V, VI, VII, and the Appendix. If an Application is not complete, then the Applicant shall be so advised, and no further action shall be taken by the Planning Board until a complete Application is received.

4.3 After the Planning Board determines that an Application is complete, the Planning Board shall so notify the applicant in writing and schedule a public hearing to be held within 30 days. The Board shall have notice of the date, time and place of the hearing given to the applicant and published at least 2 times in a newspaper of general circulation, with the first notice published at least 7 days before the hearing. Costs of the hearing shall be charged to the escrow account.

4.4 Following the public hearing, the Planning Board will review the record and determine whether the Application meets all requirements of this Ordinance. In determining whether the Application meets the requirements of this Ordinance, the Planning Board may obtain assistance from such staff and consultants as it deems appropriate. The Planning Board shall process the Application as soon as reasonable and feasible, given the complexity of the Application, other business facing the Town, staff and other resources, questions that arise during the review process, and other matters affecting the time needed to complete the review process.

4.5 If an Application is complete and meets all requirements of this Ordinance, and the Applicant has paid all fees and costs pursuant to Sections V and VII and the Appendix, then the Planning Board shall approve a WEF Site Permit for the WEF. If an Application does not meet all requirements of this Ordinance or the Applicant has not paid all fees and costs, then the Planning Board may deny the Application or approve the Application with conditions that will assure compliance with this Ordinance. If an Application is approved with conditions, then a WEF Site Permit for the WEF shall be issued when all conditions of approval have been satisfied.

4.6 Any significant modification of the approved WEF, such as but not limited to, the number of WTs, tower height, tower locations, turbine design and specifications shall require the Applicant to obtain an amended Site Permit from the Planning Board, pursuant to this Ordinance. The application procedures and permit requirements and standards for amending a Site Permit are the same as for an initial application.

4.7 An Application for a WEF Site Permit shall include the following information and meet the following requirements.

A) The Applicant's name, address and phone number, and the name, address and phone number of the Owner/operator, if different.

B) A narrative describing the proposed WEF, including an overview of the project, the project location, and the generating capacity and expected production of the WEF.

C) Evidence of the Applicant's technical and financial ability to implement the project as proposed.

D) An overview map that includes the extent of the entire Town, showing all roads, together with the location of all WT access roads, power transmission lines, and all other features of the WEF deemed to be relevant by the Planning Board.

E) The tax map and lot number of all Project Parcels, including any deed restrictions or easements

F) For any Project Parcel that is not owned by the Applicant, a copy of any agreement(s) between the owner of the Project Parcel and the Applicant and/or the Owner/operator.

G) The boundaries of all Project Parcels, surveyed by a Maine Professional Land Surveyor, with name, registration number and seal of the surveyor provided.

H) The boundaries of all Participating Parcels.

I) The boundaries of all Non-Participating Parcels located within 5,280 feet of any proposed WT, together with the distance to, and bearing to, all boundary lines relative to each proposed WT, as measured from the nearest point of the property line to the WT. This information shall be provided by a Maine Professional Land Surveyor.

J) The names, addresses and phone numbers of the owners of all Project Parcels, Participating Parcels, and Non-Participating Parcels located within 5,280 feet of any proposed WT, with each property owner's status indicated (Project Parcel, Participating Parcel or Non-Participating Parcel), including the book and page reference of the identified owner's interest as recorded in the Waldo County Registry of Deeds.

K) An aerial photo showing all Project Parcels, Participating Parcels, and Non-Participating Parcels located within 5,280 feet of any proposed WT and indicating any current agricultural uses.

L) Existing zoning of each Project Parcel and all required zoning setbacks on each Project Parcel.

M) Soils information of at least medium intensity, analyzed for relevant drainage characteristics.

N) The location of all components of the WEF, including but not limited to the WTs, access roads, control facilities, meteorological towers, turnout locations, substation(s), ancillary equipment, buildings, structures, and temporary staging areas, together with maintenance and all power collection and transmission systems.

O) The location and description of all structures located on Project Parcels, and all occupied structures located on Participating and Non-Participating Parcels located within 5,280 feet of any proposed WT.

P) The location of any existing culverts, utility poles, signs or other prominent man-made features on the parcel or on any property within 100 feet of the area to be developed.

Q) Dimensional representation and sizes of the structural components of the tower construction including the base, footings, tower, and blades.

R) The distance between each WT tower and each of the following shall be shown on the site plan: structures on all Project Parcels and Participating Parcels; structures on all Non-Participating Parcels located within 5,280 feet of any boundary of a Project Parcel; all utility lines, telephone lines, and public ways located within 5,280 feet of any proposed WT.

4.8 Schematic of electrical systems associated with the proposed WEF including all existing and proposed electrical connections and components.

4.9 Manufacturer's specifications and installation and operation instructions.

4.10 *The topography of the site at an appropriate contour interval (2 to 20 foot), showing direction of* proposed surface water drainage across and from Project Parcels and Participating Parcels, with an assessment of impacts on downstream properties and water resources, including, but not limited to, streams and wetlands. The survey references from which the elevation was determined should be clearly marked both on the plan and at/near the site.

4.11 The location of any of the following found within 5,280 feet of any proposed WT: open drainage courses, wetlands, and other important natural areas and site features, including, but not limited to, floodplains, deer wintering areas, low level avian migration routes significant wildlife habitats, scenic areas, habitat of rare and endangered plants and animals, unique natural areas, sand and gravel aquifers and historic and/or archaeological resources, together with a description of such features.

4.12 Provisions made for handling all solid wastes, including hazardous and special wastes and the location and proposed screening of any on-site collection or storage facilities.

4.13 The location, dimensions and materials to be used in the construction of proposed roads, driveways, parking areas and loading areas, together with an assessment of any changes to traffic flow. *Note: Any new or upgraded road or driveway must also comply with the requirements of the Thorndike Road Ordinance or Driveway Permit portions of the Thorndike Land Use Ordinance, as appropriate.*

4.14 A topographical overlay for the Project Parcel(s), Participating Parcels and Non-Participating Parcels located within 5280 feet of any proposed WT.

4.15 The size and scale of maps and diagrams shall be as determined by the Planning Board, and shall include a north arrow, the date, the scale, and date and seal of a Maine Professional Land Surveyor or professional engineer.

4.16 Emergency shut down plan.

4.17 The site plan shall include such additional relevant information as the Planning Board may require.

Section V. Site Permit Requirements and Standards

5.1 Sound Modeling, Sound Standards and Sound-Related Enforcement Procedures

A) *Independent Pre-licensing Sound Study.* An Application for a WEF Site Permit shall include a four season sound study as specified in the Appendix. This study shall be conducted by a Qualified Independent Acoustical Consultant approved by the Planning Board. The consultant will review this study and assist the Planning Board in determining whether the proposed WEF will comply with the sound limits set forth in this Ordinance. The Applicant shall provide financial surety that the cost of the study, and its review, will be borne by the Applicant, in accordance with Section (VII) of this Ordinance.

B) *Sound Limits.* No Site Permit shall be issued if the pre-licensing information or sound study indicates that the proposed WEF will not comply with the following requirements, which are to apply everywhere within one mile (5280 feet) of any WT, except on Project Parcel(s) or on a Participating Parcel(s) which is subject to a Mitigation Waiver which specifies different sound limits than those below. If pre-construction estimates of the post-construction sound levels, exceed the limits below, then the WEF Application will be denied; if these limits are exceeded after the WEF has been built, then the WEF will be in violation of this Ordinance.

1) The sound limits below are stated in terms of $L_{90}A$(pre), $L_{eq}A$(post), $L_{eq}C$(post), $L_{90}C$(post) and $L_{eq}A$(post). Each of these quantities is defined in the Appendix, particularly in Parts c(3)A, c5 and d. Prior to construction of the WEF, the "pre" values are as measured and the "post" values are as calculated, following the guidelines of the Appendix. After the WEF has been constructed, the "pre" values are the WEF-Off values and the "post" values are the WEF-On values.

2) *Audible Sound Limit.* The appropriate value to use for the pre-construction sound level in the three tests below is $L_{90}A$(pre); the appropriate value to use for the post construction sound level is $L_{eq}A$(post).

   a) No WT, WES or WEF shall be located so as to generate post-construction sound levels that exceed 40 dBA at night (8:30 p.m. to 6:00 a.m.) or 45 dBA during the day (6:00 a.m. to 8:30 p.m.).

   b) A 5 dB penalty is applied for tones as defined in IEC 61400-11.

3) *Low Frequency Sound Limit.*

   a) $L_{eq}C$(post) minus $L_{90}A$(pre) must be less than 20 dB outside of any occupied structure.

   b) $L_{90}C$(post) may not exceed 50 dBC, without contribution from other ambient sounds, for properties located one mile or more away from state highways or other major roads, and it may not exceed 55 dBC for properties closer than one mile from a state highway or other major road.

4) *Mitigation Waiver.* Property owners may waive these sound restrictions with a written Mitigation Waiver agreement. A complete copy of any such agreement must be filed with the Planning Board and Recorded in the Waldo County Registry of Deeds.

5) *Post-construction Sound Measurements.* Starting within twelve months after the date when the WEF is operating, a post-construction sound study shall be performed, with all WTs operating, as described in Part d of the Appendix. Post-construction sound studies shall be conducted by a Qualified Independent Acoustical Consultant chosen by the Planning Board. The Permittee will provide financial surety that the costs of these studies shall be paid by the Permittee. The surety required by Section VII shall include these costs. A Consultant of the Permittee may observe the Town's consultant. The WEF Permittee shall provide all technical information required by the Planning Board or Independent Qualified Acoustical Consultant before, during, and/or after any acoustical studies required by this document and for local area acoustical measurements. The post-construction sound measurements, as described in Part d of the Appendix, shall be repeated every three years throughout the life of the facility.

5.2 Set-Back Requirements

A) A WEF shall comply with the following set-back requirements, which shall apply in addition to the siting requirements found elsewhere in this Ordinance. If more than one set-back requirement applies, the greater set-back distance shall be met.

   1) All parts of a WEF shall comply with all applicable set-back requirements in the Town's zoning Ordinance.

   2) Each WT shall be set back at least 1,800 feet from the property line of any Non-Participating Parcel. Property owners may waive this setback with a written Mitigation Waiver agreement.

   3) Each WT shall be set back at least 1,500 feet from any public way.

   4) Each WT shall be set back at least 1,200 feet from any above-ground electric power line or telephone line except that a lesser setback shall be permitted if the utility agrees, in writing, and this agreement is approved by the Planning Board.

5) Each WT shall be set back not less than 5,280 feet from any residence, business, school, daycare facility, church, hospital, or other Occupied Structure on any Non-Participating Parcel. Property owners may waive this setback with a written Mitigation Waiver agreement.

6) All WTs must be set back a minimum of 2,500 feet from any Scenic or Special Resource as defined in Section (III).

7) All set-back distance measurements shall be based on horizontal distances.

B) Minor changes in approved plans necessary to address field conditions may be approved by the Planning Board, provided that any such change does not affect compliance with the Ordinance. The Permittee shall submit revised plans to the Planning Board showing the proposed minor change, which, if approved, shall be considered an amendment to an existing WEF Site Permit and/or Operational License, as appropriate. In the event that a majority of the Planning Board believes that a requested change constitutes a material change to a Site Permit and/or Operational License, or if the changes will affect compliance with the Ordinance, full reapplication is required.

C) All construction activities must conform to the approved WEF site plan, including any conditions of approval and minor changes approved by the Planning Board to address field conditions.

D) Upon completion of the project, the Permittee must provide the Planning Board with a set of construction plans showing the structures and site improvements as actually constructed. These "as-built" plans must be submitted within thirty days of completion of the WEF, and before commencement of operation of the WEF.

5.3 Plan and Risk Assessment for Road and Property Use

A) An Application for a WEF Site Permit shall include a road and property use and risk assessment plan containing the following information and meeting the following requirements.

1) A description and map of all public ways, and other property, in the Town to be used or affected in connection with the construction of the WEF, including a description of how and when such ways and property will be used or affected.

2) A description of the type and length of vehicles and type, weight and length of loads to be conveyed on all public ways in the Town.

3) A complete assessment of the proposed use of public ways in the Town in connection with the construction of the WEF, including the adequacy of turning radii; the ability of the public ways to sustain loads without damage; the need to remove or modify (permanently or temporarily) signs, trees, utilities, or anything else; any reasonably foreseeable damage to public ways or other property, public or private; any reasonably foreseeable costs that the Town may incur in connection with the use of property in the Town, including but not limited to costs relating to traffic control, public safety, or damage to public ways, or to other public or private property.

4) A traffic control and safety plan relating to the use of public ways in the Town in connection with the construction of the WEF.

5) Any additional relevant information that the Planning Board may request relating to the use of public ways or other effects on public and private property that may occur in connection with the construction and operation of the WEF.

6) Any new or upgraded road or driveway must receive additional approvals as required by the Road Ordinance or Driveway Permit portions of the Land Use Ordinance, as appropriate.

B) The Planning Board will evaluate the risk assessment plan with assistance from such consultants that it deems appropriate, including without limitation a third-party engineer approved by the Planning Board, the cost to be solely borne by the Applicant. The Planning Board may document the condition of public ways and other property to be used in connection with the construction of the WEF in such manner as it deems appropriate. The Planning Board may require changes to the risk assessment plan that it deems to be appropriate to protect public safety, to protect public and private property, and to address anticipated costs to the Town associated with construction of the WEF.

C) If the Applicant requires the temporary closure of any public way, the Planning Board may require the Applicant to enter into an agreement relating to the use of the public way.

D) The Applicant shall be responsible for paying for any damage to any public way. If the risk assessment anticipates damage to any public way, the Planning Board may require the Applicant to provide a surety in an amount that the Planning Board determines appropriate to secure any obligations under the agreement, including but not limited to any obligation relating to alterations or modifications to public ways made in connection with the Applicant's activities.

5.4 Design Plan and Design Requirements. An Application for a WEF Site Permit shall include a design plan containing the information and meeting the following requirements.

1) The total height of any WT shall not exceed 500 feet above grade, as measured to the blade tips at their maximum distance above grade.

2) Wind Turbines shall be painted a non-reflective, non-obtrusive color.

3) The design of the buildings shall, to the extent reasonably feasible, use materials, colors, textures, screening and landscaping that will blend with and be compatible with the natural setting and the existing environment.

4) Wind Turbines shall not be artificially lighted, except to the extent required by law, and strobe or other intermittent lights are prohibited unless required by law.

5) No advertising or display shall be permitted, other than reasonable identification of the manufacturer or operator of the Wind Turbines or WEF.

6) Electrical controls and control wiring and power-lines must be wireless or below ground, except where WES collector wiring is brought together for connection to the utility grid.

7) The clearance between the ground and the Wind Turbine blades shall be not less than 75 feet.

5.5 Additional Protection Requirements. The Application shall include a statement from the Federal Aviation Administration that the proposed WEF will not pose a hazard to aircraft. The Applicant must also provide memoranda from the Maine Department of Inland Fisheries and Wildlife (MDIFW) Environmental Coordinator and from the Maine Natural Areas Program (MNAP) outlining any concerns that these bodies may have with the proposed WEF. In the absence of any such concerns, the Applicant must provide copies of correspondence with these bodies showing that no such concerns exist. The Applicant must demonstrate that the proposed WEF will not have an undue adverse effect on rare, threatened, or endangered wildlife, significant wildlife habitat, rare, threatened or endangered plants and rare and exemplary natural plant communities and ecosystems.

5.6 Blasting Plan and Requirements. Owner/operator shall not undertake any blasting in connection with the construction of the WEF unless the Applicant has notified the Town and submitted a blasting plan consistent with applicable laws and regulations. The plan must be reviewed and approved by the Planning Board before any blasting may take place. No blasting shall be undertaken without 48 hours notice to all residents within a half mile radius, measured horizontally, from the blasting area. All blasting operations will cover the blasting area with sufficient stemming, matting or natural protective cover to prevent debris from falling on nearby properties.

5.7 Signal Interference Requirements. The WEF shall not cause any disruption or loss of radio, telephone, television or similar signals.

5.8 Shadow Flicker and Blade Glint Assessment and Requirements

A) Shadow flicker occurs when the blades of a Wind Turbine pass between the sun and/or moon and an observer, casting a readily observable, moving shadow on the observer and his or her immediate environment. The Application shall include a detailed shadow flicker and blade glint assessment model and an estimate of the expected amount of flicker and glint.

B) This study must meet the following requirements.

1) The study shall be prepared by a registered professional regularly engaged in this type of work who is approved by the Planning Board. The Applicant shall be responsible for paying the registered professional's fees and all costs associated with conducting the study. The Applicant shall provide financial surety to the Town for the cost of the study in accordance with Section VII of this Ordinance.

2) The study will examine the areas within a one mile radius of any WT in the proposed WEF.

3) The model will be calculated using the following minimum inputs:

a) Turbine locations (proposed and existing)

b) Shadow flicker Sensitive Receptor locations

c) Existing topography (elevation contours and vegetation)

d) Rotor diameter, blade width and hub height

e) Joint wind speed and direction distribution (wind rose table)

f) Hours of sunshine (long term monthly references)

4) The model may be prepared by use of current aerial photography and topographical maps. A site visit by the preparer is required to identify Sensitive Receptors and to verify the existing conditions.

5) The study shall estimate the locations and durations of shadow flicker caused by the proposed WEF within the study area. The study shall clearly indicate the duration of shadow flicker at locations throughout the study area, showing the total number of hours per year anticipated.

6) The study must include estimates for the duration of shadow flicker at all existing occupied structures, structures permitted for construction, schools, churches, public buildings, and roadways. The estimated duration of shadow flicker at any residential parcel shall include flicker that occurs within 100 feet of the residence.

7) The study must include a statement of the assumptions made, methodology applied, and data used by the study. This information must be sufficient to allow an independent third party to verify the results of the study.

8) The study shall include a paint sample that demonstrates the color, texture and gloss of the proposed surface coating and a certification that the proposed surface coating will not create a reflective surface conducive to blade glint.

C) The Application will not be approved if the study estimates that the duration and location of flicker will satisfy any of the following conditions.

1) There are more than 10 hours of flicker per year on any Non-participating Parcel.

2) There are more than 10 hours of flicker per year on any roadway.

3) Flicker is possible at intersections of any roadways.

If after construction, the WEF violates any of these three conditions, then the WEF will be in violation of this Ordinance.

5.9 Sign Plan and Sign Requirements. An Application for a WEF Site Permit shall include a sign plan meeting the requirements in this section.

A) The plan shall provide reasonable signage at the WEF, identifying the Project Parcels as being part of the WEF and providing appropriate safety notices and warnings.

B) No advertising material or signage other than warning, equipment information or indicia of ownership shall be allowed on the Wind Turbines. This prohibition shall include the attachment of any flag, decorative sign, streamers, pennants, ribbons, spinners or waving, fluttering or revolving devices, but not including weather devices.

C) The address and phone number of the Owner/operator and Licensee shall be posted on all access points from public roads.

5.10 Stray Voltage Assessment and Requirements.

A) An Application for a WEF Site Permit shall include reports of stray voltage analyses in accordance with this section. The Applicant shall conduct and include a report of a preconstruction stray voltage test on all commercial livestock facilities located within a one-mile radius of the Project Parcels. The tests shall be performed by an investigator, approved by the Planning Board, using a testing protocol which is approved by the Planning Board. A report of the tests shall be provided with the WEF Site Permit Application and shall be provided to the owners of all property included in the study area. Applicant shall seek written permission from property owners prior to conducting testing on such owners' property. Applicant shall not be required to perform testing on property where the owners have refused to grant permission to conduct the testing.

B) Following construction of the WEF and within one year after commencing operation, the Applicant shall conduct a post-construction stray voltage test on all commercial livestock facilities located within a one-mile radius of the Project Parcels. The tests shall be performed by an investigator approved by the Planning Board and shall be performed using a testing protocol which is approved by the Planning Board. A report of the tests shall be provided to the Planning Board and to the owners of all property included in the study area. Applicant shall seek written permission from property owners prior to conducting testing on private property. Applicant shall not be required to perform testing on property where the owners have refused to grant permission to conduct the testing.

C) The Applicant or subsequent holder of the Operational License shall provide neutral isolation devices to property owners where testing reveals neutral-to-earth voltages in excess of 0.5 volts caused by the WEF.

5.11 Security Plan and Requirements. The Application shall include a security plan that contains the information and meets the requirements in this section or offers alternative strategies that achieve the objectives of effectively discouraging vandals and climbers.

A) The outside of Wind Turbines shall not be climbable.

B) All access doors to the towers and electrical equipment shall be locked.

C) Warning signs shall be placed on each tower, all electrical equipment, and each entrance to the WEF.

5.12 Fire Prevention and Emergency Response Plan and Requirements.

A) An Application for a WEF Site Permit shall include a fire prevention and emergency response plan containing the information and meeting the requirements in this section. The plan shall describe the potential fire and emergency scenarios that may require a response from fire, emergency medical services, police or other emergency responders.

B) The plan shall designate the specific agencies that would respond to potential fire or other emergencies, shall describe all emergency response training and equipment needed to respond to a fire or other emergency, shall include an assessment of the training and equipment available to the designated agencies, and shall provide for any special training or emergency response equipment that the designated agencies need to use in responding to a potential fire or other emergency. The study shall be conducted at Applicant's cost and the Applicant shall pay for the cost of any training or equipment required by local fire and emergency responders.

C) Access to the WEF and construction area(s) shall be constructed and maintained following a detailed erosion control plan in a manner designed to control erosion and to provide maneuverability for service and emergency response vehicles.

5.13 Emergency Shutdown Plan and Requirements. An Application for a WEF Site Permit shall include an emergency shutdown plan. The plan shall describe the circumstances under which an emergency shutdown may be required to protect public safety, and shall describe the procedures that the Town and the Owner/operator and Licensee will follow in the event an emergency shutdown is required.

5.14 Decommissioning and Site Restoration Plan and Requirements. An Application for a WEF Site Permit shall include a decommissioning and site restoration plan containing the information and meeting the requirements in this section.

A) The plan shall provide for the removal from the Project Parcels, and lawful disposal or disposition of, all Wind Turbines and other structures, hazardous materials ,and electrical facilities. The plan shall provide for the removal of all access roads and foundations unless the landowner wishes them left in place. The plan shall provide for the restoration of the Project Parcels to a condition similar to that which existed before construction of the WEF.

B) The plan shall provide for the decommissioning of the site upon the expiration or revocation of the WEF Permit, or upon the abandonment of the WEF. The WEF shall be deemed abandoned if its operation has ceased for six consecutive months without substantiating communication concerning the ceasing of operations to the satisfaction of the Planning Board.

C) The plan shall include provisions for financial surety to ensure completion of decommissioning and site restoration, in form and amount satisfactory to the Planning Board. A performance bond or a cash escrow account held by the Town with 5% of the estimated cost of decommissioning to be added by the WEF on an annual basis shall be acceptable surety, the total amount to be based on the estimated cost of completing the decommissioning and site restoration in accordance with the approved plan, adjusted for inflation, and as approved by the Planning Board.

D) The plan shall include written authorization from the WEF Permittee and all owners of all Project Parcels for the Town to access the Project Parcels and implement the decommissioning and site restoration plan, in the event that the WEF Permittee fails to implement the plan. The written authorization shall be in a form approved by the Planning Board and recorded in the Waldo County Registry of Deeds.

5.15 Mitigation Waiver Agreement. Non-participating Landowners may waive certain specified protections in this Ordinance using a written, legally enforceable Mitigation Waiver negotiated between the wind turbine Applicant and the Non-participating Landowner, who thereby becomes a Participating Landowner. Complete copies of executed Mitigation Waivers must be included with the submission of the WEF Application. The Mitigation Waiver must be recorded in the Waldo

County Registry of Deeds, and describe the benefited and burdened properties. Any subsequent deed must advise all subsequent owners of the burdened property.

5.16 Inspections. Wind Turbines shall be inspected after construction is completed but before becoming operational, and every two years thereafter, for structural and operational integrity by a Maine licensed professional engineer, and the Owner/operator and/or Licensee shall submit a copy of the inspection report to the Planning Board. If such report recommends that repairs or maintenance are to be conducted, then the Owner/operator and/or Licensee shall provide the Planning Board with a written schedule for the repairs or maintenance. Failure to complete the repairs or maintenance in accordance with the schedule shall be deemed a violation of this Ordinance.

5.17 Liability Insurance. The Applicant, Permittee, Owner/operator and Licensee, as applicable, shall maintain a current general liability policy for the WEF that covers bodily injury and property damage in an amount commensurate with the scope and scale of the WEF, and acceptable to the Planning Board. Certificates of insurance shall be provided to the Planning Board annually. The policy must include the requirement that the Planning Board will be provided at least ten days notice by the policy provider in the case of cancellation or change to the policy. In addition, the Applicant, Permittee, Owner/operator and Licensee, as applicable, must inform the Planning Board of such changes.

5.18 Construction Codes.

A) All wiring shall be installed according to local, state, and national electrical codes.

B) All construction shall be conducted in accordance with the International Building Code 2006, published by the International Code Council, Inc.

Section VI. Operational License

6.1 Applications for a WEF Operational License shall be submitted to the Planning Board.

A) Where an Applicant is applying for a new or amended WEF Site Permit, the application for a WEF Operational License, or amended license, shall be submitted to the Planning Board in conjunction with the Site Permit application, and shall include the application form and the separate fee specified in Section VII.

B) Where an Applicant is applying for a WEF Operational License renewal, a new License as the result of transfer of ownership or operation, or reinstatement or modification of an Operational License, the Applicant shall submit an application form, a copy of the existing WEF Site Permit, and the fee specified in Section VII.

6.2 The application for a WEF Operational License shall include the following items:

A) The Applicant's name, address and phone number, and the name, address and phone number of the Owner/operator, if different;

B) An emergency directory for the Owner/operator sufficient to allow the Town to contact the Owner/operator at any time;

C) Evidence of the Applicant's technical and financial ability to operate the WEF in accordance with this Ordinance, the Site Permit, and the Operational License;

D) For any Project Parcel that is not owned by the Applicant, a copy of any agreement(s) between the owner of the Project Parcel and the Applicant;

E) An updated security plan in accordance the requirements of Section V(k);

F) An updated fire prevention and emergency response plan in accordance with the requirements of Section V(l);

G) An updated emergency shutdown plan in accordance with the requirements of Section V(m);

H) An updated decommissioning and site restoration plan in accordance with the requirements of Section (V)(n), including a transfer of financial surety rights from prior License holder;

I) Updated liability insurance information in accordance with the requirements of Section (V)(q); and

J) A signed statement from the Applicant that the Applicant agrees to assume full responsibility for complying with the provisions of this Ordinance and the Site Permit, including agreeing to continue or complete any duties and obligations of the former Operational License holder under this Ordinance or former Operational License, including, but not limited to, the requirement for post-construction sound measurements, post-construction stray voltage testing, wind turbine inspections, and submission to inspections. Items (3) through (9) do not need to be duplicated if the Operational License is submitted in conjunction with an application for a Site Permit.

6.3 The Planning Board shall, with assistance from such staff, consultants, committees or commissions as it deems appropriate, determine whether the Application is complete. If an Application is not complete, then the Applicant shall be so advised, and no further action shall be taken by the Planning Board until a complete Application is received.

6.4 After the Planning Board determines that an Application is complete, the Planning Board shall determine whether the Application meets all requirements of this Ordinance. In determining whether the Application meets the requirements of this Ordinance, the Planning Board may obtain assistance from such staff and consultants as it deems appropriate. The Planning Board shall process the Application as soon as reasonable and feasible, given the complexity of the Application, other business facing the Town, staff and other resources, questions that arise during the review process, and other matters affecting the time needed to complete the review process.

6.5 If an Application is complete and meets all requirements of this Ordinance, and the Applicant has paid all fees and costs, then the Planning Board shall approve a WEF Operational License for the WEF. If an Application does not meet all requirements of this Ordinance or the Applicant has not paid all fees and costs, then the Planning Board may deny the Application or approve the Application with conditions that will assure compliance with this Ordinance. If an Application is approved with conditions, then a WEF Operational License for the WEF shall be issued when all conditions of approval have been satisfied, or, when the Planning Board deems appropriate under the circumstances, the Planning Board may issue a Temporary Operational License for up to 90 days.

Section VII. Fees and Costs

7.1 Preliminary Cost Agreement. At the time an Application for a WEF Site Permit is filed with the Town, the Applicant shall execute for the benefit of the Town an agreement to pay and provide adequate surety guaranteeing payment of the cost of the investigation, review and processing of the Application, including without limitation by way of enumeration, legal, engineering, acoustical, planning, environmental, and staff administrative costs as provided in this Ordinance. The agreement shall provide for the establishment of an escrow account with a minimum of $10,000 cash deposit to be provided by the Applicant to begin review under this Ordinance. The Town may use the funds in the escrow account in connection with the application review as allowed by this Ordinance. In the event that the cash deposit in escrow is insufficient to complete the review, the Town shall notify the Applicant that additional funds are necessary and of the amount reasonably believed necessary to complete the review, and the Applicant shall provide the additional funds. The Planning Board shall not begin processing, or in the case of where additional funds are requested, shall not continue processing, the Application until the preliminary cost agreement is approved and signed and until the required surety, or additional surety, and/or funds, are provided to the Town.

7.2 The application fee for a Site Permit shall consist of a base application fee of $2,500.00, plus $500.00 for every WT included in the project.

7.3 The application fee for an Operational License is $1,000.

7.4 The annual fee for an Operational License is $250.00.

Section VIII. Expiration of Site Permit Approval and WEF Operational License

8.1 If on-site construction of a WEF is not significantly commenced within one year of the date of issue of a Site Permit, the Site Permit shall automatically lapse and become null and void. If an approved WEF is not completed within 30 months after a Site Permit is issued, then the Site Permit shall expire, and the Applicant must reapply. The Planning Board may, for good cause shown, grant a one-time extension of up to six months for either start of construction or completion of construction provided such request is submitted prior to the lapse or expiration of the Site Permit.

8.2 A WEF Operational License issued under this Ordinance shall expire twenty years after the date it is issued, unless earlier terminated.

8.3 A WEF Operational License shall be deemed abandoned if its operation has ceased for six consecutive months, without communication to the Planning Board of an explanation to the Planning Board's satisfaction. An Operational License expires immediately upon abandonment.

8.4 A WEF Operational License shall automatically terminate upon transfer of ownership or operation of the WEF. The proposed new owner or operator shall be required to obtain a new Operational License, which must be in place prior to the transfer of ownership or operation of the WEF.

Section IX. Violations, Complaints and Penalties

9.1 Violations of This Ordinance. It shall be unlawful to construct or operate any WEF or part thereof in violation of any provision of this Ordinance, a WEF Site Permit, or a WEF Operational License; any violation thereof is punishable, upon conviction, in accordance with 30-A M.R.S.A. § 4452(3), and shall include attorneys fees and a penalty to address economic benefit as provided in 30-A M.R.S.A. § 4452(3)(D) and (H). All fines assessed under this Ordinance shall inure to the benefit of the Town of Thorndike. Each day a violation exists or continues shall constitute a separate offense.

9.2 Complaint Review Board. Prior to permitting any WEF, the town shall establish a Complaint Review Board to serve as the enforcing Authority. The Complaint Review Board will consist of three Commissioners as follows:

A) One Town Selectperson

B) The Code Enforcement Officer (CEO)

C) One member of the Planning Board

9.3 Complaints and Modification, Revocation or Suspension. The Complaint Review Board pursuant to Section IX(9.3) will serve as the Enforcing Authority for WEFs and will have continuing jurisdiction to modify, revoke, or suspend all WEF Operational licenses in accordance with this section. Such authority shall be in addition to the Town's authority to prosecute violations and take other enforcement action.

A) In this section, "violation" means a violation of this Ordinance, or a violation of a WEF Site Permit issued under this Ordinance, or a violation of a WEF Operational License.

B) Any resident of the Town, real property tax-payer to the Town, or Town official may file a written complaint with the Town Clerk alleging that a WEF Permittee, Owner/operator or Licensee has committed or is committing a violation. Such complaints shall be forwarded to the Complaint Review Board.

C) The Complaint Review Board shall preliminarily review the complaint. In connection with its preliminary review, the Complaint Review Board may require the Code Enforcement Officer or other person or persons to conduct such investigations and make such reports as the Complaint Review Board may direct. The Complaint Review Board may request information from the WEF Permittee, Owner/operator and/or Licensee, the complainant, and any other person or entity to assist with its preliminary review.

D) Following its preliminary review, the Complaint Review Board may:

1) Dismiss the complaint;

2) Refer the complaint to the Town attorney for prosecution; or

3) Conduct a public meeting to determine whether the alleged violation(s) have occurred, and what remedial action should be taken. Prior to such meeting, notice of the meeting shall be given to the WEF Permitee, Owner/operator, Licensee, as applicable, and the complainant. The WEF Permittee, Owner/operator, Licensee, as applicable, and the complainant, and any other person, may appear at the meeting and may offer testimony and other relevant evidence, and may be represented by any attorney. If the Complaint Review Board concludes that violations have occurred, the Complaint Review Board may:

   a) Impose conditions on the WEF Site Permitee, Owner/operator and/or Licensee to the extent reasonably necessary to discontinue the violation(s) or avoid any recurrence thereof; or

   b) Suspend the WEF Site Permit and/or Operational License until such time as the WEF Permitee, Owner/operator and/or Licensee presents and implements a plan, satisfactory to the Complaint Review Board that will discontinue the violation(s) or prevent any recurrence thereof, and meets such further conditions as the Complaint Review Board deems appropriate to discontinue and prevent further violations; or

   c) Recommend to the Select Board that the matter be referred to the Town's attorney for prosecution seeking that the WEF Site Permit and/or Operational License be revoked and that decommissioning of the WEF be directed, if the Complaint Review Board concludes that no reasonable modification can be made to the WEF to discontinue or prevent violations; or

   d) Refer the matter to the Select Board and Town's attorney for prosecution, subject to Complaint Review Board and Select Board approval; or

   e) Take no action, if the Complaint Review Board concludes that no further action is needed to discontinue or prevent violations, and that prosecution is unwarranted.

E) Following any such hearing, the Complaint Review Board's written decision shall be furnished to the WEF Permitee, Owner/operator and/or Licensee, as applicable, and to the complainant.

F) An appeal from the decision of the Complaint Review Board may be taken to the Appeals Board by the WEF Permittee, Owner/operator or Licensee, or a complainant. Such appeal must be in writing and must specify the grounds thereof, and must be filed with the Town Clerk within 30 days after the final action of the Complaint Review Board. The Town Clerk shall provide any appeal to the Appeals Board. The Appeals Board shall fix a reasonable time for the hearing of the appeal, and shall give public notice thereof as well as due notice to the WEF Permitee, Owner/operator and/or Licensee, as applicable, and the complainant. The action of the Complaint Review Board shall be sustained unless the Appeals Board, by a favorable vote of the majority of all members of the Appeals Board, reverses or modifies the Complaint Review Board's determination.

G) An appeal from a decision of the Board of Appeals shall be made to Superior Court in accordance with M.R.Civ.P. 80B.

Section X. Maintenance, Amendments, and Miscellaneous Requirements

10.1 A WEF shall be constructed, operated, and maintained, and repaired in accordance with the approved Site Permit, Operational License, and this Ordinance. Where a standard or requirement is not provided by either this Ordinance, the WEF Site Permit or the WEF Operational License, the WEF Permittee and Licensee shall comply with Good Utility Practices.

10.2 All components of the Wind Turbine Project shall conform to relevant and applicable local, state and national building codes.

10.3 A WEF Permittee may apply to the Planning Board for changes to a WEF Site Permit or Operational License. The Application shall describe the requested change or changes. The Planning Board shall review the Application and determine what provisions of this Ordinance and Appendix will apply to the Application. The Application will then be processed in accordance with all provisions of this Ordinance deemed to be applicable by the Planning Board. The provisions of Section (VII), together with all other instances where this Ordinance outlines financial obligations of the Applicant, Permitee, Owner/operator and Licensee shall apply to any Application for changes to a WEF Site Permit or Operational License. An Application for changes will be required for any significant modification to the approved WEF Permit, including, but not limited to: any change in the number of WTs; any change in WT height, location, design, or specification; or any substantive change to any required plan or insurance coverage.

10.4 The WEF Permitee, Owner/operator and/or Licensee, as applicable, shall notify the Town of any extraordinary event as soon as possible, and in no case more than 12 hours after the event. "Extraordinary events" shall include but not be limited to tower collapse, catastrophic turbine failure, fires, leakage of hazardous materials, unauthorized entry to the tower base, thrown blade or hub, any injury to a Facility worker or other person that requires emergency medical treatment, or other event that impacts the health and safety of the Town or its residents.

10.5 Approval of a WEF Permit under this Ordinance does not exempt an Applicant from obtaining other applicable permits from the Town of Thorndike, such as building, electrical, plumbing and shoreland zoning permits, as applicable, or any applicable state or federal permit.

Section XI. Severability; Conflicts with Other Ordinances, Laws, and Regulations; Appeal

11.1 If any section, subsection, sentence, clause or phrase of this Ordinance is for any reason held to be invalid or unconstitutional by reason of any decision of any court of competent jurisdiction, such decision shall not affect the validity of any other section, subsection, sentence, clause or phrase or part thereof. The Town hereby declares that it would have passed this Ordinance and each section, subsection, sentence, clause, phrase or part thereof even if any one or more sections, subsections, sentences, clauses, phrases or parts thereof may be declared invalid or unconstitutional.

11.2 Whenever a provision of this Ordinance conflicts with or is inconsistent with another provision of this Ordinance or of any other Town Ordinance, or Federal or State of Maine rule, regulation or statute, the more restrictive provision shall apply.

11.3 Except as provided in Section IX.3 F), an aggrieved party may appeal a decision of the Planning Board to Superior Court in accordance with M.R.Civ.P. 80B.

Section XII. Effective Date

12.1 This Ordinance shall take effect immediately upon passage.

Appendix.

A.1 Introduction. The purpose of this Appendix is to describe the requirements for pre-construction and post-construction sound and vibration monitoring. Determining the sound and vibration impacts is a highly technical undertaking and requires a serious effort in order to collect reliable and meaningful data for both the public and decision-makers. This protocol is based in part on criteria published in American National Standards S12.9 - Quantities and Procedures for Description and Measurement of Environmental Sound, and S12.18 for the measurement of sound pressure level outdoors. Where there are differences between the procedures and definitions of this document and ANSI standards, this document shall apply. Where a standard's requirements may conflict with other standards or with this document, the most stringent requirements shall apply. IEC 61400-11 procedures are not suitable for enforcement of these requirements except for the presence of tones.

A.2 Instrumentation. All instruments and other tools used to measure audible, inaudible and low frequency sound shall meet the requirements for ANSI or IEC Type 1 Integrating Averaging Sound Level Meter with one-third octave band analyzer with frequency range from 6.3 Hz to 20k Hz and capability to simultaneously measure dBA LN and dBC LN. The instrument must also be capable of measuring low level background sounds down to 20 dBA, and must conform, at a minimum, to the

requirements of ANSI S1.43-1997. Measurements shall only be made with the instrument manufacturer's approved wind screen. A compatible acoustic field calibrator is required with certified ± 0.2 dB accuracy. Portable meteorological measurement requirements are outlined in ANSI S12.9 Part 3 and are required to be located within 5 meters of the sound measuring microphone. The microphone shall be located at a height of 1.2 to 1.5 meters for all tests unless circumstances require a different measurement position. In that case, the reasons shall be documented and include any adjustments needed to make the results correspond to the preferred measurement location.

A.3 Pre-construction Sound Measurement and Study. An assessment of the sound environment in the area surrounding the proposed WEF is necessary in order to predict the impact of a proposed project. The following guidelines shall be used in developing an estimate of an area's pre-construction sound environment. All testing is to be performed by a Qualified Independent Acoustical Consultant chosen by the Planning Board. The Applicant may file objections detailing any concerns it may have with the Planning Board's selection. These concerns will be addressed in the study. Objections must be filed prior to the start of the sound study. Test results and the study will be reported to the Planning Board.

A) *Location of Measurement Points for Pre-construction Sound Measurement.* Sites to be used as Measurement Points shall be selected as follows.

1) Sites should not be located near large objects, such as buildings. The distance to buildings or other structures should be twice the largest dimension of the structure, if possible.

2) The sites shall include those locations anticipated to have the highest sound emissions of the proposed WEF.

3) The sites shall include those locations where the background soundscape is quietest.

4) The sites shall include locations along the property line(s) of Project Parcel(s) and Participating Parcel(s). The intent is to anticipate the locations along the property line(s) that will receive the highest sound emissions. The Applicant and the owner of relevant Project Parcel(s) and Participating Parcel(s) must provide access to allow measurements to be taken. The Permit will not be approved if such access is refused. Mitigation Waivers for any parcel(s) do not eliminate the requirement that access be provided.

5) The sites shall include locations selected to represent the sound level at all Sensitive Receptors located within 1.5 miles of the boundaries of the proposed WEF.

6) Sites shall be located with the assistance of the Planning Board and property owner(s).

7) Additional sites may be chosen by the Consultant conducting the study if these sites will improve the accuracy of the study's conclusions.

B) *Conditions under which Measurements are to be Taken.* At each Measurement Point, information will be gathered under the conditions specified.

1) The duration of each measurement shall be ten continuous minutes for each quantity listed in Part c(3)A, below, at each location. Longer-term tests are not appropriate. In most cases, it should be possible to derive all values described in Part c(3)A from a single ten minute sample. The duration must include at least six minutes that are not affected by transient sounds from near-by and non-natural sources. Multiple ten minute samples over longer periods may be used to improve the reliability, in which case the quietest ten minute sample will be used.

2) Measurements shall be taken during the times of day and night expected to be have the quietest background sound level, as appropriate for the site. The preferred nighttime testing time for background sound levels is from 10 pm until 4 am. If circumstances indicate that samples should be taken at a different time, then the test may be conducted at an alternate time, if approved by the Planning Board.

3) Measurements must be made on a week-day of a non-holiday week. Week-end measurements may be taken at selected sites where there are weekend activities that may be affected by WT sound.

4) Measurements must be taken at 1.2 to 1.5 meters above the ground and at least 15 feet from any reflective surface, following ANSI S12.9 Part 3 protocol together with any other requirements found in this Ordinance.

5) Measurements taken when the wind speeds exceed two meters per second (4.5 miles per hour) at the microphone location are not valid. A windscreen of the type recommended by the monitoring instrument manufacturer must be used for all data collection.

6) All elements of any pre-existing WEF, whether operated by the current Applicant or some other party, must be turned off for the duration of background sound level measurements. Willingness of the Applicant to abide by this condition for any future Applicants is a requirement of Permit approval.

C) *Quantities to be Measured.* At each Measurement Point, the following information will be gathered, at a *minimum*, and provided as part of the Study.

1) L_{eq}, L_{10} and L_{90}, each to be given in dBA and in dBC. L_{90} is the value for the quietest continuous minute of a continuous ten minute period, L_{10} is the value for the loudest continuous minute of a continuous ten minute period, and L_{eq} is the average value over the entire ten minute period. To distinguish these values from their post-construction counterparts, these values may be denoted L_{eq}(pre), L_{10}(pre) and L_{90}(pre), with an "A" or a "C", depending on the weight. For instance, L_{10}A(pre) means the A-weighted preconstruction measurement of L_{10}. The ten minute period shall be considered invalid if either

a) L_{10}A minus L_{90}A is greater than 10 dBA; or

b) L_{10}C minus L_{90}C is greater than 15 dBC.

2) One-third octave band sound pressure levels, averaged over each ten minute sample. selection. These concerns will be addressed in the study. Objections must be filed prior to the start of the sound study. Test results and the study will be reported to the Planning Board.

a) Location of Measurement Points for Pre-construction Sound Measurement. Sites to be used as Measurement Points shall be selected as follows.

1. Sites should not be located near large objects, such as buildings. The distance to buildings or other structures should be twice the largest dimension of the structure, if possible.

2. The sites shall include those locations anticipated to have the highest sound emissions of the proposed WEF.

3. The sites shall include those locations where the background soundscape is quietest.

4. The sites shall include locations along the property line(s) of Project Parcel(s) and Participating Parcel(s). The intent is to anticipate the locations along the property line(s) that will receive the highest sound emissions. The Applicant and the owner of relevant Project Parcel(s) and Participating Parcel(s) must provide access to allow measurements to be taken. The Permit will not be approved if such access is refused. Mitigation Waivers for any parcel(s) do not eliminate the requirement that access be provided.

5. The sites shall include locations selected to represent the sound level at all Sensitive Receptors located within 1.5 miles of the boundaries of the proposed WEF.

6. Sites shall be located with the assistance of the Planning Board and property owner(s).

7. Additional sites may be chosen by the Consultant conducting the study if these sites will improve the accuracy of the study's conclusions.

b) *Conditions under which Measurements are to be Taken.* At each Measurement Point, information will be gathered under the conditions specified.

1. The duration of each measurement shall be ten continuous minutes for each quantity listed in Part c(3)A, below, at each location. Longer-term tests are not appropriate. In most cases, it should be possible to derive all values described in Part c(3)A from a single ten minute sample. The duration must include at least six minutes that are not affected by transient sounds from near-by and non-natural sources. Multiple ten minute samples over longer periods may be used to improve the reliability, in which case the quietest ten minute sample will be used.

2. Measurements shall be taken during the times of day and night expected to be have the quietest background sound level, as appropriate for the site. The preferred nighttime testing time for background sound levels is from 10 pm until 4 am. If circumstances indicate that samples should be taken at a different time, then the test may be conducted at an alternate time, if approved by the Planning Board.

3. Measurements must be made on a week-day of a non-holiday week. Week-end measurements may be taken at selected sites where there are weekend activities that may be affected by WT sound.

4. Measurements must be taken at 1.2 to 1.5 meters above the ground and at least 15 feet from any reflective surface, following ANSI S12.9 Part 3 protocol together with any other requirements found in this Ordinance.

5. Measurements taken when the wind speeds exceed two meters per second (4.5 miles per hour) at the microphone location are not valid. A windscreen of the type recommended by the monitoring instrument manufacturer must be used for all data collection.

6. All elements of any pre-existing WEF, whether operated by the current Applicant or some other party, must be turned off for the duration of background sound level measurements. Willingness of the Applicant to abide by this condition for any future Applicants is a requirement of Permit approval.

c) *Quantities to be Measured.* At each Measurement Point, the following information will be gathered, at a minimum, and provided as part of the Study.

1. L_{eq}, L_{10} and L_{90}, each to be given in dBA and in dBC. L_{90} is the value for the quietest continuous minute of a continuous ten minute period, L_{10} is the value for the loudest continuous minute of a continuous ten minute period, and L_{eq} is the average value over the entire ten minute period. To distinguish these values from their post-construction counterparts, these values may be denoted L_{eq}(pre), L_{10}(pre) and L_{90}(pre), with an "A" or a "C", depending on the weight. For instance, L_{10}A(pre) means the A-weighted preconstruction measurement of L_{10}. The ten minute period shall be considered invalid if either

i. L_{10}A minus L_{90}A is greater than 10 dBA; or

ii. L_{10}C minus L_{90}C is greater than 15 dBC.

2. One-third octave band sound pressure levels, averaged over each ten minute sample.

3. A narrative description of any intermittent sounds registered during each measurement.

4. A narrative description of the steady sounds that form the background soundscape.

5. Digital recording of all data, sampled at a rate of at least 44,100 Hz with signed 16 bit Pulse Code Modulation, as described in IEC 60908, and measured using a recording instrument meeting ANSI S1.4. This may be augmented with video recordings.

6. Wind speed and direction, humidity and temperature, together with the corresponding information from the nearest ten meter weather reporting station.

d) *Information to be supplied by the Applicant.* The Applicant must provide the following information.

1. The make and model of all WT units to be installed in the WEF.

2. The sound power of all WT units to be installed in the WEF, expressed in watts, and abbreviated as L_W. This information must have been determined for the WT manufacturer under laboratory conditions specified by IEC 61400-11, and provided to the Applicant. It cannot be assumed that these values represent the highest sound output for any operating condition; they reflect the operating conditions necessary to meet the IEC 614100-11 requirements. The lowest frequency for acoustic power (L_W) required in IEC 61400-11 is 50 Hz. This Ordinance requires wind turbine certified acoustic power (L_W) levels at rated load for the total frequency range from 6.3 Hz to 10,000 Hz, in one-third octave frequency bands tabulated to the nearest 0.1 dB.

3. Any additional information that the Consultant reasonably deems necessary to fulfill the requirements in Part c(5), below.

4. The burden is on the Applicant to provide sufficient information to establish that operation of the WEF will meet the requirements of this Ordinance.

e) Required Elements of the Study

1. The purpose of the study is, first, to establish a consistent and scientifically sound procedure for evaluating existing background levels of audible and low-frequency sound; and, second, to determine whether the proposed WEF will meet the conditions set forth in Section V The characteristics of the proposed WEF and the features of the surrounding environment will influence the design of the study. Site layout, types of WES/WT selected and the existence of other significant local audible and low frequency sound sources and Sensitive Receptors should be taken into consideration.

2. Determining whether the proposed WEF will meet the conditions set forth in this Ordinance requires that the Consultant predict the postconstruction sound level of the proposed WEF. At each Measurement Point, the Consultant must estimate values for L_{90}, L_{10} and L_{eq}, both A-weighted and C-weighted, for a total of six values at each Measurement Point. These pre-construction estimates of the post-construction sound level will be denoted L_{90}(post), L_{10}(post) and L_{eq}(post), each of which may have an "A" or a "C" to indicate the method of weighting.

3. In determining these post-construction values, the Consultant should assume worst-case conditions for producing sound emissions. The assumed wind speed shall be the speed that results in the worst-case (i.e., highest) dBA and dBC sound levels in the area surrounding the WEF. The wind direction shall be taken to be the

dominant wind direction in each season. If other wind directions may cause levels to exceed those of the predominant wind direction at Sensitive Receptors, then these levels and conditions shall be considered in the Study. To accommodate enforcement under weather conditions where this is a significant difference between the wind speed at ground-level and at hub-height, any predictive model shall assume that the winds at hub-height are sufficient for the highest sound emission, even though the enforcement tests will be with ground-level wind speeds of ten miles per hour or less.

4. In the event that there are several pending Permit Applications, or preexisting WEF(s), the estimated post-construction values shall be the combined predicted output of all proposed or existing WEFs. All of these WEFs will be treated using the same methodology to arrive at combined value for the predicted post-construction sound level.

5. Each additional WEF adds to the sound-burden of a community. If the contribution to sound levels of a proposed WEF, together with the sound generated by pre-existing WEFs would raise sound levels beyond the limits of this Ordinance, then the proposed WEF will not be approved.

6. At a minimum, the study shall include the following information, and meet the following requirements.

   i. The study shall address conditions in all four seasons, and it is required that measurements be taken at each Measurement Point at least once in each of the four seasons. The quietest period of each season should be chosen for measurement.

   ii. The study may be based on computer models, but shall include a description of all assumptions made in the model's construction and algorithms. This description must be sufficient to allow an independent third party to verify the conclusions of the study. If the model does not consider the effects of wind direction, worst-case weather, operating conditions, geography of the terrain, and/or the effect of reinforcement from coherent sounds or tones from the turbines, then these shortcomings must be identified and other means used to adjust the model's output to account for these factors.

   iii. The minimum and maximum distance between any Measurement Points.

   iv. The distance between each Measurement Point and any significant local sound sources.

   v. The predicted sound pressure levels for each of the 1/1 octave bands as un-weighted dB in tabular form from 6.3 Hz to 10,000 Hz. This should be given for a set of locations throughout the study area deemed by the Consultant and Planning Board to be representative.

   vi. Eight iso-contour maps shall be included, two for each season, showing the level of pre-construction background sound, as given by $L_{90}A$(pre) and $L_{90}C$(pre). These maps shall extend to a minimum of 1.5 miles beyond the perimeter of the project boundary, and may be extended to a distance of more than 1.5 miles at the discretion of the Planning Board. The scale shall be such as to allow individual Measurement Points and Sensitive Receptors to be distinguished.

   vii. Eight iso-contour maps shall be included, two for each season, showing the level of post-construction sound, as given by $L_{eq}A$(post) and $L_{eq}C$(post). These maps shall cover the same area and use the same scale as those in (F).

   viii. Eight iso-contour maps shall be included, two for each season. Four of these maps shall show the value of $L_{eq}A$(post) minus $L_{90}A$(pre), one map for each

season; and four maps shall show $L_{eq}C$(post) minus $L_{90}A$(pre), one map for each season. These maps shall cover the same area and use the same scale as those in (F).

ix. All maps shall use of contour interval of no more than 5 dB, and shall extend out, at a minimum, to distance sufficient to show the 30 dBA or 40 dBC boundary, whichever is greater.

x. Maps shall show the location of a Measurement Points, sources of any significant local non-WEF sound or vibration, and the location of all Sensitive Receptors, including, but not limited to, schools, daycare centers, hospitals, residences, places of worship, and elderly care facilities.

xi. A map shall be included that shows the layout of the project area, including topography, the project boundary lines and property lines.

xii. Any additional information that the Consultant and Planning Board reasonably believe will aid in making a more informed decision as to whether the proposed WEF will meet the requirements of this Ordinance.

D) Post-construction Sound Measurement and Study

1) Post-construction sound studies require two sets of measurements. One set of measurements shall be gathered using the same methodology as outlined in Part (c), above. These measurements may be referred to as the "WEF-Off Measurements." The second set of measurements shall be gathered as set forth in this Part (d), and may be referred to as the "WEF-On Measurements". The WEF-Off Measurement Points shall be the same as those used as WEF-On Measurement Points. All testing is to be performed by a Qualified Independent Acoustical Consultant chosen by the Planning Board.

2) At the discretion of the Planning Board, the pre-construction sound measurements, taken in Part (c), can be substituted for the WEF-Off Measurements if a random sampling of 10% of the pre-construction study sites shows that $L_{90}A$ and $L_{90}C$ levels have not changed by more than ± 5 dB when measured under the same meteorological conditions.

3) If there have been any complaints about WEF sound or low frequency sound by any resident of an occupied dwelling, then a location or locations on that property will be included in the WEF-Off and WEF-On Measurement Points.

4) This location(s) will be selected jointly by the complainant and Consultant. In addition, the Consultant and Planning Board may include additional Measurement Points where they reasonably believe that doing so will improve the accuracy of the study.

5) The WEF-On Measurements shall be taken under the conditions listed below, and the quantities measured shall be as specified in Part c(3), above.

a) The duration of each measurement shall be ten continuous minutes for each quantity listed in Part c(3)A, above, at each location. The duration must include at least six minutes that are not affected by transient sounds from near-by, non-natural, non-WEF sources. Multiple ten minute samples over longer periods may be used to improve the reliability.

b) Measurements must be taken at 1.2 to 1.5 meters above the ground and at least 15 feet from any reflective surface, following ANSI S12.9 Part 3 protocol together with any other requirements found in this Ordinance.

c) Measurements must be taken with the wind speed at hub-height sufficient for full operating capacity, and at two meters per second (4.5 miles per hour) or less at the microphone location. Conditions should reflect the loudest sound emissions from the WEF. For purposes of enforcement, the wind speed and direction at the WT blade height shall be selected to reproduce the conditions leading to the enforcement action.

A windscreen of the type recommended by the monitoring instrument manufacturer must be used for all data collection.

6) The Consultant shall provide a study including the same information and meeting the same requirements as the pre-construction sound study described in Part c(5), except that the values for L_{90}(post), L_{10}(post) and L_{eq}(post) (both A-weighted and C-weighted) shall be taken to be the measured WEF-On values.

7) For the purposes of enforcement, the post-construction values of L_{90}A(post), L_{90}C(post), L_{10}A(post), L_{10}C(post), L_{eq}A(post) and L_{eq}C(post) are defined to be equal to the measured WEF-On value of each quantity.

References

ANSI/ASA S12.9-1993/Part 3 (R2008) - American National Standard
Quantities and Procedures for Description and Measurement of Environmental Sound, Part 3:
Short-Term Measurements with an Observer Present

This standard is the second in a series of parts concerning description and measurement of outdoor environmental sound. The standard describes recommended procedures for measurement of short-term, time-average environmental sound outdoors at one or more locations in a community for environmental assessment or planning for compatible land uses and for other purposes such as demonstrating compliance with a regulation. These measurements are distinguished by the requirement to have an observer present. Sound may be produced by one or more separate, distributed sources of sound such as a highway, factory, or airport. Methods are given to correct the measured levels for the influence of background sound. For the purposes of this Ordinance the options that are provided in ANSI S12.9-Part 3 (2008) shall be applied with the additional following requirements:

Wind Turbine Siting Acoustical Measurements ANSI S12.9 Part 3 Selection of options and other requirements

4.2 background sound: Use definition (1) 'long-term

4.3 long-term background sound: The L_{90} excludes short term background sounds

4.4 basic measurement period: Ten (10) minutes L_{90} (10 min)

4.5 Sound Measuring Instrument: Type 1 integrating meeting ANSI S1.43

6.5 Windscreen: Required

7.1 Long-term background sound

7.2 Data collection Methods: Second method Observed samples to avoid contamination by short term sounds (purpose: to avoid loss of statistical data)

8 Source(s) Data Collection: All requirements in ANSI S12.18 Method #2 precision to the extent possible while still permitting testing of the conditions that lead to complaints.

8.3(a) All meteorological observations required at both (not either) microphone and nearest 10m weather reporting station.

8.3(b) For a 10 minute sound measurement to be valid the wind velocity shall not exceed 2m/s (4.5 mph) measured less than 5m from the microphone. Compliance sound measurements shall not be taken when winds exceed 2m/s.

8.3(c) In addition to the required acoustic calibration checks the sound measuring instrument internal noise floor must also be checked at the end of each series of ten minute measurements and no less frequently than once per day. Insert the microphone into the acoustic calibrator with the calibrator signal off. Record the observed dBA and dBC reading from the sound level meter or other recording instrument to determine an approximation of the instrument self noise. This calibrator covered microphone must demonstrate that the results of this test are at least 5 dB below the immediately previous ten minute acoustic test results for the acoustic data to be valid. This test is necessary to detect undesired increase in the microphone and sound level meter internal self noise. As a precaution sound measuring instrumentation should be removed from any air conditioned space at least an hour before use. Nighttime

measurements are often performed very near the dew point. Minor moisture condensation inside a microphone or sound level meter can increase the instrument self noise and void the data.

8.4 to the end: The remaining sections of ANSI S 12.9 Part 3 Standard do not apply.

ANSI S12.18-1994 (R2004) American National Standard
Procedures for Outdoor Measurement of Sound Pressure Level

This American National Standard describes procedures for the measurement of sound pressure levels in the outdoor environment, considering the effects of the ground, the effects of refraction due to wind and temperature gradients, and the effects due to turbulence. This standard is focused on measurement of sound pressure levels produced by specific sources outdoors. The measured sound pressure levels can be used to calculate sound pressure levels at other distances from the source or to extrapolate to other environmental conditions or to assess compliance with regulation. This standard describes two methods to measure sound pressure levels outdoors. METHOD No. 1: general method; outlines conditions for routine measurements. METHOD No. 2: precision method; describes strict conditions for more accurate measurements. This standard assumes the measurement of A-weighted sound pressure level or time-averaged sound pressure level or octave, 1/3-octave or narrow-band sound pressure level, but does not preclude determination of other sound descriptors.

ANSI Sl.43-1997(R2007) American National Standard
Specifications for Integrating Averaging Sound Level Meters

This Standard describes instruments for the measurement of frequency-weighted and time-average sound pressure levels. Optionally, sound exposure levels may be measured. This standard is consistent with the relevant requirements of ANSI Sl.4-1983(R 1997) American National Standard Specification for Sound Level Meters, but specifies additional characteristics that are necessary to measure the time average sound pressure level of steady, intermittent, fluctuating, and impulsive sounds.

ANSI S1.11-2004 American National Standard
'Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters'

This standard provides performance requirements for analog, sampled-data, and digital implementations of bandpass filters that comprise a filter set or spectrum analyzer for acoustical measurements. It super-cedes ANSI S1.11-1986 (R1998) American National Standard Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters, and is a counterpart to International Standard IEC 61260:1995 Electroacoustics - Octave-Band and Fractional-Octave-Band Filters. Significant changes from ANSI S1.11-1986 have been adopted in order to conform to most of the specifications of IEC 61260:1995. This standard differs from IEC 61260:1995 in three ways: (1) the test methods of IEC 61260 clauses 5 is moved to an informative annex, (2) the term 'band number', not present in IEC 61260, is used as in ANSI S1.11-1986, (3) references to American National Standards are incorporated, and (4) minor editorial and style differences are incorporated.

ANSI S1.400-2006 American National Standard
Specifications and Verification Procedures for Sound Calibrators
IEC 60908 Audio Recording – Compact disk digital audio system

Applies to a pre-recorded optical reflective digital audio disc system. Defines those parameters of compact discs that affect interchangeability between discs and players. Is also intended as a reference for manufacturers wishing to produce discs and/or players that conform to the system described.

IEC 61400-11

Second edition 2002-12, Amendment 1 2006-05

IEC 61400-11

Second edition 2002-12, Amendment 1 2006-0

Wind turbine generator systems - Part 11: Acoustic noise measurement techniques

The purpose of this part of IEC 61400 is to provide a uniform methodology that will ensure consistency and accuracy in the measurement and analysis of acoustical emissions by wind turbine generator systems. The standard has been prepared with the anticipation that it would be applied by:

- the wind turbine manufacturer striving to meet well defined acoustic emission performance requirements and/or a possible declaration system;
- the wind turbine purchaser in specifying such performance requirements;
- the wind turbine operator who may be required to verify that stated, or required, acoustic performance specifications are met for new or refurbished units;
- the wind turbine planner or regulator who must be able to accurately and fairly define acoustical emission characteristics of a wind turbine in response to environmental regulations or permit requirements for new or modified installations.

This standard provides guidance in the measurement, analysis and reporting of complex acoustic emissions from wind turbine generator systems. The standard will benefit those parties involved in the manufacture, installation, planning and permitting, operation, utilization, and regulation of wind turbines. The measurement and analysis techniques recommended in this document should be applied by all parties to insure that continuing development and operation of wind turbines is carried out in an atmosphere of consistent and accurate communication relative to environmental concerns. This standard presents measurement and reporting procedures expected to provide accurate results that can be replicated by others.

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TOWN OF MONTVILLE WIND TURBINE GENERATOR ORDINANCE

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TOWN OF MONTVILLE WIND TURBINE GENERATOR ORDINANCE

1.0 Title

This Ordinance shall be known as the Town of Montville Wind Turbine Generator (WTG) Ordinance.

2.0 Purpose

The purpose of this Ordinance is to regulate Wind Turbine Generators to protect and safeguard the health, safety, and general welfare of the citizens of Montville by establishing reasonable and uniform regulations.

3.0 Authority

This Ordinance is adopted pursuant to the enabling provisions of Article VIII, Part 2, Section 1 of the Maine Constitution (Municipal Home Rule), the provisions of Title 30-A M.R.S.A. Section 3001 (Home Rule), and the provisions of the Planning and Land Use Regulation Act, Title 30-A M.R.S.A. Section 4312, etc. seq. (*Comprehensive Planning and Land Use Regulation, or "Growth Management Act"*).

4.0 Conflicts with Other Ordinances, Laws and Regulations

Whenever a provision of this Ordinance conflicts with or is inconsistent with another provision of this Ordinance or of any other ordinance, regulation or statute from any jurisdiction, the more restrictive provision shall control.

5.0 Validity and Severability

Should any section or provision of this Ordinance be declared by the courts to be invalid such decisions shall not invalidate any other section or provision of the Ordinance.

6.0 Effective Date

6.1 This Ordinance shall become effective upon the date of its passage.

6.2 If this Ordinance is enacted within 90 days after the expiration of an ordinance entitled "Moratorium on Wind Power Development for the Municipality of Montville" (Moratorium) adopted March 28, 2009, the effective date of this Ordinance will be retroactive to the expiration date of the Moratorium. [If the Ordinance and the required public hearings, public notices, etc. cannot be completed within the moratorium timeframe, the Ordinance should be made retroactive to the date the moratorium expires.]

7.0 Applicability

This Ordinance applies to any wind turbine that is the subject of a permit or license application pending before, or filed with the Town of Montville, after the effective date of the Ordinance.

8.0 Definitions

Aerodynamic Sound – a noise that is caused by the flow of air over and past the blades of a WTG.

Ambient Sound – Ambient sound encompasses all sound present in a given environment, being usually a composite of sounds from many sources near and far. It includes intermittent noise events, such as, from aircraft flying over, dogs barking, wind gusts, mobile farm or construction machinery, and the occasional vehicle traveling along a nearby road. The ambient also includes insect and other nearby sounds from birds and animals or people. The nearby and transient events are part of the ambient sound environment but are not to be considered part of the long-term background sound.

American National Standards Institute (ANSI) – Standardized acoustical instrumentation and sound measurement protocol shall meet all the requirements of the following ANSI Standards:

ANSI S1.43 Integrating Averaging Sound Level Meters: Type-1 (or IEC 61672-1)
ANSI S1.11 Specification for Octave and One-third Octave-Band Filters (or IEC 61260)
ANSI S1.40 Verification Procedures for Sound Calibrators
ANSI S12.9 Part 3 Procedures for Measurement of Environmental Sound
ANSI S12.18 Measurement of Outdoor Sound Pressure Level
IEC 61400-11 WTG systems –Part 11: Acoustic noise measurements

Anemometer – a device for measuring the speed and direction of the wind.

Applicant – the legal entity, which includes an individual or business entity that seeks to secure a Permit or Operating License under this Ordinance.

A-Weighted Sound Level (dBA) – A measure of over-all sound pressure level designed to reflect the response of the human ear, which does not respond equally to all frequencies. It is used to describe sound in a manner representative of the human ear's response. It reduces the effects of the low with respect to the frequencies centered around 1000 Hz. The resultant sound level is said to be "A-weighted"and the units are "dBA." Sound level meters have an A-weighting network for measuring A-weighted sound levels (dBA) meeting the characteristics and weighting specified in ANSI Specifications for Integrating Averaging Sound Level Meters, S1.43-1997 for Type 1 instruments, and be capable of accurate readings (corrections for internal noise and microphone response permitted) at 20 dBA or lower. In this document dBA means LAeq unless specified otherwise.

Background Sound (L90) – refers to the sound level present at least 90% of the time. Background sounds are those heard during lulls in the ambient sound environment. That is, when transient sounds from flora, fauna, and wind are not present. Background sound levels vary during different times of the day and night. Because WTGs operate 24/7 the background sound levels of interest are those during the quieter periods which are often the evening and night. Sounds from the WTG of interest, near-by birds and animals or people must be excluded from the background sound test data. Nearby electrical noise from streetlights, transformers and cycling AC units and pumps etc., must also be excluded from the background sound test data.

Background sound level (dBA and dBC (as L90)) is the sound level present 90% of the time during a period of observation that is representative of the quiet time for the soundscape under evaluation and with duration of ten (10) continuous minutes. Several contiguous ten (10) minute tests may be performed in one hour to determine the statistical stability of the sound environment.

Measurement periods such as at dusk when bird and insect activity is high or the early morning hours when the 'dawn chorus' is present are not acceptable measurement times. Longer term sound level averaging tests, such as 24 hours or multiple days are not at all appropriate since the purpose is to define the quiet time background sound level. It is defined by the LA90 and LC90 descriptors. It may be considered as the quietest one (1) minute during a ten (10) minute test. LA90 results are valid only when LA10 results are no more than 10 dB above LA90 for the same period. LC10 less LC90 are not to exceed 10 dB to be valid.

The background noise environment consists of a multitude of distant sources of sound. When a new nearby source is introduced the new background noise level would be increased. The addition of a new source with a noise level 10 dB below the existing background would increase the new background 0.4 dB. If the new source has the same noise level as the existing background then the new background is increased 3.0 dB. Lastly, if the new source is 3.3 dB above the existing background then the new background would have increased 5 dB. For example, to meet the requirement of L90A + 5 dB = 31 dBA if the existing quiet nighttime background sound level is 26 dBA, the maximum wind turbine noise immission contribution independent of the background cannot exceed 29.3 dBA Leq at a dwelling. When adding decibels, a 26 dBA background combined with 29.3 dBA from the turbines (without background) results in 31 dBA.

Further, background L90 sound levels documenting the pre-construction baseline conditions should be determined when the ten (10) minute maximum wind speed is less than 2 m/s (4.5 mph) near ground level/microphone location 1.5 m height.

Blade Passage Frequency (BPF) – the frequency at which the blades of a turbine pass a particular point during each revolution (e.g. lowest point or highest point in rotation) in terms of events per second. A three bladed turbine rotating at 28 rpm would have a BPF of 1.4 Hz. [E.g. ((3 blades times 28rpm)/60 seconds per minute = 1.4 Hz BPF)]

Blade Reflection – the intermittent reflection of the sun off the surface of the blades of a Wind Turbine.

C-Weighted Sound Level (dBC) – Similar in concept to the A-Weighted sound Level (dBA) but C-weighting does not de-emphasize the frequencies below 1k Hz as A-weighting does. It is used for measurements that must include the contribution of low frequencies in a single number representing the entire frequency spectrum. Sound level meters have a C-weighting network for measuring C-weighted sound levels (dBC) meeting the characteristics and weighting specified in ANSI S1.43-1997 Specifications for Integrating Averaging Sound Level Meters for Type 1 instruments. In this document dBC means LCeq unless specified otherwise.

Community Owned Wind – a WTG planned with wide community participation that meets any one of the following criteria: 1) a municipality owning 51% or more of the project, 2) the majority of the direct financial benefits of the project accruing to all of the residents of the municipality, exclusive of any tax considerations. Community Owned Wind may include or incorporate consumer-owned transmission and distribution utilities, rural electric cooperatives, municipal electric districts, or other electrical generation and transmission models established by State law to facilitate and encourage local electrical generation. Community Owned Wind does not include partial or minority municipal ownership of WTGs without the municipality or municipalities being the managing partner, and does not include WTGs located in Montville having majority ownership or control by private individuals,

private businesses, or non-profit organizations not under direct control of the municipality or municipalities.

Decibel (dB) – A dimensionless unit which denotes the ratio between two quantities that are proportional to power, energy or intensity. One of these quantities is a designated reference by which all other quantities of identical units are divided. The sound pressure level (Lp) in decibels is equal to 10 times the logarithm (to the base 10) of the ratio between the pressure squared divided by the reference pressure squared. The reference pressure used in acoustics is 20 MicroPascals.

DEP Certification – a certification issued by the Department of Environmental Protection pursuant to Title 35-A M.R.S.A. §3456 for a WTG that is subject to this Ordinance.

Emission – Sound energy that is emitted by a noise source (WTG) is transmitted to a receiver (dwelling) where it is immitted (see "immission).

Enforcing Authority – the Code Enforcement Officer (CEO) designated by the Town of Montville. The CEO is responsible for enforcing the standards of this Ordinance after a permit is granted to a WTG.

Frequency – The number of oscillations or cycles per unit of time. Acoustical frequency is usually expressed in units of Hertz (Hz) where one Hz is equal to one cycle per second.

Good Utility Practice – any of the practices, methods and acts with respect to the safe operation of the Wind Turbine or WTG engaged in or approved by a significant portion of the electric utility industry and, in particular, those portions of the industry with experience in the construction, operation, and maintenance of wind turbines during the relevant period; or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability and safety.

Height – the total distance measured from the grade of the property as existed prior to the construction of the wind energy system, facility, tower, turbine, or related facility at the base to its highest point. (See Turbine Height definition below)

Hertz (Hz) – Frequency of sound expressed by cycles per second.

Ice Throw – accumulated ice buildup on the blades of a Wind Turbine that is or can be thrown during normal spinning or rotation.

Immission – Noise immitted at a receiver (dwelling) is transmitted from noise source (WTG) that emitted sound energy (see "emission").

Immission spectra imbalance – The spectra are not in balance when the C-weighted sound level is more than 20 dB greater than the A-weighted sound level. For the purposes of this requirement, the A-weighted sound level is defined as the long-term background sound level (LA90) +5 dBA. The C-weighted sound level is defined as the LCeq measured during the operation of the wind turbine operated so as to result in its highest sound output. A Complaint Test provided later in this document is based on the immission spectra imbalance criteria.

Infra-Sound – sound with energy in the frequency range of 0-20 Hz is considered to be infra-sound. It is normally considered to not be audible for most people unless in relatively high amplitude. However, there is a wide range between the most sensitive and least sensitive people to perception of

sound and perception is not limited to stimulus of the auditory senses. The most significant exterior noise induced dwelling vibration occurs in the frequency range between 5 Hz and 50 Hz. Moreover, levels below the threshold of audibility can still cause measurable resonances inside dwelling interiors. Conditions that support or magnify resonance may also exist in human body cavities and organs under certain conditions. Although no specific test for infrasound is provided in this document, the test for immission spectra imbalance will limit low frequency sound and thus, indirectly limit infrasound. See low-frequency noise (LFN) for more information.

Low Frequency Noise (LFN) – refers to sounds with energy in the lower frequency range of 20 to 200 Hz. LFN is deemed to be excessive when the difference between a C-weighted sound level and an A-weighted sound level is greater than 20 decibels at any measurement point outside a residence or other occupied structure.

Measurement Point (MP) – location where sound measurements are taken such that no significant obstruction blocks sound from the site. The Measurement Point should be located so as to not be near large objects such as buildings and in the line-of-sight to the nearest turbines. Proximity to large buildings or other structures should be twice the largest dimension of the structure, if possible. Measurement Points should be at quiet locations remote from street lights, transformers, street traffic, flowing water and other local noise sources.

Measurement Wind Speed – For measurements conducted to establish the background noise levels (LA90 10 min, LC90 10 min, and etc.) the maximum wind speed, sampled within 5m of the microphone and at its height, shall be less than 2 m/s (4.5 mph) for valid background measurements. For valid WTG noise measurements conducted to establish the post-construction sound level the maximum wind speed, sampled within 5m of the microphone and at its height, shall be less than 4m/s (9mph). The wind speed at the WTG blade height shall be at or above the nominal rated wind speed and operating in its highest sound output mode. For purposes of enforcement, the wind speed and direction at the WTG blade height shall be selected to reproduce the conditions leading to the enforcement action while also restricting maximum wind speeds at the microphone to less than 4 m/s (9 mph).

For purposes of models used to predict the sound levels and sound pressure levels of the WTG to be submitted with the Application, the wind speed shall be the speed that will result in the worst-case LAeq and LCeq sound levels at the nearest non-participating properties to the WTG. If there may be more than one set of nearby sensitive receptors, models for each such condition shall be evaluated and the results shall be included in the Application.

Mechanical Noise – sound produced as a byproduct of the operation of the mechanical components of a WTG(s) such as the gearbox, generator and transformers.

Meteorological Tower (MET Tower) – a meteorological tower used for the measurement of wind speed.

Mitigation Waiver – a legally enforceable, written agreement between the Applicant and a Non-participating Landowner in which the landowner waives certain setback, noise or other protections afforded in the Ordinance.

Nacelle – the frame and housing at the top of the tower that encloses the gearbox and generator.

Nameplate Capacity – the electrical power rating of an individual wind turbine as certified by the manufacturer and normally expressed in watts, kilowatts (kW), or megawatts (MW).

Noise – any unwanted sound. Not all noise needs to be excessively loud to represent an annoyance or interference.

Non-participating Landowner – any landowner other than a Participating Landowner.

Notification Area – the entire land base within two (2) miles, measured horizontally from the Project Boundary. All landowners with any part of their property within the notification area, or residents living within the notification area must be notified as specified in the Ordinance.

Occupied Building – any structure that is, or is likely to be, occupied by persons or livestock. This includes, but is not limited to dwellings, places of business, places of worship, schools, and barns.

Operational License – a license or a license renewal issued by the Planning Board to operate a WTG in accordance with this Ordinance.

Owner/operator – the person or entity with legal ownership of the WTG, including successors and assigns, that has the authority and responsibility to operate the WTG on a day-to-day basis. An Owner/operator must have the legal authority to represent and bind.

Participating Landowner – one or more persons that hold title in fee to the property on which the WTG is proposed to be located pursuant to an agreement with the development Owner/operator.

Permitting Authority – the Planning Board, designated as responsible for conducting the review of WTG applications.

Person – an individual, corporation, partnership, firm, organization or other legal entity.

Project Boundary – the external property boundaries of parcels owned by or leased by the WTG developers. It is represented on a plot plan view by a continuous line encompassing all WTG(s) and related equipment associated with the WTG project.

Property Line – the recognized and mapped property parcel boundary line.

Qualified Independent Acoustical Consultant – Qualifications for persons conducting baseline and other measurements and reviews related to the application for a WTG or for enforcement actions against an operating WTG include, at a minimum, demonstration of competence in the specialty of community noise testing. An example is a person with Full Membership in the Institute of Noise Control Engineers (INCE). There are scientists and engineers in other professional fields that have been called upon by their local community for help in the development of a WTG Noise Ordinance. Many of these scientists and engineers have recently spent hundreds of hours learning many important aspects of noise related to the introduction of WTG into their communities. Then with field measurement experience with background data and wind turbine noise emission, they have become qualified independent acoustical consultants for WTG siting. Certifications such as Professional Engineer (P.E.) do not test for competence in acoustical principles and measurement and are thus not, without further qualification, appropriate for work under this document. The Independent Qualified Acoustical Consultant can have no financial or other connection to a WTG developer or related company.

Scenic or Special Resource – a scenic resource of state or national significance, as defined in Title 35-A M.R.S.A. §3451(9), any site registered in the National Registry of Historic Places, or a scenic or special resource of local significance identified as such.

Sensitive Receptor – places or structures intended for human habitation, whether inhabited or not, public parks, state and federal wildlife areas, the manicured areas of recreational establishments designed for public use, including but not limited to golf courses, campgrounds and other non-agricultural state or federal licensed businesses. These areas are more likely to be sensitive to the exposure of the noise, shadow or flicker, etc. generated by a WTG or WTG Facilities. These areas include, but are not limited to: schools, daycare centers, elder care facilities, hospitals, places of seated assemblage, non-agricultural businesses and residences.

Setback – the minimal allowable horizontal distance as measured from the Project Boundary to a defined point (e.g. a property line or a road).

Setback Area – the entire land base that falls within a specified setback.

Setback Distance – the larger of one mile or 13 times the Turbine Height, measured horizontally from the Project Boundary to the nearest property line.

Shadow Flicker – alternating changes in light intensity caused by the movement of wind turbine blades casting shadows on the ground or a stationary object.

Shadow Flicker Receptor – any Occupied Building on a Non-participating Landowner's property plus an additional 100 foot boundary surrounding the exterior of the Occupied Building, the entire outdoor public area surrounding schools, churches and public buildings, and public roads with a posted speed limit greater than 25 mph.

Sight Line Representation – a line depicted in profile extending from an observer's eye to the lowest point of a viewed tower.

Sound – A fluctuation of air pressure which is propagated as a wave through air

Sound Power – The total sound energy radiated by a source per unit time. The unit of measurement is the watt. Abbreviated as Lw. This information is determined for the WTG manufacturer under laboratory conditions specified by IEC 61400-11 and provided to the local developer for use in computer model construction. There is known measurement error in this test procedure that must be disclosed and accounted for in the computer models. Even with the measurement error correction it cannot be assumed that the reported Lw values represent the highest sound output for all operating conditions. They reflect the operating conditions required to meet the IEC 61400-11 requirements. The lowest frequency is 50 Hz for acoustic power (Lw) requirement (at present) in IEC 61400-11. This Ordinance requires wind turbine certified acoustic power (Lw) levels at rated load for the total frequency range from 6.3 Hz to 10k Hz in one-third octave frequency bands tabulated to the nearest 1 dB. The frequency range of 6.3 Hz to 10k Hz shall be used throughout this Ordinance for all sound level modeling, measuring and reporting.

Sound Pressure – The instantaneous difference between the actual pressure produced by a sound wave and the average or barometric pressure at a given point in space.

Sound Pressure Level (SPL) – 20 times the logarithm, to the base 10, of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micronewtons per square meter. In equation form, sound pressure level in units of decibels is expressed as SPL (dB) = 20 log p/pr.

Spectrum – The description of a sound wave's resolution into its components of frequency and amplitude. The WTG manufacturer is required to supply a one-third octave band frequency spectrum of the wind turbine sound emission at 90% of rated power. The published sound spectrum is often

presented as A-weighted values but C-weighted values are preferred. This information is used to construct a model of the wind farm's sound immission levels at locations of interest in and around the WTG. The frequency range of interest for wind turbine noise is approximately 6 Hz to 10k Hz.

Statistical Noise Levels – Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LNA, where LNA is the A-weighted sound level exceeded for N% of a given measurement period. For example, L10 is the noise level exceeded for 10% of the time. Of particular relevance, are: LA10 and LC10 the noise level exceeded for 10% of the ten (10) minute interval. This is commonly referred to as the average maximum noise level. LA90 and LC90 are the A-weighted and C-weighted sound levels exceeded for 90% of the ten (10) minute sample period. The L90 noise level is defined by ANSI as the long-term background sound level (i.e. the sounds one hears in the absence of the noise source under consideration and without short term or near-by sounds from other sources), or simply the "background level." Leq is the A or C-weighted equivalent noise level (the "average" noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

Structure – the total footprint of all of the physical attributes of the entire WTG as defined in Title 38 M.R.S.A. § 482.

Tonal sound or tonality – Tonal audibility. A sound for which the sound pressure is a simple sinusoidal function of the time, and characterized by its singleness of pitch. Tonal sound can be simple or complex.

Tower – the freestanding structure on which the wind measuring or energy conversion system is mounted.

Turbine Height – the distance measured from the surface of the tower foundation to the highest point of any turbine rotor blade measured at the highest arc of the blade.

Wind Turbine Generators (WTG) – equipment that converts and then transfers energy from the wind into usable forms of electrical energy. and includes all related and supporting items including but not limited to all buildings, structures, electrical equipment, substations, transmission lines, access roads, parking lots, areas to be stripped or graded, and areas to be landscaped or screened.

Wind Turbine – a wind energy conversion system that converts wind energy into electricity through the use of a WTG, and includes the nacelle, rotor, tower and pad transformer if any.

9.0 Classification of Wind Turbines and Meteorological Towers

For the purpose of clarification, all WTGs are classified according to the following definitions:

9.1 Wind Turbine Classifications:

9.1.1 Type 1 – Small Wind Turbine means a single wind turbine with a nameplate capacity less than 10 kW, and a turbine height less than 100 feet. This ordinance does not apply to these.

9.1.2 Type 2 – Intermediate Wind Turbine means a single wind turbine with a nameplate capacity less than 100 kW, and a turbine height less than 150 feet, and not requiring a Site Location of Development permit from the Maine Department of Environmental Protection (DEP) pursuant to Title 35-A M.R.S.A. §3456. This ordinance does not apply to these.

9.1.3 Type 3 – Large Wind Turbine means up to three wind turbines with a nameplate capacity less than 1 MW, and a turbine height less than 300'. A Location of Development permit from the Maine Department of Environmental Protection (DEP) pursuant to Title 35-A M.R.S.A. §3451, Title 35-A M.R.S.A. § 3456 and Title 38 M.R.S.A § 482 is normally required unless the Wind Turbine: 1) does not sell or convert electricity for off site use including net metering; and, 2) does not qualify as a Structure with a total land area in excess of 3 acres for the entire WTG.

For the purposes of this Ordinance, included in the Type 3 - Large Wind Turbine shall be any turbine(s) of nameplate capacity equal to or greater than 100 kW and a turbine height greater than 150 feet if the energy generated is for sale or use by a Person other than the generator.

9.1.4 Type 4 – Industrial Wind Turbine means one or more wind turbines each with a nameplate capacity of greater than or equal to 1 MW, or a turbine height greater than or equal to 300'; or more than three Type 3 Wind Turbines. A Location of Development permit from the Maine Department of Environmental Protection (DEP) pursuant to Title 35-A M.R.S.A. §3451, Title 35-A M.R.S.A. § 3456 and Title 38 M.R.S.A § 482 is normally required unless the Wind Turbine: 1) does not sell or convert electricity for off site use including net metering; and, 2) does not qualify as a Structure with a total land area in excess of 3 acres for the entire WTG.

9.2 Meteorological Towers (MET Towers)

MET towers shall be permitted under the Montville Site Plan Review Ordinance or the Personal Wireless Service Facilities Siting Ordinance, whichever best applies and at the discretion of the Planning Board, with no height limitations, other than those imposed under State or Federal law. A permit for a temporary MET tower shall be valid for a maximum of one year after which a single extension of up to one year may be granted. The site shall be restored to its original condition within 30 days following removal of the tower.

10.0 Permit and Operational License Requirement

10.1 Permit Requirement

10.1.1 A permit is required for each WTG built in the Town of Montville after the effective date of this Ordinance. However, single phase WTGs of under 150 feet and less than 100 kW name plate capacity are not regulated under this Ordinance.

10.1.2 The Planning Board will aggregate, to the fullest and most practical extent possible, and pursuant to Section 26.0 , all Wind Turbines held under common or related ownership into a single WTG. With the exception of Projects owned by the Town of Montville, separate corporate legal structures under common or joint ownership or under common or joint control will be deemed to be a single project for purposes of permit and licensing notwithstanding separate corporate legal ownership.

10.1.3 Receipt of a permit under this Ordinance does not relieve the Owner/operator from the responsibility to obtain any other such permits or approvals as required under the Town of Montville Site Plan Review Ordinance or pursuant to other State or Federal jurisdiction.

10.2 Operational License

An Operational License is required for the operation of all WTG. Applications for a WTG Operational License shall be submitted to the Planning Board.

10.2.1 Where an Applicant is applying for a new or amended WTG Permit, the application for a WTG Operating License, or amended license, shall be submitted to the Planning Board in conjunction with the Permit application, and shall include the application form and the separate fee specified in Section 10.2.10.

10.2.2 Where an Applicant is applying for a WTG Operational License renewal, a new License as the result of transfer of ownership or operation, or reinstatement or modification of an Operational License, the Applicant shall submit an application form, a copy of the existing WTG Permit and the fee specified in Section 10.2.10.

10.2.3 An Operational License shall be valid for five years.

10.2.4 The granting of an Operational License is conditional upon the following criteria:

10.2.4.1 Demonstration by the Applicant of compliance with performance standards of the Ordinance.

10.2.4.2 For the initial Operational License, the Wind Turbine Project must successfully pass an inspection for structural and operational integrity conducted by a Maine licensed professional engineer chosen by the Permitting Authority. The inspection shall be conducted after construction is completed but before operations begin. Success will be demonstrated by submission of a copy of the engineer's inspection report to the Planning Board. If the report specifies that repairs, maintenance or changes to safety procedures are necessary, the owner shall provide the Enforcing Authority with proof that the repairs have been completed, a written schedule for any recommended maintenance, and documentation of any updated safety procedures.

10.2.4.3 For a renewal of an Operational License, where there is no change of Ownership or operator, the inspection procedure and criteria specified in Section 10.2.4.2 shall be completed six months prior to the expiration of the current Operational License.

10.2.5 Applications for Operational License renewals where there is no change of ownership of operator shall be submitted to the Planning Board 6 months prior to their expiration.

10.2.6 An Operational License shall automatically terminate upon transfer of ownership or operation of the WTG. The proposed new owner or operator shall be required to obtain a new Operational License, which must be in place prior to the transfer of ownership or operation of the WTG. The application for renewal of the Operational License in the case of transfer of ownership or operation shall include the following items:

10.2.6.1 The Applicant's name, address and phone number, and the name, address and phone number of the Owner/operator, if different

10.2.6.2 An emergency directory for the Owner/operator sufficient to allow the Town to contact the Owner/operator at any time

10.2.6.3 Evidence of the Applicant's technical and financial ability to operate the WTG in accordance with this Ordinance, the Site Permit, and the Operational License

10.2.6.4 For any Project Parcel that is not owned by the Applicant, a copy of any agreement(s) between the owner of the Project Parcel and the Applicant

10.2.6.5 An updated safety plan in accordance the requirements of Section 14.2 .

10.2.6.6 An updated fire prevention and emergency response plan in accordance with the requirements of Section 15.6.1;

10.2.6.7 An updated emergency shutdown plan in accordance with the requirements of Section 21.4 ;

10.2.6.8 An updated decommissioning and site restoration plan in accordance with the requirements of Section 22.0 ;

10.2.6.9 Updated liability insurance information in accordance with the requirements of Section 14.4 ;

10.2.6.10 Updated Real Estate Property Value Assurance Plan in accordance with the requirements of Section 23.0 ;

10.2.6.11 A signed statement from the Applicant that the Applicant agrees to assume full responsibility for complying with the provisions of this Ordinance and the Site Permit, including agreeing to continue or complete any duties and obligations of the former Operational License holder under this Ordinance or former Operational License, including, but not limited to, the requirement for post-construction sound measurements, post-construction stray voltage testing, wind turbine inspections, and submission to inspections.

10.2.7 An Operational License shall automatically terminate upon any amendment to a permit.

10.2.8 Failure to comply with the provisions of this Ordinance may result in the suspension or revocation of the Operational License pursuant to Section 21.0 .

10.2.9 An Operational License shall be deemed abandoned if the WTG's operation has ceased for twelve consecutive months. An Operational License expires immediately upon abandonment.

10.2.10 Fees.

10.2.10.1 The application fee for an Operational License is $1,000.00.

10.2.10.2 The annual fee for an existing Operational License is $250.00.

11.0 Permitting Authority

11.1 The Town of Montville Planning Board is authorized to review all WTG applications and may approve, reject or conditionally approve such applications in accordance with the standards of the Ordinance.

11.2 The Maine Department of Environmental Protection (DEP) may be required to review WTG applications. The Planning Board shall consider, at a minimum and to the extent applicable, pertinent findings in the DEP certification when making its determination.

11.3 The following types of permits require final approval by a vote of the residents of the Town of Montville:

11.3.1 Any WTG to be built on property owned by the Town

11.3.2 Any WTG partially or totally owned by the Town.

12.0 Standards for Setbacks, Noise, Shadow Flicker, and Mitigation Waivers

This section addresses the interrelated standards of setbacks, noise, shadow flicker and mitigation waivers and applies to all WTGs.

Setbacks provide a number of important Ordinance functions, including but not limited to: 1) working in conjunction with noise standards as a primary means of mitigating potential and unforeseen noise complaints; 2) providing for public safety in the event of a catastrophic turbine failure or ice throw; 3) mitigating the effects of shadow flicker from larger turbines

In general, the taller the turbine, and the greater the number of turbines in a WTG, the greater the setback needed to mitigate noise, debris hazards, and shadow flicker. However, setbacks for noise must also be implemented in conjunction with specific wind turbine noise limits (see Section 12.2). Although larger wind turbines appear to generate the highest proportion of published noise complaints, poorly designed smaller turbines can also cause serious noise.

Setbacks to property lines are a minimum buffer of one mile from the Project Boundary. This is assuming a 1.5 MW industrial wind turbine, which has a Turbine Height of approximately 400 feet. However, larger wind turbines are louder, so a varying setback basis is required. A one mile setback is approximately equal to 13 times the turbine height for a 400 foot turbine. Therefore, the Setback Distance is defined as the larger of one mile or 13 times the Turbine Height, measured horizontally from the Project Boundary to the nearest property line.

Setbacks for public roads are based on an approximation of an 1800-foot debris field for ice throw. Four times the turbine height for a 440 foot Wind Turbine is equal to 1760 feet.

12.1 Setback Standards

12.1.1 Setback to Non-participating Landowner Property Lines – Given the abundant evidence that wind turbines sited too close to humans has deleterious effects on them, and given that the most effective means of preventing negative health effects is proper setbacks, WTGs must be located no closer than the Setback Distance from non-participating property lines. Property owners may waive this setback with a written Mitigation Waiver. (See Section 12.4).

12.1.2 Setback to Public Roads - Wind Turbines will be set back from any public road a distance no less than 4 times the turbine height, measured horizontally.

12.2 Noise Standards

For all wind turbines, the primary guiding principle is that their operation must not be disruptive at any time of day or night. Current sound limitations in the state of Maine regulating noise from WTG reflect sound limits applicable to urban residential and urban mixed neighborhoods instead of the deep quiet of rural areas such as Montville to which this Ordinance pertains.

12.2.1 Principles Governing Sound Measurements

12.2.1.1 Section 27.0 applies in addition to relevant paragraphs of Section 28.0 . Procedures in Section 27.0 and Section 28.0 are mandatory and additional to the relevant application procedures.

12.2.1.2 Sound measurements must be made to all non-participating property lines within and up to two (2) miles measured horizontally from the Project Boundary.

12.2.1.3 All sound measurements will be filtered for both dBA and dBC.

12.2.1.4 All sound measurements before construction, and after will be made by a Professional Engineer who is a Full Member of the Institute of Noise Control Engineering (INCE).

12.2.1.5 This engineer must be an independent contractor to the Town of Montville, and have no ties to wind developers or related conflicts of interest.

12.2.2 Noise Limits at Non-participating Property Lines

No WTG turbine shall be located so as to cause an exceedence of the pre-construction/operation background sound levels by more than 5 dBA or dBC. The background sound levels shall be the L90 dB sound levels sound descriptor (both A and C weighing) measured during a pre-construction noise study during the quietest time of evening or night. Measurements shall be for ten (10) minutes or more. L90 results are valid when L10 results are no more than 15 dB above L90 for the same time period. Noise sensitive sites are to be selected based on the WTG's predicted sound emissions (in dBA, dBC and 1/3 octaves to blade passage frequency), which are to be provided by the Applicant.

12.2.2.1 Audible noise levels (dBA) due to wind turbine operation will not exceed the pre-construction ambient noise level by more than 5 dBA as measured at any property line. Property owners may waive this noise restriction with a written Mitigation Waiver. (See Section 12.4 .)

12.2.2.2 Low frequency noise levels (dBC) due to wind turbine operation as measured inside or at any Property Line will not exceed:

1. 20 decibels (measured as dBC) above the pre-development ambient noise level (measured as dBA).
2. A maximum not-to-exceed level of 50 dBC.

Property owners may waive this noise restriction with a written Mitigation Waiver. (See Section 12.4 .)

12.2.2.3 Noise measurement standards and procedures are described in Section 27.0 .

12.2.3 Violations and Enforcement

12.2.3.1 Sound Regulations Compliance. A WTG shall be considered in violation of the conditional use permit unless the applicant demonstrates that the project complies with all sound level limits using the procedures specified in this ordinance. Sound levels in excess of the limits established in this ordinance shall be grounds for the Town of Montville to order immediate shut down of all non-compliant Wind Turbine units.

12.2.3.2 A serious noise violation is defined as three (3) verified noise complaints attributed to the operation of a Wind Turbine within a period of one month or less with a measurable noise level greater than 10 dBA above pre-construction ambient noise levels or 50 dBC inside or at an Occupied Building. For serious violations the Owner/operator will respond within five (5) days of the complaint. Testing, if necessary, will be paid for by the Owner/operator and hired independently by the Town, and will commence within ten working days of the complaint. Testing will be conducted for a minimum of a one-month period according to the measurement standards and procedures in Section 27.0 . The Owner/operator is responsible for mitigating the problem within ten (10) days from a final determination of any cause attributed to the operation of the Wind Turbine. Failure to mitigate the problem will result in the Wind Turbine being declared unsafe and emergency shutdown procedures will be implemented per Section 21.4 .

12.2.3.3 Noise violations not determined to be an emergency pursuant to Sections 12.2.3.1 and 21.4 , or not determined to be a serious violation pursuant to Section 12.2.3.2 , shall be managed pursuant to Section 21.6 . Testing, if necessary, will be paid for by the Owner/operator and hired independently by the Town. Testing will be conducted for an appropriate period of time and conducted according to the measurement standards and procedures set forth in Section 27.0 . The Owner/operator is responsible for mitigating the problem within 30 days from a final determination of any cause attributed to the operation of the WTG. Mitigation involving significant construction or physical modification may have up to 90 days to be completed pursuant to Section 15.4.1.

12.3 Shadow Flicker and Blade Reflection

12.3.1 WTGs shall be designed and sited so that shadow flicker and/or blade reflection will not fall on a receptor as defined in Section 8.0 . Exceptions to this standard may be made based on the following condition only if the flicker or reflection does not exceed 10 hours per year for any given receptor. Property owners may waive the Shadow Flicker and Blade Reflection restriction with a written Mitigation Waiver. (See Section 12.4 .)

12.3.2 Violations and Enforcement

12.3.2.1 A serious shadow flicker or blade reflection violation is defined as: 1) three (3) days of significant nuisance shadow flicker or blade reflection, in any one month falling on a receptor that, if annualized, will be estimated to be more than 10 hours per year; or 2) any complaint of shadow flicker or blade reflection from vehicles on Route 220. The predictive annualized calculation shall assume clear weather, but take into account seasonal tracking of the sun. For serious violations the Owner/operator will respond within five (5) days of the complaint. The Owner/operator is responsible for mitigating the problem within ten (10) days from a final determination of any cause attributed to the operation of the WTG. Failure to mitigate the problem will result in the WTG being declared unsafe and emergency shutdown procedures will be implemented per Section 21.4 .

12.3.2.2 Shadow flicker and blade reflection not determined to be a serious violation pursuant to Section 12.3.2.1 , shall be managed pursuant to Section 21.6 . Field verification and modeling, if necessary, will be paid for by the Owner/operator and hired independently by the Town. The Owner/operator is responsible for mitigating the

problem within 30 days from a final determination of any cause attributed to the operation of the WTG. Mitigation involving significant construction or physical modification may have up to 90 days to be completed pursuant to Section 15.4.1.

12.4 Mitigation Waivers

Non-participating Landowners may modify or waive certain specified protections in this Ordinance using a written, legally enforceable Mitigation Waiver negotiated between the Applicant and the Non-participating Landowner. Copies of executed Mitigation Waivers must be included with the application. The Mitigation Waiver must be recorded in the Register of Deeds office appropriate for the affected property. The deed must advise all subsequent owners of the burdened property.

12.4.1 The requirements permitted in Mitigation Waivers are:

12.4.1.1 Property line setbacks – Section 12.1.1.

12.4.1.2 Audible noise levels – Section 12.2.2.1 .

12.4.1.3 Low frequency noise levels – Section 12.2.2.2 .

12.4.1.4 Shadow Flicker and Blade Reflection – Section 12.3.1.

12.4.1.5 No Mitigation Waivers on other requirements set forth in this Ordinance are permitted.

12.4.2 The Mitigation Waiver must contain a separate paragraph for each specific requirement being modified or waived. Each paragraph must specify:

12.4.2.1 The requirement as set forth in this ordinance.

12.4.2.2 The modified requirement to which the affected property owner is now agreeing.

13.0 General Standards

All WTGs shall comply with the appropriate Standards of this Ordinance. No WTG shall cause unreasonable health or safety conditions.

13.1 Building Codes. All components of the WTG shall conform to local, state and national building codes.

13.2 Electrical Components and Interconnections. All electrical components of the Wind Turbine and WTG shall conform to relevant and applicable local, state, and national codes.

13.3 Controls and Brakes. Each Wind Turbine shall be equipped with a redundant braking system that includes both aerodynamic over-speed controls (including variable pitch, tip, and other similar systems) and mechanical brakes. Mechanical brakes shall operate in fail-safe mode. Stall regulation shall not be considered a sufficient braking system for over-speed protection.

13.4 Blade Clearance. The minimum distance between the ground and all blades of a Wind Turbine shall be 100 feet as measured at the lowest arc of the blades.

13.5 Signal Interference. WTGs will be designed and sited to prevent the disruption or loss of radio, telephone, television, or similar signals. (See Section 15.7 .)

13.6 Guy Wires, Blade Feathering and Bird Sensing Radar. Monopole towers with no guy wires are preferred to minimize bat and migratory bird fatalities, and bird fatalities in general.. To further minimize such fatalities, Wind Turbines will be equipped with bird sensing radar, and the Wind turbine blades will be feathered. Bird flight diverters must be installed on any tower with guy wires.

14.0 Appearance and Safety Standards

14.1 Appearance and Visibility Standards

14.1.1 Wind Turbines shall be a non-obtrusive color such as white, off-white or gray, or as may otherwise be required by another governmental agency with jurisdiction over the WTG.

14.1.2 The design of the buildings and related structures shall, to the extent possible, use materials, colors, textures, screening and landscaping that will blend the site to the natural setting and existing environment.

14.1.3 Wind Turbines shall not be artificially lighted, except to the extent consistent with Federal Aviation Administration recommendations or other applicable authority that regulates air safety or as is otherwise required by another governmental agency with jurisdiction over the WTG. Additional lighting standards must be met for Wind Turbines (see Section 15.2.7).

14.1.4 Wind Turbines shall not be used to support signs and shall not display advertising except for reasonable and incidental identification of the turbine manufacturer, facility owner and operator, emergency contact information, and for any appropriate warnings.

14.1.5 Each Wind Turbine shall be located to reasonably maximize the effectiveness of existing vegetation, structures and topographic features to screen views of the Wind Turbine(s) from Occupied Buildings of Non-participating Land Owners, Scenic Resources and public roads.

14.1.6 When existing features do not screen views of a Wind Turbine from Occupied Buildings of Non-participating Landowners, Scenic Resources and public roads, screening shall be provided, where feasible and effective, through the planting of trees and/or shrubs. Generally, such plantings should be of native varieties. In order to maximize the screening effect and minimize wind turbulence near the Wind Turbine, plantings should be situated as near as possible to the Occupied Buildings, Scenic Resources and/or public roads.

14.2 Safety Standards

14.2.1 Design. The design of the Wind Turbines and WTG shall conform to applicable industry standards, including those of the American National Standards Institute, (ANSI) and shall comply with standards promulgated by Underwriters Laboratories, Det Norske Veritas, Germanischer Lloyd Wind Energies or other similar certifying organizations appropriate for the turbines' size and classification.

14.2.2 Access. All ground-mounted electrical and control equipment and all access doors to a Wind Turbine shall be labeled and secured to prevent unauthorized access. A Wind Tower shall not be climbable up to fifteen (15) feet above ground surface.

14.2.3 Warnings. A clearly visible warning sign concerning voltage must be placed at the base of all pad-mounted transformers and substations.

14.3 Inspections

Wind Turbines shall be inspected after construction is completed but before becoming operational, and at least every year thereafter, for structural and operational integrity by a Maine licensed professional engineer chosen by the Permitting Authority, and the Owner/operator shall submit a copy of the inspection report to the Enforcing Authority. If such report recommends that repairs or maintenance are to be conducted, the owner shall provide the Enforcing Authority a written schedule for the repairs or maintenance. Failure to complete the repairs or maintenance in accordance with the schedule shall be deemed a violation of this Ordinance.

14.4 Liability Insurance

The Applicant shall maintain a current general liability policy for the WTG that covers bodily injury and property damage in an amount commensurate with the scope and scale of the Turbine or Project. The Applicant or its designee shall provide certificates of insurance to the Planning Board, and provide a copy of each annual renewal to the Planning Board. (See Section 28.2.35.)

15.0 Financial, Environmental and Operational Standards

15.1 Financial Performance Standards

The Applicant must demonstrate that the WTG is financially viable and that the Owner/operator has the financial ability to complete the project.

15.2 Environmental Impact Standards

15.2.1 Montville Site Plan Review Ordinance. Proposed WTGs shall meet the applicable standards of the Montville Site Plan Review Ordinance

15.2.2 Environmentally Sensitive Area. The plan for the WTG will reflect the natural capabilities of the site to support development. Environmentally sensitive areas, including but not limited to wetlands, steep slopes, watersheds, floodplains, significant wildlife habitats, fisheries, habitat for rare or endangered plants and animals, unique natural communities and natural areas, sand and gravel aquifers will be maintained and preserved to the maximum extent. The Applicant shall demonstrate appropriate measures for protecting these resources, including both during construction and post construction.

Given that areas within the Town of Montville are wildlife management areas and that protected bird species and migratory birds are regularly observed within the boundaries of the Town, the applicant must comply with the "Guidelines for Wind Project Ecological Study" by the Maine Department of Environmental Protection and Maine Department of Inland Fisheries and Wildlife.

15.2.3 Wildlife Protection

15.2.3.1 The Applicant will demonstrate that the WTG will not have a significant adverse effect on area wildlife and wildlife habitat. Such analysis shall include but not be limited to adverse effects to birds, bats, game animals, and habitat fragmentation. In addition, the Applicant must demonstrate that the WTG will have no significant adverse effect on rare, threatened or endangered wildlife. The wildlife and habitat analysis must include appropriate pre-construction field studies and at least three sets of corresponding post-

construction field studies conducted at periodic intervals within 3 years after the Wind Turbines become operational. These studies will be conducted by a qualified wildlife biologist hired by the Town of Montville and paid for by the Applicant.

15.2.3.2 If the post-construction field studies demonstrate significant adverse effect to birds, bats, game animals or habitat fragmentation, the Town, the Owner/operator and the Maine Department of Inland Fisheries and Wildlife (MDIFW) shall develop an appropriate mitigation plan. The Owner/operator will be responsible for the full cost of implementing the mitigation plan under the supervision of MDIFW.

15.2.4 Raptor Habitat. To the extent practicable, the creation of artificial habitat for raptors or raptor prey shall be minimized. In making its determination under this subsection the Planning Board shall consider comments and recommendations, if any, provided by the Maine Department of Inland Fisheries and Wildlife.

15.2.5 Erosion Control. The WTG will be designed, constructed and maintained in accordance with accepted erosion and sedimentation control methods. The acceptability of the proposed methods will be judged utilizing the "Maine Erosion Control Handbook for Construction: Best Management Practices", March 2003. Whenever sedimentation is caused by stripping vegetation or grading it shall be the responsibility of the Owner/operator to remove it from all adjoining surfaces, drainage systems and watercourses and to repair any damage at the Owner/operator's expense as quickly as possible.

15.2.6 Groundwater Protection. The WTG will not adversely affect the quality or quantity of groundwater. The Applicant shall have to demonstrate to the Planning Board's satisfaction that there are no unusual risks to the groundwater, including underground rivers, created by the project. The Board may require as a condition of permit approval, that spill prevention and control measures be installed, and that all activities involving potentially permeable pollutants, including at delivery and transfer points, be conducted under cover and over an impervious surface surrounded by dikes. If a Wind Turbine foundation is proposed in a bedrock area, a baseline of all wells, springs and certified public water sources within a two-mile radius of the foundation shall be established. If degradation or contamination occurs, permanent remedies shall be the responsibility of the Owner/operator.

15.2.7 Light Pollution. The WTG shall be designed to minimize the amount of nighttime light pollution. The Applicant shall provide a plan showing lighting on and around all Wind Turbines and associated facilities. Lighting on Wind Turbines shall be illuminated to Federal Aviation Administration (FAA) minimal standards using only red rather than white lights, if possible. The minimum number of Wind Turbines will be illuminated, per FAA rules. Lighting shall be shielded from ground view to FAA maximum standards.

15.2.8 Relation to DEP Certification and Permitting. If DEP has issued a Site Location of Development Act permit for a WTG there is a rebuttable presumption that the development meets the requirements of Sections 15.2.2 and 15.2.3. If a DEP Site Location of Development permit is required, the Planning Board will require the permit to be issued before the application is deemed complete and may take the recommendations under advisement to determine compliance with Sections 15.2.2 and 15.2.3.

15.3 Scenic or Special Resource Standards

15.3.1 Except as otherwise provided in this subsection, if a WTG is proposed for a location in, or is visible from, a Scenic or Special Resource, the Applicant shall provide the Planning Board with a visual impact assessment that addresses the evaluation criteria in subsection 15.3.3. There is a rebuttable presumption that a visual impact assessment is not required for those portions of a WTG that are located more than 3 miles, measured horizontally, from a Scenic or Special Resource. The Planning Board may require a visual impact assessment for portions of the WTG located more than 3 miles and up to 8 miles from a Scenic Resource if it finds that a visual impact assessment is needed to determine if there is the potential for significant adverse effects on the Scenic or Special Resource. Any interested Person must submit information intended to rebut the presumption to the Planning Board within 30 days of acceptance of the application as complete. The Planning Board shall determine if the presumption is rebutted based on a preponderance of evidence in the record.

15.3.2 The Planning Board shall determine, based on consideration of the evaluation criteria in subsection 15.3.3, whether the WTG significantly compromises views from or of a designated Scenic or Special Resource such that the proposed facility has an unreasonable adverse effect on the scenic character or existing uses related to scenic character of that Scenic or Special Resource.

15.3.3 In making its determination pursuant to subsection 15.3.2, and in determining whether an Applicant for a WTG located more than 3 miles from a Scenic Resource must provide a visual impact assessment in accordance the Montville Site Plan Review Ordinance, the Planning Board shall consider:

15.3.3.1 The significance of the potentially affected Scenic or Special Resource;

15.3.3.2 The existing character of the surrounding area;

15.3.3.3 The expectations of the typical viewer;

15.3.3.4 The WTG Project's purpose and the context of the proposed activity;

15.3.3.5 The extent, nature and duration of potentially affected public uses of the Scenic or Special Resource and the potential effect on the public's continued use and enjoyment of the Scenic or Special Resource; and

15.3.3.6 The scope and scale of the potential effect of views of the WTG on the Scenic or Special Resource, including but not limited to issues related to the number and extent of Wind Turbines visible from the Scenic or Special Resource, the distance from the Scenic or Special Resource and the effect of prominent features of the WTG Project on the landscape.

15.4 Construction/Design Standards

15.4.1 General Construction Standards. All Wind Turbines shall be constructed in compliance with Good Utility Practice for Wind Turbines. In the event that, after inspection by a qualified expert in Good Utility Practice, the Town concludes that any of the Wind Turbines were not constructed in compliance with Good Utility Practice or constitutes a danger to persons or property, then upon notice being provided, the Owner/operator shall have 90 days to bring the non-compliant Wind Turbine(s) into compliance with such standards. If 90 days is insufficient time to cure the non-compliance, the Owner/operator shall present a plan

to the Town describing the reason for the delay and the time frame for the cure to be put in place.

15.4.2 Electrical Design Standard. On-site power and transmission lines shall be placed underground to a depth consistent with Good Utility Practice. Wind Turbines shall be engineered according to Good Utility Practice to prevent transient ground currents and stray voltage. The Applicant shall demonstrate that there will be no significant adverse effect upon the environment or individuals from transient ground currents and stray voltage.

15.4.3 Transmission Line Standards. The Applicant must, in conjunction with the Maine Public Utility Commission (PUC), prepare a written report documenting all anticipated changes, modifications or upgrades to the public utility grid within the Town of Montville due to the WTG. The written report must include necessary approvals from the PUC, proof of leases or required right of ways for transmission lines, and any alternatives to the final plan considered. The report must document the residual capacity remaining in the local utility grid that is available for use by other local electrical generating projects.

15.4.4 Geological Stability. Wind Turbines shall not be constructed on areas of geological instability. The Applicant shall demonstrate that this standard is met.

15.5 Operational Performance Standards

15.5.1 General Performance Standards. All Wind Turbines shall be operated and maintained consistent with Good Utility Practice for comparable facilities.

15.5.2 Repairs and Maintenance. The Owner/operator shall be required to repair and replace the WTG and associated equipment consistent with Good Utility Practice as needed to keep the Wind Turbine and Associated Facilities in good repair and operating condition.

15.6 Public Safety and Health Standards

15.6.1 Fire Protection. The Applicant shall prepare a plan in consultation with the Town of Montville fire department as part of the permitting process. The plan shall address all activities at the WTG from the start of construction through the end of power generation and the final removal and restoration of the site, and shall describe a response plan to address all identified potential fire, rescue and hazardous materials scenarios. The Owner/operator shall ensure that the WTG complies with the following control and prevention measures and assumes responsibility for all associated incremental costs:

15.6.1.1 Use of fireproof or fire resistant building materials and buffers or fire retardant landscaping around WTGs as appropriate.

15.6.1.2 Incorporation of a self-contained fire protection system to address nacelle fires including but not limited to redundant fire quenching systems in the nacelle..

15.6.1.3 Maintenance of firebreak areas as appropriate, cleared of vegetation and maintained as a fire/fuel break as long as the Wind Turbine is in operation.

15.6.1.4 Provision for any additional fire fighting or rescue personnel, services, training, materials, or vehicles as may be required to address any emergency related to the WTG that is beyond the current capabilities and duties of the local fire department.

15.6.2 Hazardous Wastes. The Owner/operator shall be responsible for compliance with all ordinances, state regulations and laws applicable to the generation, storage, cleanup, and disposal of hazardous wastes generated during any phase of the project's life. The Town of Montville may require that a plan be submitted by the Applicant demonstrating the ability and intent to meet such compliance.

15.6.3 Blasting. Owner/operator shall not undertake any blasting in connection with the construction of the WTG unless Applicant has notified the Town and submitted a blasting plan consistent with applicable laws and regulations. The plan must be reviewed and approved by the Planning Board before any blasting may take place. No blasting shall be undertaken without 48 hour notification to all residents within a two mile radius, measured horizontally, from the blasting area. All blasting operations will cover the blasting area with mattresses to prevent debris from falling on nearby properties.

15.7 Communications and Electromagnetic Interference Standards

15.7.1 WTGs shall be sited and operated so that they do not interfere with emergency (fire, police/sheriff, ambulance) radio two-way communications (base stations, mobile, and hand held radios, including digital) and/or paging, television, telephone (including cellular and digital), microwave, satellite (dish), navigational, internet or radio reception to neighboring areas. The Owner/operator of the project shall be responsible for the full cost of any remediation necessary to provide equivalent alternate service or correct any problems, including relocation or removal of the Wind Turbine, and any and all related transmission lines, transformers, and other components related to the interference.

15.7.2 The Owner/operator of the WTG shall respond within one day to any request for communications interference investigation by any emergency agency (fire, police/sheriff, ambulance). Testing will commence within two days of the request. The Owner/operator is responsible for mitigating within two days from the determination of interference attributed to the operation of the Wind Turbine.

15.7.3 The Owner/operator of the WTG shall respond within five business days to any request for communications interference investigation by a property owner or resident within a three-mile radius, measured horizontally, of the WTG. Testing will commence within five business days of the request. The owner/operator is responsible for mitigating within ten business days from the determination of interference attributed to the operation of the Wind Turbine.

15.8 Ground Transportation Standards

15.8.1 The Applicant shall identify all public ways to be used within the Town of Montville to transport equipment and parts for construction, operation or maintenance of the Wind Turbines.

15.8.2 A qualified third party engineer, hired by the Planning Board and paid for by the Applicant, shall document road conditions prior to construction. The engineer shall document road conditions again thirty (30) days after construction is complete or as weather permits.

15.8.3 The Town of Montville may bond the road(s) in compliance within state regulations.

15.8.4 Any road damage caused by the Applicant or its contractors shall be promptly repaired at the Owner/operators expense.

15.8.5 The Applicant shall demonstrate that it has appropriate financial insurance to ensure the prompt repair of damaged roads.

15.9 Plan and Risk Assessment for Road and Property Use

15.9.1 An Application for a WTG Site Permit shall include a road and property use and risk assessment plan containing the following information and meeting the following requirements.

15.9.1.1 A description and map of all public ways, and other property, in the Town to be used or affected in connection with the construction of the WTG, including a description of how and when such ways and property will be used or affected.

15.9.1.2 A description of the type and length of vehicles and type, weight and length of loads to be conveyed on all public ways in the Town.

15.9.1.3 A complete assessment of the proposed use of public ways in the Town in connection with the construction of the WTG, including: the adequacy of turning radii; the ability of the public ways to sustain loads without damage; the need to remove or modify (permanently or temporarily) signs, trees, utilities, or anything else; any reasonably foreseeable damage to public ways or other property, public or private; any reasonably foreseeable costs that the Town may incur in connection with the use of property in the Town, including but not limited to costs relating to traffic control, public safety, or damage to public ways, or to other public or private property.

15.9.1.4 A traffic control and safety plan relating to the use of public ways in the Town in connection with the construction of the WTG.

15.9.1.5 Any additional relevant information that the Planning Board may request relating to the use of public ways or other effects on public and private property that may occur in connection with the construction and operation of the WTG.

15.9.2 The Planning Board will evaluate the risk assessment plan with assistance from such consultants that it deems appropriate, including without limitation a third-party engineer chosen by the Planning Board, the cost to be solely borne by the Applicant. The Planning Board may document the condition of public ways and other property to be used in connection with the construction of the WTG in such manner as it deems appropriate. The Planning Board may require changes to the risk assessment plan that it deems to be appropriate to protect public safety, to protect public and private property, and to address anticipated costs to the Town associated with construction of the WTG.

15.9.3 If the Applicant requires the temporary closure of any public way, the Planning Board may require the Applicant to enter into an agreement relating to the use of the public way.

15.9.4 The Applicant shall be responsible for paying for any damage to any public way. If the risk assessment anticipates damage to any public way, the Planning Board may require the Applicant to provide a surety in an amount that the Planning Board determines appropriate to secure any obligation under the agreement, including but not limited to any obligation

relating to alterations or modifications to public ways made in connection with the Applicant's activities.

15.10 Reporting Requirements:

15.10.1 Extraordinary Events.. The Owner/operator shall notify the Town of any extraordinary event within 24 hours of that event,. "Extraordinary events" shall include but not be limited to tower collapse, catastrophic turbine failure, fires, leakage of hazardous materials, unauthorized entry to the tower base, thrown blade or hub, any injury to a Facility worker or other person that requires emergency medical treatment, or other event that impacts the public health and safety of the Town or its residents.

Additionally, the Owner/Operator will provide the Town and its residents with a hotline phone number for reporting of any such extraordinary events to a manned facility on call 24 hours a day, 365 days a year.

15.10.2 Change of Owner/operator. The Owner/operator will notify the Town of Montville of a pending change of ownership in writing 30 days before the effective change. New owners will apply for a transfer of permits to be reviewed by the Town Of Montville and will assume all the obligations of the selling Owner/operator.

15.10.3 Reports from annual safety inspections pursuant to Section 14.3 .

15.10.4 Annual proof of liability insurance pursuant to Section 14.4 .

16.0 Application Submission Requirements and Procedural Time Frames

16.1 Pre-application Meeting

A pre-application meeting with the Planning Board will be scheduled at a regularly scheduled public Planning Board meeting. At the meeting the Applicant will review the type and scope of the project and the Planning Board will review Ordinance Standards and submission requirements. The Planning Board will establish an application file at this time.

16.2 Site Inspection

The Planning Board reserves the right to establish a time for a site inspection at any time during the application process. Planning Board and Applicant will set a mutually agreeable time for the Planning Board to inspect the site. Site visits will normally be postponed if there is more than one foot of snow on the ground. The site inspection will be treated as a public meeting of the Planning Board with appropriate notices given to the community. While the Planning Board may set additional requirements for the site inspection at the pre-application meeting, the Applicant shall, at minimum, flag the location of the proposed WTG and relevant property boundaries. The Applicant or a representative will accompany the Planning Board to describe the project and answer any questions.

16.3 First Public Hearing

The Planning Board will schedule a public hearing to be held within 60 days of the pre-application meeting process for the WTG.

16.4 Notice to Abutters and residents within the Notification Area

In addition to any required public notices for the site inspection and first public hearing, the Planning Board will prepare a notice to property owners and residents within the Notification Area.. The notice will briefly describe the proposed WTG and notify the recipient of the dates, times and places of the site inspection and first public hearing. The notice will be sent by certified mail with mailing costs paid for by the Applicant. The town will give residents no less than 14 days' notice of such a meeting.

16.5 Determine Submission Requirements

Within 60 days of the pre-application meeting the Planning Board shall inform the Applicant in writing of the submission requirements for the application. The submission requirements for WTGs are listed in Section 28.0 . If the Applicant wishes to have any of the submission requirements waived, the Applicant must make the request in writing to the Planning Board. The Planning Board will notify property owners and residents within the Notification Area. The notice will be sent by certified mail with mailing costs paid for by the Applicant. The Planning Board will send the notice at least 14 days prior to the Planning Board meeting at which the Applicant's request will be considered.

16.6 Application Submission

The Applicant has up to 180 days after the determination of submission requirements to submit a completed application with the required fees to the Town clerk. The application shall be deemed abandoned unless the application has been received within 180 days of the determination of submission requirements. The Town Clerk will forward the application to the Planning Board.

16.7 Completeness Review

The Planning Board will notify the Applicant within 90 days from the date of submission whether the application is complete. Specific studies may be required for a consideration of completeness including but not limited to noise studies, DEP certification and permitting, and environmental impact studies. If the application is deemed to be incomplete the Planning Board shall indicate the additional information needed. The application shall be deemed abandoned unless the Applicant provides the information requested, demonstrates that additional time is needed to complete required studies, or submits in writing the reason for any delay within 30 days from the date of notice indicating the application is incomplete.

16.8 Second Public Hearing

The Planning Board will schedule a second public hearing to be held within 60 days of the determination of completeness of the Application for the WTG.

16.9 Notice to Town of Montville

In addition to any required public notices for the second public hearing, the Planning Board will prepare a notice to all residents and property owners in the Town of Montville and to property owners and residents within the Notification Area. The notice will briefly describe the proposed WTG and notify the recipient of the date, time and place of the second public hearing. The notice will be sent by certified mail with mailing costs paid for by the Applicant. The town will give residents no less than 14 days' notice of such a meeting.

16.10 Final Planning Board Determination

A decision to approve or reject the application, or to approve the application with conditions, will be made by the Planning Board within 60 days from the date of the second public hearing.

16.11 Final Town Approval

Final Town approval is required if the WTG is located on Town property or if the WTG is wholly or partially owned by the Town.

17.0 Professional Services

In reviewing an application for compliance with this Ordinance, the Permitting Authority may retain professional services as necessary to assist with its review, including but not limited to those of an attorney, engineer, biologist, or land use planner. Within fourteen (14) days of filing an application the Applicant shall deposit in a joint escrow account with the Town the sum of $25,000 as partial payment for the appropriate Town expenses in hiring consultants and experts, as the Permitting Authority shall, at its discretion, deem necessary. If at any time the balance of the fund falls below $5,000, the Applicant upon notice shall submit an additional $25,000 so that the Town's full and actual expenses of examining and verifying the data presented by the Applicant can be paid in full by the Applicant. If at any time the balance of this fund falls below $5000 for a period of 30 days after notification the application shall be considered to have been withdrawn. The balance of the escrow account shall be returned to the Owner/operator after all expenses have been paid, and after a permit is granted or the Applicant has withdrawn.

18.0 Application Changes

18.1 Throughout the permit process, the Applicant shall promptly notify the Permitting Authority of any changes to the information contained in the permit application.

18.2 Material changes may not be made to a WTG after an application is determined to be complete, without initiating a new application process. Material changes include, but are not limited to, increasing the number of Wind Turbines, increasing the nameplate capacity of the Wind Turbines, increasing Turbine Height, changes to the location of Wind Turbines, or material changes to Associated Facilities. Non-material changes require a permit modification as determined by the Permitting Authority. The Permitting Authority shall have sole discretion for determining what is a material or non-material change.

19.0 Cumulative Effect of Multiple Permits

The Town of Montville reserves the right to limit the total number of WTG permits that are under review for approval at any given time. The Permitting Authority will process no more than one application at any one time, or the deadline for submission and review may be modified correspondingly to reflect the increased workload of multiple permits.

20.0 Appeals

20.1 The Board of Appeals shall have the power to hear and decide administrative appeals, on an appellate basis, where it is alleged by an aggrieved party that there is an error in any order, requirement, decision, or determination made by, or failure to act by, the Reviewing Authority.

Any order, requirement, decision or determination made, or failure to act, in the enforcement of this Ordinance is not appealable to the Board of Appeals.

20.2 The Board of Appeals may reverse the decision of the Permitting Authority only upon finding that the decision was contrary to specific provisions of the Ordinance or contrary to the facts presented to the Permitting Authority. The Board of Appeals may only review the record of the proceedings before the Permitting Authority. The Board of Appeals shall not receive or consider any evidence that was not presented to the Permitting Authority, but the Board of Appeals may receive and consider written or oral arguments. If the Board of Appeals determines that the record of the Permitting Authority's proceedings is inadequate, the Board of Appeals may remand the matter to the Permitting Authority for additional fact finding.

20.3 For the purposes of hearing appeals, at a minimum, all property owners and residents within the Notification Area shall be deemed to have interested party standing. The Appeals Board may grant other individuals interested party standing as special circumstances warrant. All interested parties must be sent notice by certified mail with mailing costs paid for by the Applicant. The Appeals Board will give interested parties a reasonable and appropriate amount of time to present information and rebuttals.

20.4 A final Town vote as outlined in Section 16.11 shall not be subject to Appeals Board review.

21.0 Complaints/ Violations/ Enforcement

21.1 General Standard. It shall be unlawful for any person, firm or corporation to violate or fail to comply with or take any action that is contrary to the terms of this Ordinance, or any permit or Operational License issued under this Ordinance, or cause another to violate or fail to comply or take any action which is contrary to the terms of this Ordinance or any permit or Operational License issued under this Ordinance.

21.2 Enforcing Authority. The CEO will serve as the Enforcing Authority for WTGs. The Enforcing Authority will:

21.2.1 Have the authority to conduct investigations, resolve complaints, ensure compliance with and enforce standards, and levy penalties if required.

21.2.2 Appoint qualified representatives to investigate complaints. The reasonable costs and fees for the qualified representative will be paid by the Owner/operator and may include engineers, consultants, and other professionals.

21.2.3 Recommend to the Planning Board amendments to this Ordinance deemed necessary to address health or safety concerns not currently addressed in this Ordinance.

21.2.4 Have access to Town legal counsel as required.

21.3 Enforcement. Standards in this Ordinance will be enforced through a series of enforcement options including but not limited to: 1) Emergency shutdown; 2) 5 day response to serious violations with a 10 day mitigation period; 3) 30 day complaint resolution with a 30 day mitigation period; 4) financial penalties; and 5) other remedies.

21.4 Emergencies and Emergency Shutdown

The Owner/operator shall be required to immediately cease operations for the duration of any Emergency. Emergency shall mean a proven condition or situation caused by the WTG that presents an imminent physical threat of danger to life or significant threat to property. A WTG that is found to present an imminent physical threat of danger to life or significant threat of damage to property shall be immediately shut down and repaired or otherwise made safe and certified so by a professional engineer in good standing prior to resumption of operation. The Town shall have the right to access all Wind Turbines to verify conditions and/or repair progress with reasonable notice to the Wind Turbine owner/operator. Within 24 hours of an occurrence of a tower collapse, turbine failure, property damage or contamination, fires, thrown blade or hub, collector or feeder line failure, injured Wind Turbine worker or ptivate person, the Owner/operator shall notify the Town of the occurrence and proposed remedial action.

21.5 Serious Violations of Standards

The Owner/operator of the WTG shall respond within five business days to any complaint or complaints deemed by the Enforcing Authority to have merit. Testing, paid for by the Owner/operator, will commence within ten working days of the complaint. Except as noted for interference with emergency communications, the Owner/operator is responsible for mitigating the problem within ten business days from the final determination of any cause attributed to the operation of the WTG. Pursuant to Section 15.7.2, interference with emergency communications must be responded to in one day and mitigated within 2 days.

21.6 Other Violations

If the Enforcing Authority determines that a violation of the Ordinance or the permit has occurred, and the violation is determined neither to be an emergency pursuant to Section 21.4 , nor a serious violation pursuant to Section 21.5 , the Enforcing Authority shall provide written notice to the Owner/operator alleged to be in violation of this Ordinance or permit. The Enforcing Authority and the involved parties shall engage in good faith negotiations to resolve the alleged violation. Such negotiations shall be conducted within thirty (30) days of the written notice of violation. The Owner/operator shall pay for any necessary testing if the Owner/operator is subsequently determined to be in non-compliance. The Owner/operator is responsible for mitigating the problem within 30 days from the final determination of any cause attributed to the operation of the WTG. Mitigation involving significant construction or physical modification may have up to 90 days to be completed pursuant to Section 15.4.1.

21.7 Penalties

Any Person or Applicant who fails to comply with any provision of this Ordinance by failing to reach agreement with the Enforcing Authority, or after the expiration of the mitigation periods defined in Section 21.5 and Section 21.6 , shall be fined at least five hundred dollars ($500) but no more than one thousand dollars ($1000) for each WTG. A separate offense shall be deemed to be committed on each day during which a violation occurs or continues to occur.

21.8 Other Remedies

If the Owner/operator has not corrected the violation within the timeframes contained in Section 21.5 or Section 21.6 , the Enforcing Authority shall order the WTG to cease operation until the WTG can prove compliance with the standards of this Ordinance. At the discretion of the Enforcing Authority, penalties and fines may continue to accrue during this period. If after 6

months of being ordered to cease operations the Owner/operator has not demonstrated good faith and significant effort in resolving the issue, the Enforcing Authority shall initiate the decommissioning procedure pursuant to Section 22.0 .

21.9 Identifying Violations and Registering Complaints

21.9.1 Pursuant to Section 15.10.1, the Owner/operator will report to the Town all extraordinary events within 24 hours of their occurrence.

21.9.2 For Wind Turbines the Town will maintain, at the Owner/operator's expense, a system for recording and investigating all complaints related to the WTG. The system must be able to receive complaints 24 hours a day, 365 days a year. A permanent record of all complaints, investigations and outcomes will be maintained. The Owner/operator will designate a representative and method to receive and respond to complaints from the Town 24 hours a day, 365 days a year. Complaints for WTGs will be referred to the Enforcing Authority in a timely manner.

22.0 Decommissioning Standards

22.1 The Owner/operator shall, at its expense, complete decommissioning of the WTG within: 1) twelve (12) months after the end of the useful life of the WTG, or; 2) as specified in the materials provided at the time of application or; 3) pursuant to remedies described in Section 21.8 . The WTG will be presumed to be at the end of its useful life if no electricity is generated for a continuous period of twelve (12) months.

22.2 Decommissioning shall include removal of wind turbines and foundations to a depth of 36 inches. All buildings, cabling, electrical components, roads, and any other associated facilities shall be removed unless, at the end of the Wind Turbine or WTG's useful life, as determined in accordance with Section 22.1 , the Applicant provides written evidence of plans for continued beneficial use of these components of the WTG, and this evidence is approved by the Planning Board.

22.3 Except as otherwise provided by Section 22.2 , disturbed earth shall be graded and re-seeded, unless the Participating Landowner of the affected land requests otherwise in writing.

22.4 An independent and certified Professional Engineer shall be retained to estimate the total cost of decommissioning without regard to salvage value of the equipment ("Decommissioning Costs"), and the cost of decommissioning including the salvage value of the equipment ("Net Decommissioning Costs"). Said estimates shall be submitted to the Town of Montville after the first year of operation and every other year thereafter.

22.5 The Owner /operator shall post and maintain decommissioning funds in an amount equal to Net Decommissioning Costs; provided that at no point shall decommissioning funds be less than one hundred percent (100%) of Decommissioning Costs. The decommissioning funds shall be posted and maintained with a bonding company or Federal or State-chartered lending institution chosen by the Owner/operator and Participating Landowners posting the financial security, provided that the bonding company or lending institution is authorized to conduct such business within the State and is approved by the Town of Montville. No work can begin on the WTG before the decommissioning bond is issued and approved.

22.6 Decommissioning funds may be in the form of a performance bond, surety bond, letter of credit, or other form of financial assurance as may be acceptable to the Town of Montville.

22.7 If the Owner/operator fails to complete decommissioning within the period prescribed by Section 22.1 , then the Participating Landowner shall have an additional six (6) months to complete decommissioning.

22.8 If neither the Owner/operator, nor the Participating Landowner completes decommissioning within the periods prescribed by Sections 22.1 and 22.7 the Wind Turbine or WTG shall be deemed to be in violation of this Ordinance and the Town of Montville may take such measures as necessary, including court action, to ensure the completion of decommissioning. The entry into and submission of evidence of a Participating Landowner agreement to the Town of Montville shall constitute agreement and consent of the Parties to the agreement, their respective heirs, successors and assigns that the Town of Montville may take such action as necessary to implement the decommissioning plan.

22.9 The escrow agent shall release the decommissioning funds when the Owner/operator has demonstrated and the Enforcement Authority concurs that the decommissioning has been satisfactorily completed, or upon written approval of the Town in order to implement the decommissioning plan.

23.0 Real Estate Property Value Assurance Plan

The WTG Owner/operator must provide the Real Estate Property Value Assurance Plan (REPVAP)to all Non-Participating landowners who: 1) own property within one mile, measured horizontally, from the Project Boundary, and 2) have not signed any mitigation waivers. This is a legally binding contract with the Owner/operator and its successors and the landowners. Each one of these contracts must be submitted with the application.

The elements of the Real Estate Property Value Assurance Plan are as follows:

23.1 Establishing the Current Value of the Home

23.1.1 Three neutral real estate agents will be selected from a list of agents licensed in the State of Maine and conducting business in the general project area.

23.1.2 Each agent shall perform a Comparative Market Analysis (CMA) of the property – in its current state – which will compare the property size and improvements to no less than three similar properties that are listed for sale, using generally accepted CMA methods.

23.1.3 The two highest property valuations determined from each CMA will then be averaged to determine the "baseline" property value for REPVAP purposes only. The CMAs will be performed at the Applicant's expense. The property owner hereby agrees to permit access to the property as required to perform the CMA inspection. Furthermore, the property owner hereby agrees to provide full disclosure of known defects of the property as may be required under Maine State Law.

23.1.4 The agents preparing the CMAs will provide a written copy of their report to both the property owner and the Applicant. Both the Applicant and the land owner reserve the right to reject CMA results only in the instance of a clear mistake by the agent.

23.2 Establishing the Future Value of the Home if Listed for Sale.

23.2.1 If at any time during the three year period after a permit to erect the WTG, the property owner lists the property for sale with a qualified realtor from the Board of Realtors, then an "updated" Comparative Analysis will be prepared, again at the Applicant's expense, using the same procedure outlined above. The updated CMA will explicitly take into account any changes in local market conditions for comparable properties unaffected by the wind project, as well as any improvements to the home and/or lot.

23.2.2 In the event that the property has been listed for at least 12 months and sells for less than the market value determined by the updated CMA average, the Applicant will pay the difference in value within 30 days after closing of the sale of the property. The 12 month listing requirement may be waived by Applicant if requested by the property owner at the Applicant's sole discretion.

23.3 Other stipulations

23.3.1 The property owner hereby grants the Applicant the right to purchase the property at the greater amount of the updated CMA average market value or the highest bona fide offer.

23.3.2 In the event the property was offered for sale and did not sell or generate any acceptable bona fide offers within 12 months, the Applicant will pay the difference in value between the updated CMA averaged market value and the highest bona fide offer, but only upon reasonable certification by the property owner's selling agent that the lack of an acceptable offer or sale was attributable solely to the close proximity of the property to the WTG, and not due to any other reason whatsoever including but not limited to market conditions or specific deficiencies related to the property that was otherwise assumed to be satisfactory.

23.3.3 If the property does not sell within an 18 month period, the Applicant will have to purchase the property at the updated CMA average market value..

23.4 Subject to the Applicant's right to waive any or all these exclusions, the plan outlined herein does not cover a sale or transfer of the property under any of the following conditions.

23.4.1 If the property owner does not have clear and marketable title.

23.4.2 If the property has not been listed for sale for at least 12 months as a continuous period.

23.4.3 If the property is gifted or assigned to another person.

23.4.4 If the property is not listed for sale in accordance with Section 23.4.2 at some point.

23.4.5 If the property is not reasonably maintained in its current condition, reasonable wear and tear excepted.

23.5 Additional Conditions:

23.5.1 A property owner can participate voluntarily in this plan, under the terms and conditions established herein, but the benefit is not assignable to new or subsequent property owners.

23.5.2 If the Applicant sells or transfers ownership of the WTG, it must assign, transfer, pledge, or otherwise dispose of its obligations and interests under this agreement in a form acceptable to the contracting landowners, unless released in writing by contracting landowners . If no agreement can be reached, then the Applicant shall, before sale of the

WTG, place into an escrow account, in favor of the landowner(s) the full value of the property, to be accessed by the landowner(s) if no sale is finalized within the time allocated in Section 23.4.2.

23.5.3 In the event any landowner experiences health problems directly attributable to the operation of the WTG, such that the home is rendered uninhabitable, and unsellable, the listing period will be waived, and the Applicant will be responsible for all medical expenses incurred, including but not limited to doctor visits, hospital visits and stays, medical procedures, medication and cost of lodging away from the home, up until such time as the Applicant purchases the affected property at its full value before the approval and operation of the WTG reduced the property's worth.

24.0 Tax Valuation Agreement and Tax Impact Statement

24.1 Tax Valuation Agreement

24.1.1 WTGs that have a taxable property value of greater than $10 million dollars; or, if the project will be qualified as a "designated business" for the purposes of state tax incremental financing as defined in Title 30-A M.R.S.A.§5241, are required to have a written agreement between the Town of Montville and the Owner/operator designating the financial methodology that will be used for tax valuation purposes ("Tax Valuation Agreement").

24.1.2 The Tax Valuation Agreement must be in a format approved by the Town attorney and comply with all applicable state and federal tax codes and laws.

24.1.3 The Tax Valuation Agreement must include a financial projection of the tax valuation for the useful life of the project and be prepared by a qualified CPA and reviewed by a qualified tax attorney selected by the Town and paid for by the Applicant.

24.2 Tax Impact Statement

A Tax Impact Statement must be prepared and presented to the Town. It will contain year-by-year for 10 years estimates of Montville resident's tax burden using the following data: 1) re-appraised values for all residents within 2 miles of the WTG, 2) State re-assessment for school tax amounts (assume constant school budget and constant contributions from Towns other than Montville), 3) other residents properties are presumed to stay at their same value. This Tax Impact Statement will be prepared by an Accountant hired by the Town at Owner/operator's expense. The Tax Impact Statement will be presented to the Town for information.

25.0 Jurisdiction Across Multiple Municipalities

This section addresses issues unique to the geography of the Town of Montville and its neighboring towns with which it shares a common boundary. In the event that potential sites for WTGs share multiple municipal jurisdictions, project permits should be coordinated to the fullest extent possible across town boundaries, while at the same time maintaining each individual Town's right to individual Home Rule.

25.1 This Ordinance applies to WTGs located wholly or partially in the Town of Montville to the fullest extent allowable by municipal, state, and federal law.

25.2 Approval to build or operate a WTG applies only to that portion of the WTG located within the boundaries of the Town of Montville. However, the application must take into account the entire WTG across municipal boundaries, including but not limited to the total number of Wind Turbines, Turbine Height, Wind Turbine location and all other relevant facts and data that may directly or indirectly effect the operation and viability of that portion of the WTG located in the Town of Montville.

25.3 Setback, Noise, Shadow Flicker and Mitigation Waiver standards for WTGs located and operated in the Town of Montville shall apply to property lines and roads irrespective of Town boundaries. For the purpose of this section a resident of such abutting towns is afforded the same protections as a resident of Montville.

25.4 This subsection applies to WTGs that are located partially in Montville and partially in neighboring Towns. To receive a permit from the Town of Montville for that portion of the WTG located in the Town of Montville, the Owner/Operator shall agree in writing that the most protective setback and noise ordinance standard from any Town located within the WTG area shall control. The controlling ordinance must be in effect at the time the permit is granted.

25.5 The Town Clerk shall forward notice of WTG permit applications within 10 days of receipt, and notice of hearings and public meetings 14 days in advance, to the Selectmen and Planning Boards of adjacent communities for all WTGs if the neighboring community is located within a defined Setback of this Ordinance.

26.0 Ethical Standards

26.1 Transparency, Public Participation and Highest Ethical Standards

All public deliberations and decisions regarding WTGs and Community Owned Wind shall be conducted in an open, transparent manner that encourages the broadest public participation and adherence to the highest ethical standards.

26.2 Public Access

All deliberations concerning WTGs and Community Owned Wind, whether in writing or conducted verbally, by the Planning Board, Selectmen, Appeals Board, and any subcommittees or working groups of the aforementioned bodies shall fully comply with the letter and spirit of State law regarding Freedom of Access pursuant to Title 1; Chapter 13; Subchapter 1. Specifically, all deliberations regarding WTGs between members of the Planning Board, Selectmen, Appeals Boards and any subcommittees and working groups shall be conducted at public meetings, which have been duly posted. Exceptions will be made only for: 1)appropriately recorded and executed executive sessions, and 2)communicating the minimal information necessary to set up and facilitate public meetings. Detailed minutes of deliberations and decisions concerning WTGs and Community Owned Wind will be recorded and posted. Copies of all correspondence and e-mails will be made available to the public with the exception of those publicly identified and disclosed as being subject to "attorney-client privilege" by the Town attorney. All documents, correspondence and e-mails generated by consultants on behalf of the Planning Board, the Selectmen, Appeals Board, their subcommittees and working groups shall be part of the public record.

26.3 Conflicts of Interest

The process to develop, permit and administer WTGs or Community Owned Wind shall be governed by a strict ethical code for conflicts of interest. No elected or appointed Town official or Town employee, their immediate family members, or their employees, who has a conflict of interest shall be directly or indirectly involved in the planning process or decision-making process for WTGs. Conflicts of interest include but are not limited to:

1. having a lease as a Participating Landowner for a Wind Turbine or a lease for a transmission right-of-way,
2. having an identified financial arrangement with a wind development company including a signed Mitigation Waiver with financial remuneration,
3. serving as a paid representative of a wind development company, or a written or verbal promise for future employment or contracts from a wind development company;
4. being directly or indirectly affiliated or related to an Applicant with a pending application for a WTG, and,
5. knowing there is a substantial opportunity to accept bids, receive remuneration, or employment valued at greater than $10,000 on behalf of a wind development company or as a subcontractor or employee of the Community Owned Wind.

Individuals with a conflict of interest must identify the conflict of interest and recuse themselves from all direct and indirect planning and decision making regarding WTGs or Community Owned Wind, with the exception of voting and debating as a private citizen at any public meetings and public hearings.

26.4 Bidding and Contracting

All bidding, contracts and employment for Community Owned Wind projects must be awarded through a process of public notice and competitive bidding. The Town of Montville reserves the right to design the bidding process to favor local contracts and local employment.

26.5 Code of Ethics for Wind Companies and Municipal Employees

26.5.1 Wind companies will not hire municipal employees or their relatives, give gifts of more than $10 during a one-year period, or provide any other form of compensation that is contingent on any action before a municipal agency

26.5.2 Wind companies will not solicit, use, or knowingly receive confidential information acquired by a municipal officer in the course of his or her official duties.

26.5.3 Wind companies will establish and maintain a public Website to disclose the names of all municipal officers or their relatives who have a financial stake in WTG development.

26.5.4 Wind companies will submit, in writing to the municipal clerk for public inspection, and additionally will publish in the local newspaper, the nature and scope of the municipal officer's financial interest.

26.5.5 All wind easements and leases will be in writing and filed with the County Clerk for public inspection.

27.0 Noise Measurement Standards and Procedures

27.1 A qualified independent acoustical consultant who is a Full Member of the Institute of Noise Control Engineering (INCE) shall conduct all noise studies. The acoustical consultant shall be hired by and report to the Permitting Authority. The Applicant will pay for the studies.

27.2 The WTG Applicant/Licensee shall provide all technical information and wind farm data required by the qualified independent acoustical consultant before, during, and/or after any acoustical studies required by this document and for acoustical measurements.

27.3 Sound level meters and calibration equipment must comply with the latest version of the American National Standards Institute " American Standard Specifications for General Purpose Sound Level Meters" (ANSI Standard S1.4) and shall have been calibrated at a recognized laboratory within one month prior to the initiation of the study.

27.4 Except as specifically noted otherwise, measurements shall be conducted in compliance with ANSI Standard S12.18-1994 "Outdoor Measurements of Sound Pressure".

27.5 Along with information about the make, model, and name plate capacity of all turbine potentially used in the proposed WTG, the Applicant will also supply their sound power levels (Lw) for each 1/3 octave band from 6.3 Hz to 10k hz.

27.6 A sound propagation model predicting the sound levels immitted into the community computed using at minimum 1/1 octave band sound power levels to compute the LCeq and LAeq levels to generate LAeq and LCeq contours in 5 dB increments overlaying an aerial view and property survey map from the WTG property out to a distance to include all residential property lines within two (2) miles measured horizontally from the Project Boundary.

27.7 Prior to permit application approval, a pre-construction ambient noise level study shall be conducted at each property line within 2 miles measured horizontally from the Project Boundary.

27.8 The tests shall be conducted using both an A-weighting scale (dBA) and low frequency C-weighting scale (dBC).

27.9 Predictions shall be made at all property lines within and outward for two (2) miles measured horizontally from the Project Boundary for the wind speed, direction and operating mode that would result in the worst case WTG nighttime sound emissions.

27.10 Tests shall be reflective of seasonal changes to vegetation and atmospheric conditions. At a minimum one set of tests should be performed during each of the four (4) calendar seasons of the year.

27.11 All measuring points shall be located in consultation with the property owners and such that no significant obstruction blocks noise and vibration to the site.

27.12 Outdoor noise level measurements must be taken at 6 feet above the ground and at least 15 feet from any reflective surface.

27.13 Duration of measurements shall be a minimum of ten continuous minutes for each criteria at each location.

27.14 Measurements must be made when the wind levels are less than 4.5 mph and with appropriate wind screening for the recording device.

27.15 When conducting their pre-construction noise prediction analysis, the Applicant shall make specific reference to: 1) the unique aspects of the mountainous contours and terrain of the area and its effect on noise predictability and; 2) line source noise predictions (emanating from a line of Wind Turbines) in addition to the traditional single point source predictions.

27.16 Measurements should be obtained during representative weather conditions when the Wind Turbine noise is most noticeable, including periods of temperature inversion most commonly occurring at night.

27.17 Measurements shall be taken at each of the following three time periods:

27.17.1 Day (10 a.m. – 2p.m.)

27.17.2 Evening (7p.m. -11 p.m.)

27.17.3 Night (12 midnight – 4 a.m.)

27.18 Each measurement shall be replicated during the same time period over three different days within the same season for a total of 9 measurements per location per season (e.g., three daytime measurements in the winter, three evening measurements in the winter, and three night time measurements in the winter). The lowest of the three measurements per time period, per season, will be used to determine the pre-construction ambient noise for that time period and season.

27.19 For each measurement the following minimum criteria will be recorded:

27.19.1 Lmax, Leq, L10 and L90 in dBA

27.19.2 Lmax, Leq, L10 and L90 in dBC

27.19.3 A narrative description of any intermittent noises registered during each measurement

27.19.4 Wind speed and direction at time of measurement

27.19.5 Description of weather conditions at time of measurement

27.19.6 Description of topography and contours relative to proposed or actual Wind Turbines

27.20 A comparison of the expected sound levels from the proposed WTG with the sound level limits of this regulation shall be submitted. Per Maine TA Bulletin #4, a written report comparing the expected sound levels with the pre-development ambient sound levels will help determine compliance with the standard.

27.21 A 5 dBA and/or a 5 dBC penalty shall be applied for short duration repetitive noise or repetitive impulse noise. This is a characteristic "thumping" or "whooshing" sometimes exhibited by larger Wind Turbines. Per Maine TA Bulletin #4, intermittent noise is a more serious nuisance than constant noise.

27.22 A 5 dBA penalty shall be applied for tonal noise. This is a single or limited frequency noise (vs. broadband noise) associated with mechanical noise artifacts (i.e. high pitched whining, screeching, buzzing). Per Maine TA Bulletin #4, noise over a narrow frequency is more serious nuisance than broadband noise.

27.23 For sites being measured with existing Wind Turbines two sets of measurements are required: 1) one set with the Wind Turbine(s) off and; 2) one set with the Wind Turbine(s) running.

27.24 For noise complaints after the Wind Turbines are operational, the measurement points, season, time, and duration of measurements shall be selected in consultation with the affected property owner. If requested by the property owner, continuous measurements may be taken for longer periods of time to capture intermittent nuisance noise patterns.

27.25 Within twelve months of the date when the project is fully operational, and within four weeks of the anniversary date of the pre-construction background noise measurements, repeat the existing sound environment measurements taken before the project approval. Post-construction sound level measurements shall be taken both with all WTG's running and with all WTG's off.

27.26 The post-construction measurements will be reported to the Town of Montville (available for public review) using the same format as used for the preconstruction sound studies. Post-construction noise studies shall be conducted by a firm chosen and hired by the Town of Montville. Costs of these studies are to be paid by the Licensee.

27.27 Any noise level falling between two (2) whole decibels shall be deemed the higher of the two.

27.28 When testing for WTG noise compliance, all measurements at the test location must be the pre-turbine background noise measurement location nearest to the home of the complainant in line with the WTG and nearer to it. The time of day for the testing and the wind farm operating conditions plus wind speed and direction must replicate the conditions that generated the complaint. Procedures of ANSI S12.9-Part 3 apply. The effect of instrumentation limits for wind and other factors must be recognized and followed.

28.0 WTG Submission Standards and Fees

28.1 Fees and Bonds.

28.1.1 Application Fee: $5000.00.

28.1.2 Professional Fees Escrow: one half of one percent of the estimated cost of the project, minimum balance of $25,000.00 at all times.

28.1.3 Decommissioning Bond: See Section 22.0 .

28.1.4 Road Damage Bond: See Section 15.9.4.

28.2 Submission standards.

All information in this application, unless specified, will become part of the public record. Information submitted by the Applicant must be continuously updated throughout the application process as changes are made or new information becomes available.

The Applicant shall include a written application, which shall include:

28.2.1 Applicant's name and contact information.

28.2.2 Legal Owner/operator and contact information.

28.2.3 Description of the legal structure of the WTG including a corporate organizational chart, ownership and equity structure, and all investors.

28.2.4 Description of the proposed WTG that includes the number of Wind Turbines, the nameplate capacity of each Wind Turbine, Turbine Height and manufacturer's specifications

for each Wind Turbine, the aggregate generating capacity of the entire project, and a description of associated facilities.

28.2.5 Location map of the project showing the location of the each Wind Turbine, associated facilities, all property under partial or total control of the Applicant including easements and those under lease with Participating Landowners, roads, municipal boundaries, proximity to all Scenic or Special Resource features in the Town of Montville and major geographical features.

28.2.6 Detailed site plan showing the location of each Wind Turbine and Associated Facility and any of the following features located within 1.5 times the required setback: property boundaries, required setbacks, topographic contour lines (maximum 20-foot interval), buildings (identify use), roads, driveways, right-of-ways, overhead utility lines, Scenic or Special Resources, tree cover, wetlands, streams, water bodies, areas proposed to be cleared of vegetation or re-graded, and areas proposed to be significantly excavated or blasted.

28.2.7 Copies of all Participating Landowner agreements and easement agreements. Dollar amounts may not remain confidential.

28.2.8 Copies of any deeds or purchase agreements for land owned or under option by the Owner/operator.

28.2.9 Receipt showing payment of application fees and escrow for professional and public hearing fees.

28.2.10 A copy of the most current business plan for the WTG.

28.2.11 A copy of all collected and available relevant wind data for the WTG. This information is a critical indicator of the long-term financial viability of the project.

28.2.12 Proof of financing.

28.2.13 Reference list of all previous WTGs with which the Owner/operator has been affiliated.

28.2.14 Proof of compliance with all required setbacks. The Applicant shall work with the Permitting Authority to complete a pre-construction noise study per Section 27.0 . This study must be completed before the permit can be approved.

28.2.15 A detailed noise prediction model for worst-case noise scenarios based on wind speed and wind direction for the WTGs. The study shall be projected onto a contour map for a minimum of two miles from each Wind Turbine. Worst-case scenarios for each property line within the 2-mile radius, measured horizontally from the Project Boundary, shall be reported in table form. The model will address the unique mountainous terrain of the area. Noise predictions will include both single source and line source origination. All underlying assumptions and algorithms in the model will be documented.

28.2.16 As part of the review process, the Applicant will, per Maine TA Bulletin #4, provide written demonstration that the noise standards in this Ordinance will be met.

28.2.17 The Wind Turbine manufacturer's noise emission specifications for each Wind Turbine model.

28.2.18 A shadow flicker and blade reflection model for the proposed WTG. The model will provide a worst-case scenario (100%) seasonal representation for each Occupied Building

within two miles of any Wind Turbine. The model will calculate maximum hours of shadow flicker and blade reflection in table form for each Occupied Building. A worst-case scenario shall also be constructed for vehicle traffic on Route 220.

28.2.19 Copies of all executed Mitigation Waiver agreements concerning Setbacks, Noise and Shadow Flicker/Blade Reflection. Dollar amounts may not remain confidential.

28.2.20 Written demonstration that the Wind Turbine Plan is consistent with the Montville Site Plan Review Ordinance.

28.2.21 Documentation showing compliance with Section 15.2.2, both during construction and post construction.

28.2.22 Documentation showing compliance with Section 15.2.3 and with Section 15.2.4.

28.2.23 Documentation showing compliance with Section 15.2.5. Documentation must include a construction site erosion plan and storm water runoff control plan that minimizes potential adverse impacts on streams and wetlands.

28.2.24 Documentation showing compliance with Section 15.2.6.

28.2.25 Documentation showing compliance with Section 15.2.7.

28.2.26 Written evidence that the Environmental Coordinator of the Maine Department of Inland Fisheries and Wildlife and the Maine Natural Areas Program have both been notified of the pending application and the location and Turbine Height of all proposed Wind Turbines.

28.2.27 A Location of Development permit from the Maine Department of Environmental Protection (DEP) pursuant to Title 35-A M.R.S.A. §3451, Title 35-A M.R.S.A. § 3456 and Title 38 M.R.S.A § 482 is required unless the Wind Turbine: 1) does not sell or convert electricity for off site use including net metering; and, 2) does not qualify as a Structure with a total land area in excess of 3 acres for the entire WTG.

28.2.28 A visual impact assessment pursuant to Section 15.3 .

28.2.29 Photographs of existing conditions of each Wind Turbine and associated facility site.

28.2.30 Sight line, photographic, and elevation information shall be provided from: 1) each Occupied Building within the Setback; 2) from any Scenic or Special Resource location and other locations as the Permitting Authority deems necessary.

28.2.30.1 A Sight Line Representation shall be drawn that shows the lowest point to the Wind Turbine visible from each location. Each sight line shall be depicted in profile, drawn at one-inch equals 40 feet. The profiles shall show all intervening trees and physical structures.

28.2.30.2 Each Sight Line shall be illustrated by one four-inch by six-inch color photograph of the current view.

28.2.30.3 Each of the existing condition photographs shall have the proposed Wind Turbines superimposed on it to accurately simulate the WTG when built.

28.2.30.4 Elevations of the tops of any structures on the subject property relative to the elevation of the Wind Turbines(s)

28.2.30.5 The height and elevation relative to the Wind Turbine(s) of trees, both existing and proposed, that are to provide visual buffering. In the case of trees to be planted, the proposed height at the time of planting as well as the projected mature height is to be provided.

28.2.31 Demonstrate compliance with Section 13.3 . Provide a written description of emergency and normal shutdown operations.

28.2.32 Demonstrate compliance with Section 14.1 . Submit required permits from the Federal Aviation Administration.

28.2.33 Demonstrates compliance with Section 14.2 .

28.2.34 Submit contract with Maine licensed professional engineer to conduct post construction structural and operational inspection and written agreement by Applicant to submit proof of successful inspection as a condition of permitting before operating WTG

28.2.35 Proof of Liability Insurance in the amount of five million dollars ($5,000,000.00) per occurrence.

28.2.36 Time-line showing all aspects of the construction.

28.2.37 Photographs and detailed drawings of each Wind Turbine, including foundation design. Details must be provided of all significant excavation and blasting.

28.2.38 Demonstrate compliance with Section 15.4.3. A map shall be provided showing all transmission lines and rights-of-way that will need to be built or upgraded to accommodate the WTG. Applicant shall submit copies of signed letters of intent to grant easements, long-term leases or other property rights from involved landowners and any governmental unit responsible for access, approval or construction of electric transmission and distribution lines, whether part of the WTG or part of the local electrical distribution grid. The Applicant shall submit an affidavit stating that no property will need to be taken by eminent domain to facilitate transmission lines necessary to support the project.

28.2.39 A geological report from a registered geotechnical engineer demonstrating that the soils can support the Wind Turbines and the underlying ground is geologically stable. The report shall include a slope stability analysis and any underlying fault zones.

28.2.40 A written summary of all routine operation and maintenance procedures for the WTG.

28.2.41 Demonstrate compliance with Section 15.6 . Provide an estimate of required new equipment and training to be provided.

28.2.42 Document all potential hazardous wastes that will be used on the WTG, including but not limited to any chemicals used to clean the Wind Turbine blades, and how these wastes will be transported, handled, stored, cleaned up if spilled, and disposed of during any phase of the project's life.

28.2.43 A communication/electromagnetic interference study prepared by a registered professional engineer showing that the proposed WTG will comply with Section 15.7 . The Owner/operator will sign an affidavit stating that the Owner/operator shall be responsible for the full cost remediation to remain in compliance with this Section.

28.2.44 Demonstrate compliance with Section 15.8 . Before and after photographs or videos of the roadways, in a format approved by the Permitting Authority, shall be submitted as part of the documentation process.

28.2.45 A road and property use and risk assessment plan in compliance with Section 15.9 .

28.2.46 An affidavit agreeing to comply with all provisions in Section 15.10 .

28.2.47 An affidavit agreeing to comply with all provisions in Section 21.0 .

28.2.48 A decommissioning plan in compliance with Section 22.0 .

28.2.49 Copies of executed contracts as per Section 23.0 .

28.2.50 An Tax Valuation Agreement must be submitted, if required under Section 24.1 .

28.2.51 If the WTG crosses multiple municipal jurisdictions the Applicant shall demonstrate compliance with Section 25.4 .

28.2.52 Copies of all written agreements and disclosure of all verbal promises, for contracts, subcontracts, employment, consulting fees, gifts or other remuneration in excess of $10 (cash or in-kind) to residents or businesses in Montville, either previously made or contingent on permitting of this project.

28.2.53 An Affidavit agreeing to comply with all provisions of Section 26.5 .

28.2.54 Applicant shall deliver a letter by certified mail to the owner of any property that the Applicant proposes to be restricted by the permit. The letter will state that the Applicant has filed an application, list future development that will be restricted, and to what extent it will be restricted, on abutting properties by virtue of the permit being granted. Examples of restrictions include, but are not limited to, building Occupied Buildings within the setback area without a Mitigation Waiver, building structures (i.e. Wind Turbines or cell towers that the WTG would interfere with), zones in which future telecommunication installations can expect interference from the WTG. Applicant must provide fair compensation to any non-participating landowners within the setback areas for restricting future development of their property.

28.2.55 Proof that the Applicant has notified the following agencies via certified mail and received any necessary permits or permissions for the project:

28.2.56 Federal Aviation Administration.

28.2.57 U.S. Department of Defense facilities located within 50 miles from the proposed WTG.

28.2.58 Other relevant studies, reports, certifications and approvals as may be reasonably requested by the Permitting Authority to ensure compliance with this Ordinance.

28.2.59 Signed affidavit from the Owner/operator that Applicant has read the Town of Montville Wind Turbine Ordinance and agrees to abide by its provisions, as may be amended from time to time.

FINDINGS AND RATIONALE
THE MONTVILLE WIND TURBINE GENERATOR ORDINANCE

Guiding principle: "A subset of society should not be forced to bear the cost of a benefit for the larger society". Via Kamperman and James, from George S. Hawkins, Esq., "One Page Takings Summary: U.S. Constitution and Local Land Use", Stony Brook-Millstone Watershed Association; "...nor shall private property be taken for public use, without just compensation." Fifth Amendment, US Constitution.

As part of its mandate to develop a WTG ordinance, the Montville Wind Turbine Sub-Committee reviewed upwards of 100 documents. These documents included professional papers, white papers, including peer reviewed scientific and medical studies of the effects of WTGs on nearby populations. The available evidence is abundant and credible. A partial listing of these reference materials can be found in Part III – Bibliography of this Appendix.

There is a perceived lack of concern at the state level for the well-being of residents in rural communities. The following is from Kamperman and James:

> When Wisconsin's Town of Union wind turbine committee made an open records request to find out the scientific basis for the sound levels and setbacks in the state's draft model ordinance, it found that no scientific or medical data was used at all. Review of the meeting minutes provided under the request showed that **the limits had been set by Task Force members representing the wind industry.** This may explain why state level committees or task forces have drafted ordinances with upper limits of 50 dBA or higher instead of the much lower limits applied to similar projects in other countries. There is, in fact, no independent scientific or medical support for claims that locating 400 foot tall wind turbines as close as 1000 feet (or less) to non-participating properties will not create noise disturbances or other risks. But, there is considerable independent research supporting that this will result in public health risks and other negative impacts on people and property.

Part I – Setbacks

1. Negative health impacts have been observed wherever large turbines have been placed too close to where people live. In numerous instances, these impacts are severe enough that residents have had to move out of their homes some of which they have occupied continuously for more than 30 years. These symptoms have been studied, analyzed, catalogued and documented by professional physicians and scientists, and are not limited to any one region of the world. They are classified under 3 separate clusters of symptoms; Wind Turbine Syndrome, Vibro-Accoustic Disease, and to a lesser extent in humans but widespread among livestock, Electromagnetic Hypersensitivity. The symptoms manifested include: sleeplessness and accompanying exhaustion and irritability, headaches, tinnitus, ear pressure, dizziness, blurred vision, vertigo, nausea, racing heartbeat, tachycardia, difficulties with concentration and memory.

2. We include, as Exhibit A of this Appendix, a letter by Phil Bloomstein, published in the July 16, 2009 issue of *The Republican Journal.* Phil Bloomstein a 34 year resident of Freedom, ME, documents how his and his family's life, was affected after the WTG went online late in 2008.

His story is typical of families living in quiet rural communities where WTGs have been built too close to homes and without due regard for the quietness of the rural setting.

3. Within the state of Maine, the families living 3500 feet or less of the industrial wind facility in Mars Hill have reported experiencing severe negative health effects, loss of quality of life, and loss of property values. All the families living within that distance, participating in a medical survey have expressed the desire to move away, were they able to salvage the investment they have made in their homes. At the time of this writing, there are no residences in Mars Hill between distances of 3500 feet and 1.25 miles from the industrial wind facility.

4. In Vinalhaven, the industrial wind plant Fox Island Wind, inaugurated on November 17, 2009 – initially welcomed with near unanimous support – began losing that support as families up to 1.5 miles from the project experienced disturbing noise levels and vibrations – all as described in previous studies and literature and in industrial wind plant installations in Mars Hill and Freedom. Prior to construction, residents had been assured that any noise generated would be no louder than a "quiet conversation". Further, a resident who raises ducks reported they went off their feed when the turbines started operating.

5. The Maine Medical Association on Sept. 12, 2009 and the Maine Osteopathic Association on Sept. 25, 2009 adopted nearly identical resolutions calling for modification of existing industrial wind turbine siting procedures and commited to work with regulatory bodies towards developing up-to-date evidence-based regulations that reflect and incorporate findings of scientific studies on their health effects on nearby populations.

6. For information regarding effects on humans at distances beyond the 3500 foot setback from wind turbines we look to the experience in other locations both at home and abroad, including Europe, whose experience with industrial wind turbines is counted in decades. Researchers at these various locations have made the setback recommendations below. This is by no means a comprehensive listing, but it is representative of the most repeated recommendations. The trend clearly shows a lengthening of the setback distances in order to protect health and well being.

   a. Dr. Robyn Phipps Ph.D., New Zealand – A 2007 survey of 614 respondent households in New Zealand with topography very similar to Maine's (long, parallel mountain valleys and rocky substrata), found that "wind farm noise has a significant effect on people that may well extend more than 5 kilometers (3.1 mi.) from the site of the turbines"
   b. Marjolaine Villey-Migraine, Ph.D., France – A 2004 paper concludes that no industrial wind turbines must be placed any closer than 5 kilometers (3.1 mi.) from where people live
   c. Scotland requires setbacks of at least 2 kilometers (1.24 miles) from cities, towns and villages
   d. In Feb 2007 United Kingdom's Dr. Amanda Parry conducted a survey resulting in setback recommendations of no less than 1.5 miles
   e. The Champaign, IL planning commission recommends a minimum 2.5 mile setback from municipal boundaries.

f. Dr. Nina Pierpoint, MD. Ph.D. recommends minimum setbacks of at least 2 kilometers (1.24 mi..) in flat terrain and 2.2 miles in mountainous terrain.

g. A nationwide petition in the USA is gathering signatures for minimum setbacks of 2 kilometers (1.24 mi..) with greater distances of 2 - 3 miles for rolling hills and quiet rural areas.

h. Robert Rand, Full Member INCE, Brunswick, Maine in his April 29 2009 email to the Natural Resources Council of Maine, recommends setbacks of 2 to 3 miles or more.

i. In the Report of the Governor's Task Force on Wind Power Development (Maine) dated Feb 14, 2008 recommended "... removing from consideration, 100 percent of the land within two miles of the Appalachian Trail..." even though there are no year-round residents on the trail.

j. Pharmacist Carmen Krogh of Ontario, Canada cites research calling for setbacks of 1.5 to 3.5 kilometers (.93 to 2.17 mi)

k. Angus King, former Governor of Maine, and partner of Independence Wind at his March 3, 2009 presentation at the Hutchinson Center, Belfast, ME said setbacks should be "about a mile".

7. We can also confirm that over time countries have lengthened their setback requirements after documenting the harmful effects of too-short industrial wind turbine and industrial wind turbine plant setbacks.

a. United Kingdom: original setbacks in 1991 were based on a multiple of rotor diameter resulting in setbacks of 120 to 170 meters. In 2006, those recommendations changed to no less than one mile.

b. Scotland: original setbacks were the same as the 1991 setbacks in the UK. In 2007, the Scottish Planning Policy SPP6 - PAN 45 recommended with the support of the Scottish Ministers a separation distance of 2 kilometers (1.24 mi..) "...between turbines and the edge of cities, towns and villages..."

c. France: although at first it placed no limits for setbacks other than sound limitations, in 2006 the Academy of Medicine recommended a setback of 1.5 kilometers (.93 mi) until epidemiological studies could be carried out to determine health effects.

8. It has also been documented that the distance at which human health is negatively impacted by these industrial facilities is influenced by the terrain of the location, whether flat or mountainous, whether loamy or rocky substrata – in the case of Maine, the abundance of ledge which transmits noise and vibration easily and further. The number of turbines also adds to the variables, more turbines means louder noise, traveling further. Higher name plate production turbines result in louder noise.

9. It has also been documented that industrial wind turbine facilities have negative impacts on animals, both domestic livestock and wildlife, including land animals as well as birds, bats, raptors including numerous endangered species.

Conclusion:

The best protection against the negative effects of WTGs on the health, peace of mind, well being

and real estate values is proper setbacks. The research literature repeatedly supports longer setbacks as does recorded long-term experience of nearby residents.

Part II – Sound Limitations

1. Improper and inadequate sound measurements have consistently favored the needs of the industry over the needs of the residential, quiet rural communities where they are sited. This has resulted in turbines placed too close to where people live, with real, negative impacts on people, their health, well-being, peace of mind, financial status. In far too many cases, these adverse effects have been severe, and borne not by the greater community, but by those individual families who, through no fault of their own, find themselves in an unliveable situation caused by improperly sited WTGs. The scientific, medical literature and the news outlets, including the Internet, document these at great length and detail, in print and in video, in the USA and abroad.

2. Unlike other urban or suburban sounds, or loud industrial noise, or traffic noise, those living near these WTGs report being unable to get used to the noise. Rather, reports describe that affected populations become increasingly sensitized to it. Employees in loud factories, or people exposed to traffic noises, or other noises can usually get away from them at home. Because WTGs generated noise occurs at home, 24 hours a day, 7 days a week, individuals cannot escape it. The only cure, is proper sound measurements, resulting in protective setback distances.

3. The noise generated by the WTGs is turbulent broadband noise often described as a jet engine perpetually revving for take-off as the blades move through the air, and a sonically unique and repetitive "wooshing" "thumping", "clapping", pulsing noise as the blades pass in front of the turbine mast. This noise is more pronounced at nighttime when the air at ground level is still, but the winds high up at the hub of the turbine are forceful enough to turn the turbine at capacity. Further, the pulsating noise generated by two or more turbines can combine to create louder and more complex noise that carries for longer distances.

4. The most susceptible populations to harmful effects of WTGs noise are young children, individuals with long-term medical conditions, and the elderly.

5. Further, even though many of these WTGs are placed in rural/wilderness areas, such as the Town of Montville, which are very quiet communities, government agencies charged with the protection of the citizenry, consistently espouse noise limitations more appropriate to urban residential or urban mixed areas whose background noise levels are much higher than urban/wilderness areas such as the Town of Montville. The disruption level of these misguided and permissive noise limitations are the cause of much of the sleeplessness and other real health issues suffered by residents near these WTGs.

6. The World Health Organization (WHO) in its reports "Guidelines for Community Noise" and "Report of the Third Meeting on Night Noise Guidelines" recommends that evening and nighttime sound levels should be less than 30 dBA to protect children's health. Below are some references made in its "Community Noise" (Berglund et al, 2000):

   a. "It should be noted that low frequency noise...can disturb rest and sleep even at low sound

levels

b. For noise with a large proportion of low frequency sounds a still lower guideline (than 30 dBA) is recommended

c. When prominent low-frequency components are present, noise measures based on A-weighing are inappropriate.

d. Since A-weighing underestimates the sound pressure level of noise with low frequency components, a better assessment of health effects would be to use C-weighing.

e. It should be noted that a large proportion of low frequency components in a noise may increase considerably the adverse effects on health"

f. The WHO also states: "The evidence on low frequency noise is sufficiently strong to warrant immediate concern"

g. For sounds that contain a strong low frequency component, which are typical of the sound emitted by wind turbines, the WHO says that limits may need to be even lower than 30 dBA to avoid harmful health impacts. The WHO further recommends that the criteria be based on dBC frequency weighing.

7. The low-frequency vibrations, known as dBC, is not usually measured by wind developers, and yet, this is the component that more than the other is the cause of severe health impacts. A reading of the dBC noise level, in addition to the dBA readings, is far more predictive of loudness.

8. Although the siting of WTGs in the United States consistently favors the needs of the wind developers over the needs for quietude of families living near the WTGs, history shows that they are capable of meeting far stricter sound limitations which have evolved over the 20 plus years of experience in other continents with these industrial facilities. Below is a listing of the sound limitations in place overseas, as compared to those used in the United States:

- Australia: higher of 35 dBA or L90 + 5 dBA
- Denmark: 40 dBA
- France: L90 + 3 dBA (night) and L90 + 5 dBA (day)
- Germany: 40 dBA
- Holland: 40 dBA
- United Kingdom: 40 dBA (day) and 43 dBA or L90+5 dBA (night)

In the USA:

- Illinois: Octave frequency band limits of about 50 dBA (day) and about 46 dBA (night)
- Wisconsin: 50 dBA
- Michigan: 55 dBA

9. Further, the International Standards Organization (ISO), an independent organization in ISO 1996-1971 recommends a maximum noise limit of 25 dBA for night time in rural communities. (See table below).

ISO 1996-1971
Recommendations for Community Noise Limits (dBA)

	Daytime Limit	Evening Limit 7 pm - 11 pm	Night Limit 11 pm - 7 am
Rural	35 dB	30 dB	25 dB
Suburban	40 dB	35 dB	30 dB
Urban residential	45 dB	40 dB	35 dB
Urban mixed	50 dB	45 dB	40 dB

10. From the State of Maine's Technical Assistance Bulletin #4 – Noise. May 2000:

> Prolonged noise exposure is a serious threat to human health; it can result in high stress levels and, at high sound levels, impaired hearing. Common environmental noise sources can cause or contribute to stress-related illnesses such as cardiac and circulatory diseases. Noise can also negatively impact concentration, communication, and sleep creating annoying and sometimes even hazardous conditions. These factors are important in setting noise standards for the community. [.....] It is also important to protect neighborhoods so that residents can communicate and enjoy their property. Residential areas should also be protected from noise so that residents are able to obtain uninterrupted sleep. Interrupted sleep can result in serious health impacts and also affect personal safety at home and at work. Another consideration for municipal officials is property values. Neighborhoods subject to noise disturbance will generally have lower values.
>
> Nighttime noise is more annoying than daytime noise and may cause more noticeable health impacts through the disruption of sleep. — Pages 2 and 3

11. Finally, the same document (Page2) identifies the Sound Pressure Level (dBA) for a "quiet house interior or rural nighttime" as 20 dBA even lower than the ISO's 25 dBA.

Conclusion:

The Town of Montville is a rural environment, and as such, sound limitations should reflect the quiet nature of its surroundings. Many of its residents have come to Montville from noisier urban environments attracted by its rural character, peaceful, quiet surroundings and community values. Given the abundant documentation readily available from independent professionals and researchers, it is unconscionable that any governing entity, at the local, state or higher level, charged with protecting the health, safety and well being of its citizens, would inflict avoidable hardship on them through either ignorance, carelessness, indolence or undue influences by powerful interested parties with conflicts of interest and their lobbyists.

EXHIBIT A – Letter from Phil Bloomstein

As it appeared on page A9 of the July 16, 2009 issue of the **Republican Journal.**

Living Next To a Wind Turbine

We have the distinct "privilege" of living 1,000 feet from tower T3 of the Beaver Ridge Wind Project. Freedom residents on both sides of Beaver Ridge live almost as close but none as close as my family and me. We have tower T3 literally staring us right in the face winter and summer. In the summer the tower and blades almost disappear when you are by the house, but the tower and blades still hang above the house as you walk in our lower gardens. And, you can view the wind turbine from many other spots on our land.

As disturbing as the visual presence of a nearly 400-foot wind turbine is, and its occasional hours of turbine-blade flicker, all that pales in comparison to the noise the turbines often produce. I would dare say we live in one of the noisiest neighborhoods in Waldo County.

Let's get one thing straight. I'm not claiming my life has been ruined. I'm not looking for sympathy. I'm sure many of you have suffered personal tragedies much worse than having a wind turbine built next to you.

What I am asking for is the truth and some justice.

I want to present you with a credible picture of the turbine's effects on the quality of our family's home life. I also want you to understand that the town of Freedom's planning and permitting of the Beaver Ridge Wind Project was extremely flawed. It was marked by deceptions, poor planning, and small-town politics at its worst. In my opinion, the project has proven that many good folks in the town of Freedom were outwitted by CES now Beaver Ridge Wind. Many community members were so pro green they were susceptible to the developer's deceptive practices and failed to be responsible to us and our neighbors.

My challenge is to convince you that I am telling the truth. And that others, including my neighbors, the folks in Mars Hill and as far away as the Midwest, are also telling the truth about the disturbing noise created by these machines. Living next to a wind turbine is, to say the least, a very unpleasant experience. Good-meaning people write me and say; "We just don't get it". They tell me they have visited the Beaver Ridge turbines several times in different wind conditions, and it just doesn't seem that bad.

I also visited wind turbines. I visited them with the knowledge that one was going to be built very close to my house. I came away thinking living next to one was going to be somewhat annoying but that it probably was going to be OK. I was encouraged by the promises of Beaver Ridge Wind (then called CES). The very same promises that were never kept.

What my neighbors and I have experienced has been much more negative than we had ever imagined.

What is it really like living next to the turbines? There are "good days," but there are way too many bad ones. Although the noise is almost always there, it is not constant in its intensity or type of sound. In minutes it can turn from an almost tolerable drone to a pulsating nightmare so oppressive that any outdoor activity is challenging. The noise also penetrates into the house. On many nights, as soon as you turn off the TV or stereo you immediately hear them. At least four to eight times a month they are very loud. The night noise can be especially disturbing. Some nights there is a loud pulsating noise that lasts right into the

morning, on those days we get discouraged. We think that this can't be good for our health and we might as well give up and sell out.

The wind industry, often in concert with well-meaning government officials and environmental activists, uses all its power to diminish complaints and convince the general public that "wind farms" are quiet and that most folks don't mind living next to them.

When CES (now called Beaver Ridge Wind) came to Freedom, they assured us the turbines would be quiet. During the permitting process, they presented a study showing the noise level at our home would hardly ever be above 45 dBa. When all was said and done, the noise levels exceeded the promised levels (often twice as loud). When I asked Beaver Ridge Wind what they were going to do about the noise, they looked me right in the eyes and said they never really exactly promised us that.

The developer's clever promises and use of wind industry propaganda made it easy for the townspeople to support the project even though the setbacks in Freedom were among the weakest in the country. The setbacks were even below manufacturer's suggested distances at property lines. It is my intent to show how the townspeople were misled. But for now, understand the developers presented a wind study they commissioned saying the sound levels at my house would rarely exceed 45 decibels. The truth is, sound levels are regularly over the promised level, and on many windy nights, can be twice as loud.

Victims of poorly planned wind turbine developments from Mars Hill, Maine to the Midwest are not believed. Fine citizens with the highest of motives dismiss these folks as whiners or less than credible. I have heard people say, you'll get used to it. You don't. There are many contributing factors to this. A few are that the noise changes with wind speed, the types of noise produced, wind direction and atmospheric pressure. The developers should have considered the fact that our home is on a side of a hill downwind from the prevailing wind. Documents can be found and downloaded on the Beaver Ridge Wind web site that explain, "in some hilly terrain where residents are located in sheltered dips or hollows downwind from the turbines, turbine sounds may carry further and be more audible."

Why was this not considered in our case?

There is the classic wind-energy comparison of a turbine's noise level to your refrigerator. First of all, at my house, the turbines are much louder and more annoying than my refrigerator. But let's assume the turbines do sound like my refrigerator. I ask you to imagine your fridge is always running and that also, you have one on your deck, in your garden, by the compost, next to the garage, three or four in your backyard, several well placed down your driveway, one at each door, one next to the grandkids's wing set, and don't forget the ones hanging outside your bedroom window.

Get the idea? I think you might find even your fridge noise a little annoying.

Then there are the possible negative health effects. Remember, the tower is almost 400-feet tall at the tip of the blades and we are 1,060 feet from the middle of the base. So at times, the tips of the blades are about 930 feet away. After a night of pulsating turbine noise that continues right into the morning, (no matter what studies prove) I feel as if this can't be good for my family. I can only imagine what it would be like if one were predisposed to headaches, depression or a sleep disorder.
Perhaps you are thinking, well someone has to suffer for the good of humanity, it might as well be the Bloomsteins. Maybe you are right, but does that give the developers and the wind-energy industry the right

to lie about the impact? Beaver Ridge Wind and other projects in Maine are not municipal projects, these wind turbines are for profit. I might be less angry if they had said, OK your life is going to change and not in a good way. There will be a negative impact, you will be sacrificing the quiet rural life you once had for the good of the environment.

But no, they don't do that. They lie and tell your town you'll barely hear them and it will be like being in a quiet room or a library. They could be honest and tell you that it will be noisy at your home. Beaver Ridge Wind could have mentioned the fact that other people have chosen to sell out rather than live close to a wind turbine. Instead they show videos and PowerPoint slideshows with misleading and deceptive statements.

For us the damage is done. The turbines are up, and most likely, they are not coming down for a long time.

So the question for my family and me is: What do we do? We have lived and worked on our property for the past 34 years. Do we leave the house we built, the gardens we've planted, the place my children and their children love? Or, do we stay and learn to deal with the noise, worry about unknown health hazards, keep windows closed at night in the summer, sleep with earplugs on loud nights — whatever it takes to stay sane?

We know our home will never be the same. If we do leave, what about the value of our house? The industry will tell you house values go up or stay the same, but there are many studies which show quite the opposite.

No matter what we do our family now must fight for our rights. No one comes up to us and offers a solution. Oh, Beaver Ridge Wind might tell you they are working with us and in fact they are: but not until we approached them with our concerns. Beaver Ridge Wind never did a sound study after the turbines went into operation. Their basic approach is to say nothing, do nothing and only respond when the Bloomsteins or other neighbors complain, but not until then.

It has become evident to us that trying to be reasonable, open-minded and pro green has been rewarded by deceptive practices, small-town politics at its worst and a radically negative change to our lifestyle.

We struggle to figure out what to do. We want the truth to be known. We want to be believed. We seek justice in the form of adequate compensation. We also hope in some small way we can prevent others from suffering a similar fate.

Please don't be so zealous in your support of alternative energy that you allow an industry, even a green one, to avoid any reasonable regulations. They need to be held accountable. No company out for profit should be given a free pass.

My family and other families in similar situations should not be forced to seek compensation in the courts or make deals under conditions of confidentiality.

Maine needs to grow up when it comes to wind development. There is no need to repeat the mistakes that were made in Freedom and Mars Hill.

Phil Bloomstein – Freedom, Maine

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2. From the Meyesdale, PA windplant, nearby residents speak about their lives. Affected residents live as far as 1 plus miles as the crow flies to the windplant.
   Part One: http://www.youtube.com/watch?v=SNxvkrgoPLo
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3. Dairy Farmer Scott Smrynka in Lincoln township, Wisconsin tells how the nearby windfarm has affected his milk production and the health of his herds:
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H.677

Introduced by Representatives Potter of Clarendon, Browning of Arlington, Courcelle of Rutland City, French of Shrewsbury, Howrigan of Fairfield, Kilmartin of Newport City, Lewis of Derby, Malcolm of Pawlet, Marcotte of Coventry, McNeil of Rutland Town, Peaslee of Guildhall, Rodgers of Glover, Smith of Mendon and Wheeler of Derby

Referred to Committee on

Date:

Subject: Energy; permitting; public service board; Act 250; local land use bylaws; wind energy plant siting

Statement of purpose: This bill proposes to require standard setbacks, noise limits, and other requirements for wind energy plants that exceed 0.49 megawatts, to allow nearby property owners to waive these requirements, and to require that the Act 250 district commissions and appropriate municipal panels be the permit review authorities for wind energy plants not owned by Vermont electric utilities.

An act relating to wind energy plants

It is hereby enacted by the General Assembly of the State of Vermont:

* * * Standard Requirements * * *

Sec. 1. 30 V.S.A. § 8008 is added to read:

§ 8008. WIND TOWER SITING REQUIREMENTS; ENFORCEMENT

(a) Applicability. This section applies to a plant that generates electricity using wind energy as a fuel source and has a plant capacity in excess of 0.49 megawatts (MW). The requirements of this section shall apply to any proceeding for approval of such a plant under chapter 151 of Title 10, chapter 117 of Title 24, or section 248 of this title, in addition to all other applicable criteria.

(b) Definitions. As used in this section:

(1) "dBA" means a decibel measure of overall sound level under American National Standards Institute (ANSI) S1.4 that is designed to reflect the response of the human ear. Lower frequency sounds are given less weight than those in the mid-range of human perception. The resulting measure is said to be A-weighted, and the units are dBA.

(2) "dBC" means a decibel measure of overall sound level under ANSI S1.4 that is similar to dBA but does not de-emphasize low frequencies to the extent that dBA does. The resulting measure is said to be C-weighted, and the units are dBC.

(3) "Height" means the total distance measured from the grade of a property as it exists prior to the construction of a wind turbine or related facility at the base to the highest point of a wind turbine or related facility. In the case of a wind turbine, this includes the length of the blade at its highest possible point.

(4) "Kamperman-James Guidelines" means the proposed wind turbine siting sound limits contained on page 10 of George W. Kamperman, INCE. Bd. Cert. Emeritus, and Richard R. James, INCE, "Simple guidelines for siting wind turbines to prevent health risks" (July 27, 2008) (Rev 1.0).

(5) "L_{90}" means background sound, defined over a continuous ten-minute period to be the average sound level during the quietest one continuous minute of the ten minutes. The term refers to sound that is normally present at least 90 percent of the time, and excludes any sound generated by a plant subject to this section. L_{90} may be measured relative to A-weighting or C-weighting, in which case it is denoted L_{A90} or L_{C90}.

(6) "L_{eq}" means frequency-weighted equivalent sound level. The term is defined to be the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound. L_{eq} may be measured relative to A-weighting or C-weighting, in which case it is denoted L_{Aeq} or L_{Ceq}.

(7) "Occupied building" means any structure that is or is likely to be occupied by persons or animals and includes dwellings, commercial buildings, other business structures, hospitals, places of worship, schools, stables, and barns. This term shall include a structure on which construction has commenced at the time a complete application for a plant subject to this section is filed, if the structure otherwise meets the provisions of this subdivision (8).

(8) "Rotor" means an element of a wind turbine that acts as a multibladed airfoil assembly extracting, through rotation, kinetic energy directly from the wind.

(9) "Shadow flicker" means alternating changes in light intensity caused by the moving blade of a wind turbine casting shadows on the ground and stationary objects, such as a window at a dwelling.

(10) "Wind turbine" means a mechanical device that captures the energy of the wind and converts it into electricity. The primary components of a wind turbine are the rotor or other component that extracts energy from the wind, the electrical generator, and the tower. This term does not include wiring to connect the wind turbine to the grid.

(c) Setbacks. At a minimum, a wind turbine shall be set back horizontally:

(1) One and one-quarter miles from an occupied building, if the elevation change between the wind turbine and the occupied building is equal to or less than 500 feet.

(2) Two miles from an occupied building, if the elevation change between the wind turbine and the occupied building exceeds 500 feet.

(3) One-half mile from the closest boundary of the parcel on which the wind turbine will be located.

(4) One-third of a mile from any public highway or right-of-way and from any above-ground utility line or facility. However, this subdivision shall not apply to an electric line that directly connects a wind turbine to a substation or other utility facility.

(d) Sound limits. At a minimum, a plant subject to this section shall comply with each of the following:

(1) Audible sound limit. No plant shall be located so as to generate postconstruction sound levels that exceed preconstruction background sound levels by more then 5 dBA.

(2) Low frequency sound limit. The L_{Ceq} and L_{C90} sound levels from a wind turbine at the receiving property shall not exceed the lower of either:

(A) An L_{Ceq}-L_{A90} greater than 20 dB outside any occupied building; or

(B) A sound level of 50 dBC (L_{C90}) from a wind turbine, without other ambient sounds, for a parcel the closest boundary of which is located one mile or more from a state highway or Class 1 or 2 town highway, or of 55 dBC (L_{C90}) for a parcel with a boundary closer than one mile to such a highway.

(3) General sound limit. Sound from a plant subject to this section shall not exceed 35 dBA within 30 meters of any occupied building.

(4) Demonstrating compliance with sound limits. Use of the Kamperman-James Guidelines shall be required in demonstrating compliance with the sound limits of this subsection.

(e) Other requirements.

(1) A plant subject to this section shall comply with the interconnection requirements of the Independent System Operator of New England, Inc. or the interconnection rules of the board, as applicable.

(2) The applicant shall perform and submit with the application an analysis of shadow flicker effect for each wind turbine and proposed measures to mitigate or eliminate such effect.

(3) Roads and power lines associated with the plant shall be the minimum feasible length as determined by the permitting authority. Rights-of-way for such roads and lines shall be the minimum feasible width as determined by the permitting authority.

(4) A wind turbine shall have no lighting except those lights necessary to meet the requirements of the Federal Aviation Administration.

(5) The application shall include the depreciation schedule that the applicant will use for each wind turbine and other component of a plant.

(6) The application shall include a plan for replacement or removal of each wind turbine in the event of the turbine's failure, including a failure due to natural disaster.

(7) The application shall include a decommissioning and site restoration plan containing the following information and meeting the following requirements:

(A) The plan shall provide for the removal from the project parcels and lawful disposal or disposition of all wind turbines and other structures, hazardous materials, electrical facilities, and all foundations. The plan shall provide for the removal or appropriate supervision and control of all access roads. The plan shall provide for the restoration of the project parcels to a condition as close as reasonably possible to that which existed before construction of the plant.

(B) The plan shall provide for the decommissioning of the site on the expiration or revocation of the permit or abandonment of the plant. The plant shall be deemed abandoned if its operation has ceased for 12 consecutive months.

(C) The plan shall include provision for the posting of a third party bond to assure completion of decommissioning and site restoration, in the amount of the full estimated costs of decommissioning and site restoration adjusted for inflation and in accordance with the plan as approved by the permitting authority.

(D) The plan shall include written authorization from the applicant and all owners of all project parcels for each municipality in which the plant is located, the permitting authority, or a designee of such municipality or authority to access the project parcels and implement the decommissioning and site restoration plan, in the event that the permittee fails to implement the plan. The written authorization shall be in a form approved by the permitting authority and recorded in the land records of each municipality in which the plant is located.

(f) Waiver. A property owner may waive one or more of the requirements of subsections (c) and (d) of this section by signing a written waiver of rights. At a minimum, any such waiver shall:

(1) Itemize for the property owner each specific requirement for which waiver is sought.

(2) Include full disclosure of the potential impact on the property owner of waiving each such requirement.

(3) Describe the plant that will benefit from the waiver and state that, for such plant, consent is granted to waive each itemized requirement.

(4) Be recorded prior to operation of the plant in the land records of the municipality in which the burdened property is located. For the purpose of this subsection, "burdened property" is the real property of the person signing the written waiver. The recorded documents shall describe the properties benefited and burdened and advise all subsequent purchasers of the burdened property that the waiver shall run with the land.

(g) Enforcement. With respect to a plant described in subsection (a) of this section, any appropriate action may be instituted in the superior court of the county in which the plant is located to prevent, restrain, correct, or abate any violation of this section, of the statutes identified in subsection (a) of this section, or of the conditions of any permit or approval issued under those statutes. The following may institute such an action: a municipality in which a plant subject to this section is located; any person aggrieved by a plant's violation of this section, of the statutes identified in subsection (a) of this section, or of a permit issued under one of those statutes; and the attorney general on his or her own motion or at the request of the department of public service, of the land use panel of the natural resources board, or of a municipality in which a plant subject to this section is located. This authority shall be in addition to any other enforcement statute applicable to the plant.

* * * Governance * * *

Sec. 2. 30 V.S.A. § 248 is amended to read:

§ 248. NEW GAS AND ELECTRIC PURCHASES, INVESTMENTS, AND FACILITIES; CERTIFICATE OF PUBLIC GOOD

(a)(1) No company, as defined in section 201 of this title, may:

(A) in any way purchase electric capacity or energy from outside the state, for a period exceeding five years, that represents more than one percent of its historic peak demand; or

(B) invest in an electric generation or transmission facility located outside this state unless the public service board first finds that the same will promote the general good of the state and issues a certificate to that effect.

(2) ~~Except for the replacement of existing facilities with equivalent facilities in the usual course of business, and except for electric generation facilities that are operated solely for on-site electricity consumption by the owner of these facilities:~~

(A) ~~no~~ No company, as defined in section 201 of this title, and no person, as defined in subdivision 6001(14) of Title 10, may begin site preparation for or construction of an electric generation facility or electric transmission facility within the state which is designed for immediate or eventual operation at any voltage; and

(B) ~~no~~ No such company may exercise the right of eminent domain in connection with site preparation for or construction of any such transmission or generation facility, unless the public service board first finds that the same will promote the general good of the state and issues a certificate to that effect.

(C) This subdivision (2) shall not apply to each of the following:

(i) The replacement of an existing facility with an equivalent facility in the usual course of business.

(ii) An electric generation facility that is operated solely for on-site electricity consumption by the owner of the facility.

(iii) An electric generation plant that uses wind as a fuel source, exceeds 0.49 megawatts (MW) in plant capacity, and does not have majority ownership or control by a Vermont retail electricity provider. For the purpose of this subdivision (iii):

(I) "Plant," "plant capacity," and "retail electricity provider" have the same meaning as under section 8002 of this title.

(II) If more than one Vermont retail electricity provider has ownership or control of a facility, all such providers shall be treated together as one provider for the purpose of determining majority ownership or control.

* * *

Sec. 3. 10 V.S.A. § 6001 is amended to read:

§ 6001. DEFINITIONS

When used in this chapter:

* * *

(3)(A) "Development" means:

(i) The construction of improvements on a tract or tracts of land, owned or controlled by a person, involving more than 10 acres of land within a radius of five miles of any point on any involved land, for commercial or industrial purposes in a municipality that has adopted permanent zoning and subdivision bylaws.

(ii) The construction of improvements for commercial or industrial purposes on more than one acre of land within a municipality that has not adopted permanent zoning and subdivision bylaws.

(iii) The construction of improvements for commercial or industrial purposes on a tract or tracts of land, owned or controlled by a person, involving more than one acre of land within a municipality that has adopted permanent zoning and subdivision bylaws, if the municipality in which the proposed project is located has elected by ordinance, adopted under chapter 59 of Title 24, to have this jurisdiction apply.

(iv) The construction of housing projects such as cooperatives, condominiums, or dwellings, or construction or maintenance of mobile homes

or trailer parks, with 10 or more units, constructed or maintained on a tract or tracts of land, owned or controlled by a person, within a radius of five miles of any point on any involved land, and within any continuous period of five years.

(v) The construction of improvements on a tract of land involving more than 10 acres that is to be used for municipal, county or state purposes. In computing the amount of land involved, land shall be included that is incident to the use such as lawns, parking areas, roadways, leaching fields, and accessory buildings.

(vi) The construction of improvements for commercial, industrial, or residential use above the elevation of 2,500 feet.

(vii) Exploration for fissionable source materials beyond the reconnaissance phase or the extraction or processing of fissionable source material.

(viii) The drilling of an oil and gas well.

(ix) The construction, at any elevation, of improvements for an electric generation plant that uses wind as a fuel source, exceeds 0.49 megawatts (MW) in plant capacity, and does not have majority ownership or control by a Vermont retail electricity provider. For the purpose of this subdivision (ix):

(I) "Plant," "plant capacity," and "retail electricity provider" have the same meaning as under section 8002 of Title 30.

(II) If more than one Vermont retail electricity provider has ownership or control of a facility, all such providers shall be treated together as one provider for the purpose of determining majority ownership or control.

* * *

Sec. 4. 24 V.S.A. § 4414 is amended to read:

§ 4414. ZONING; PERMISSIBLE TYPES OF REGULATIONS

Any of the following types of regulations may be adopted by a municipality in its bylaws in conformance with the plan and for the purposes established in section 4302 of this title.

* * *

(3) Conditional uses.

(A) In any district, certain uses may be allowed only by approval of the appropriate municipal panel, if general and specific standards to which each allowed use must conform are prescribed in the appropriate bylaws and if the appropriate municipal panel, under the procedures in subchapter 10 of this chapter, determines that the proposed use will conform to those standards. These general standards shall require that the proposed conditional use shall not result in an undue adverse effect on any of the following:

(i) The capacity of existing or planned community facilities.

(ii) The character of the area affected, as defined by the purpose or purposes of the zoning district within which the project is located, and specifically stated policies and standards of the municipal plan.

(iii) Traffic on roads and highways in the vicinity.

(iv) Bylaws and ordinances then in effect.

(v) Utilization of renewable energy resources.

(B) The general standards set forth in subdivision (3)(A) of this section may be supplemented by more specific criteria, including requirements with respect to any of the following:

(i) Minimum lot size.

(ii) Distance from adjacent or nearby uses.

(iii) Performance standards, as under subdivision (5) of this section.

(iv) Criteria adopted relating to site plan review pursuant to section 4416 of this title.

(v) Any other standards and factors that the bylaws may include.

(C) One or more of the review criteria found in 10 V.S.A. § 6086 may be adopted as standards for use in conditional use review.

* * *

(6) Access to renewable energy resources. Any municipality may adopt zoning and subdivision bylaws to encourage energy conservation and to

protect and provide access to, among others, the collection or conversion of direct sunlight, wind, running water, organically derived fuels, including wood and agricultural sources, waste heat, and geothermal sources, including those recommendations contained in the adopted municipal plan, regional plan, or both. The bylaw shall establish a standard of review in conformance with the municipal plan provisions required pursuant to subdivision 4382(a)(9) of this title.

* * *

(14) Green development incentives. A municipality may encourage the use of low-embodied energy in construction materials, planned neighborhood developments that allow for reduced use of fuel for transportation, and increased use of renewable technology by providing for regulatory incentives, including increased densities and expedited review.

(15) Merchant wind generation. A municipality may adopt bylaws to regulate, as a conditional use under subdivision (3) of this section, an electric generation facility that uses wind as a fuel source, exceeds 0.49 megawatts (MW) in plant capacity, and does not have majority ownership or control by a Vermont retail electricity provider.

(A) For the purpose of this subdivision (15):

(i) "Plant," "plant capacity" and "retail electricity provider" have the same meaning as under 30 V.S.A. § 8002.

(ii) If more than one Vermont retail electricity provider has ownership or control of a facility, all such providers shall be treated together as one provider for the purpose of determining majority ownership or control.

(B) In addition to the criteria of subdivision (3)(A) of this section, such bylaws shall include as criteria compliance with the requirements of 30 V.S.A. § 8008 and may include additional relevant criteria that are more stringent than state statute.

* * * Funding Municipal Review of Wind Plants * * *

Sec. 5. 24 V.S.A. § 4440 is amended to read:

§ 4440. ADMINISTRATION; FINANCE

* * *

(d)(1) The legislative body may establish procedures and standards for requiring an applicant to pay for reasonable costs of an independent technical review of the application.

(2) Notwithstanding whether the legislative body has established such standards and procedures, a municipality may allocate to an applicant the municipality's reasonable costs of review or participation or both in a proceeding if:

(A) The application is for a facility described in subdivision 4414(15) of this title.

(B) The application is for approval under chapter 151 of Title 10, 30 V.S.A. § 248, or chapter 117 of this title.

(C) The costs relate to the municipality's review of the application or participation in a proceeding under the provisions identified in subdivision (2) of this subsection or an appeal from such a proceeding.

(3) When a municipality decides to allocate costs under subdivision (2) of this subsection, the municipality shall notify the applicant of the costs to be allocated and their purpose. Upon petition of an applicant to the body conducting the proceeding, that body shall review and determine, after opportunity for hearing, having due regard for the size and complexity of the proposed plant at issue, the necessity and reasonableness of such allocation, which it may amend or revise. From time to time during the progress of the work, the municipality shall render to the applicant detailed statements showing the amount of money expended or contracted for in the work, which statements shall be paid by the applicant to the municipality at such time and in such manner as the municipality may reasonably direct. A municipality may require an applicant to pay an estimated cost in advance of the work being performed, provided that any unused portion of such payment is returned to the applicant within 30 days of final disposition of the proceeding, including any appeals.

* * * Health Department Role * * *

Sec. 6. 18 V.S.A. § 12 is added to read:

§ 12. SOUND LIMITS; WIND PLANTS; PERIODIC REVIEW

Every second December 31, the commissioner of health shall report to the house and senate committees on natural resources and energy on whether the sound limits contained in 30 V.S.A. § 8008(d) are appropriate to protect public health and whether those limits should be amended. The basis of the report shall include developing science and actual, on-the-ground experience with respect to wind plants of the type that are subject to 30 V.S.A. § 8008 and their impacts on persons and animals. The report shall include recommended statutory language for any amended limits and state the reasons for any proposed amendments.

Sec. 7. HEALTH; SOUND LIMIT REPORT; INITIAL DATE

With respect to the report required by Sec. 6 of this act, the commissioner of health shall submit the initial report by December 31, 2010.

Sec. 8. EFFECTIVE DATE

This act shall take effect on passage.

NINA PIERPONT M.D. PH.D.

February 10, 2010

Rep. Tony Klein
Vermont State House of Representatives
115 State Street
Montpelier, VT 05633-5301

Dear Representative Klein,

I am writing to express support for H.677, sponsored by Representative Potter and others, which (among other things) creates siting, setback, and noise requirements for industrial wind turbines in the good State of Vermont.

With increasing interest in building commercial-scale wind turbines in Vermont, it is imperative the Vermont legislature acts to ensure that these projects protect the health and safety of residents in communities where turbines are being proposed. As the saying goes, if you've got your health, you're okay. Conversely, if you don't, you're not okay.

H.677 provides reasonable, clinically and scientifically-based protections against noise, vibration, and shadow flicker from industrial turbines. As a physician who has intensively studied health impacts from turbine noise, vibration, and shadow flicker, I can provide ample documentation from people all over the world who have suffered because of turbines placed too close to where they live, work, and recreate. My research, along with that of others, is building a formidable body of scientific and clinical literature demonstrating the necessity of protections that are written into H.677—protections the wind industry steadfastly refuses to acknowledge.

The symptoms that people report follow a common pattern, or cluster, which I call "Wind Turbine Syndrome." These are the most prominent:

- sleep disturbance
- headache
- ringing or buzzing in the ears (tinnitus)
- ear pressure
- dizziness and vertigo
- nausea
- visual blurring
- racing heartbeat (tachycardia)
- irritability
- problems with concentration and memory
- panic episodes associated with sensations of internal pulsation or quivering, which arise while awake or asleep

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People suffering from these health effects were, in nearly all cases, supportive of these wind energy projects. Let me be clear on this. Moreover, they were assured that as the closest neighbors they would not experience any disturbance or illness. Of the 10 families (38 individuals) included in my "Wind Turbine Syndrome: A Report on a Natural Experiment" (Santa Fe, NM: K-Selected Books, 2009), 9 families have had to leave their homes, and the tenth has sued and is living in misery. Mind you, this is just the families in my report; I have since learned of numerous people, globally, who suffer from Wind Turbine Syndrome and are being forced to leave their homes. My phone and email in-box are loaded with these complaints.

Let me emphasize, people abandon their homes (as in, lock the door and leave) because they find them unlivable. I explain in 300 pages (see above) the likely pathophysiology of their illness, showing in detail that these unfortunates are not fabricating their illness—this is not something "psychosomatic"—but genuinely suffering from genuine, and genuinely serious illness. Whether the precise pathophysiological mechanism I lay out is correct or not, there is no serious dispute among medical doctors that these people suffer from bona fide and serious illness—and that its cause is the wind turbines, and that this constellation of illness disappears when these people remove themselves from the vicinity of the turbines. I repeat, there is no serious clinical dispute about this.

A few have been "lucky" enough to be bought out by the offending wind company which, then, has them sign a gag agreement not to discuss publicly their case. The rest must suffer with the additional insult of official denial and even contempt.

This needs to stop. It can be stopped by adequate setbacks and noise limits as specified in H.677.

I urge the House Natural Resources and Energy Committee to schedule hearings on the bill this year.

I am willing to testify (depending on my schedule, either in person, by teleconference, web camera, or in writing) about the scientific and clinical evidence behind my support of H.677.

Sincerely,

Nina Pierpont

Nina Pierpont, MD, PhD, FAAP
Fellow of the American Academy of Pediatrics

Co-signed by the following (signatures added digitally, with permission):

George Kamperman

George Kamperman, P.E.
President, Kamperman Associates, Inc.
Bd. Cert. Member Institute of Noise Control Engineers
Fellow Member Acoustical Society of America
Member National Council of Acoustical Consultants

F. Owen Black, MD

*F. Owen Black, MD, FACS
Board Certified Otolaryngologist
Senior Scientist
Director of Neurotology Research
Balance & Hearing Center North West
Legacy Health System
Portland, OR

* "Dr. Black is an internationally known neurotologist and human vestibular physiologist. He has received continuous funding from the NIH and NASA for his research for over 20 years. Dr. Black's research focuses on disorders of the human vestibular system and the effects of microgravity on human postural control, with a major emphasis on the role played by otolith function. A component of his work is investigating how visual cues, which the brain receives from the eyes, work with the inner ear to help control balance. His NASA-funded research involves the impact that the zero gravity of space has on astronaut balance control. He regularly travels to the JohnsonSpace Center in Houston and the Kennedy Space Center in Florida to meet with his NASA collaborators, and serves on the medical advisory team for the space shuttle program. These studies are leading to a further understanding of the human vestibular system and its role in spatial orientation, equilibrium, balance, and debilitating disorders such as motion sickness that will lead to new diagnostic and therapeutic methods" (from Dr. Black's resumé).

Joel F. Lehrer, MD

Joel F. Lehrer, M.D. FACS
Board Certified Otolaryngologist and Head and Neck Surgeon
Served on Hearing and Equilibrium Subcommittee of the American Academy of Otolaryngology and Head and Neck Surgery
Clinical Professor of Otolaryngology, Univ of Med & Dentistry of NJ (UMDNJ)
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Stanley M. Shapiro, MD

*Stanley M. Shapiro, MD, FACC
Fellow of the American College of Cardiology
Board Certified Internal Medicine, Cardiovascular Diseases, and Nuclear Cardiology
Champlain Valley Cardiovascular Associates
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*Dr. Shapiro was asked to join this list of signatories because of his expertise in the cardiac aspects of sleep deprivation, one of the most prominent symptoms of Wind Turbine Syndrome.