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PRELIMINARY REVIEW OF ANTRIM WIND ENERGY ORDINANCE AND WIND ENERGY SITING CONSIDERATIONS

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Purpose

The Town of Antrim Ad Hoc Committee requested that I review the proposed Wind Energy Facility Ordinance and make comments and recommendations particularly with regard to the appropriate siting of wind facilities to ensure the reasonable protection of the natural, cultural and scenic resources of Antrim. I had an opportunity to tour the town and to generally observe the character of the town. I was also able to view the Willard Mountain- Tuttle Hill ridgeline, the most likely location for a larger scale wind facility, from a number of vantage points. I provide some thoughts below about how a facility in this location could affect the character of the Town.

Zoning vs. Master Plan

The zoning ordinance including clear guidelines for the review of Wind Energy projects will be an important tool for ensuring the appropriate development of wind energy projects. The Master Plan provides another important tool for evaluating goals and identifying important resources and how they should be protected. The Master Plan notes for example that protecting scenic resources is important to citizens of the town, but it provides no guidance as to particular views or resources that might be important. This information along with discussions of the important qualities of these views and how they might be managed would be helpful for providing guidance in both the zoning regulations and for the SEC in its review.

Local vs. SEC Review

In our meeting last Tuesday (July 19), I responded to a question about local vs. SEC review of wind energy projects. There are advantages and disadvantages to both. As I noted, the SEC will be focused primarily on state resources vs. local. SEC review brings with it considerable expertise available at the state level, though this will be available to you in any case and you should take advantage of the resources. Agencies like the Department of Environmental Services or Fish and Game are likely to be taking a thorough look at both the applicant's studies and the resources within the project area. As a Town both the Select Board and Planning Commission will be a party and should be able to participate fully. However, you may have less negotiating power, and there is the added burden of more trips to Concord.

The SEC is likely to give consideration to local resources especially areas in conserved areas and important local resources like the town beach, for example. They will not be as familiar as you will with these areas but you can provide this information. They will take a serious look at both your zoning regulations and your Master Plan. They will be looking for clear language about particular resources or particular concerns. General statements about rural character are not particularly helpful. If a lake or pond is noted only for its natural values, the scenic characteristics won't be given as much consideration. But even reviewed at the local level, the planning commission must rely on the Master Plan and the extent to which there is clear language about particular resources.

Comments on Draft Ordinance

I will make general comments here, but also include specific notes within the document itself as an attachment.

- Possibly have sections addressing the specific issues associated with Construction (e.g. blasting, dust, noise, traffic, impacts on local roads, water quality), Operations (noise complaints, maintenance) and Decommissioning. Consider a requirement to repair any non-functioning wind turbine as soon as possible. Evidence shows that people find broken or non-functioning wind turbines to be unsightly. Also if replacement of a wind turbine is required they should be required to replace it with a model that has the same or nearly identical visual characteristics.
- Possibly note that setback standards do not address noise issues and additional setbacks may be required to address this issue.
- A set noise standard may be easier to administer than 5dBA above. That way there is no dispute over what the baseline noise level is or where the measurements are taken. Take a look at the Public Service Board decision on the Lowell Wind Project in Vermont (attached). They cite a number of standards but settle on a fairly conservative standard of 45dBA exterior and 30dba interior. It may be worth pointing out in the ordinance or elsewhere that there is a difference between a reasonable standard and audibility. The 30dBA standard does not mean that the turbines will not be heard or audible. The expectation with some wind projects that no unreasonable impact meant "not audible" caused unreasonable expectations.
- Environmental Standards: Environmentally sensitive areas may include visually sensitive viewpoints, especially recreational areas where there may be an expectation for a natural environment free of development or heavily used recreation areas. This does not mean that viewing a wind project from such a location would be unreasonable but it does mean that it would raise red flags and possibly require some mitigation. (See suggested scenic resource standards below).
- 13.2 Permit and Operational License Requirements: a site grading and clearing plan showing all areas to be cleared (and acreages) plus all grade changes. This

documentation is very important for understanding both natural and visual impacts. Details should be provided on electrical transmission: collector lines (undergrounded along the ridge?), locations and heights of poles, clearing limits for above ground lines; substations, transmission line details, upgrades or changes to existing power lines, etc.

- There seems to be a lot of lists of required information. These should perhaps be listed by category (e.g. general information - project description, project maps showing all residents and camps, Financial information, Health and Safety information, Environmental Information - wildlife, wetlands, water quality, historic, visual impacts, noise, etc.) along with the standards but have a master check list at the end.
- 13.2.2 Light pollution: generally the lights on wind turbines don't add significantly to light pollution in the traditional sense since they are designed to be seen, not to light up an area. You might instead say, Hazard Lighting Impacts. They can nevertheless change the character of the night sky, especially in areas where strobe lights are not common. Residents often find the lights more objectionable than seeing the turbines during the day. This is especially true for sensitive viewing areas where there is 1) an expectation for a natural experience, 2) no existing lights visible, and 3) frequent nighttime use, and/or 4) viewed from above during night hours. Mitigation strategies include the possibility of an Audio Visual Warning System so that lights are only operational when a plane is nearby.
- Do you want to require conceptual review of a project?
- Be sure that you reserve the right to hire outside experts to review issues independently

Recommended Additions to the Ordinance

9.0 Environmental Standards

Scenic Resources Protection

Required Documentation

The applicant shall submit a detailed report prepared by a landscape architect trained in visual impact assessment and employing an accepted professional visual impact assessment methodology. The report shall include at a minimum the following:

- A detailed project map
- A viewshed analysis map showing potential project visibility within the town of Antrim based upon the highest point of all project turbines at blade tip. The viewshed analysis should distinguish between potential visibility within open areas (e.g meadows, marshes, water bodies, open park land) and forested areas. More detailed studies for individual turbines may be requested. Software specifically designed for viewshed analysis based on GIS should be used.

- Photographic simulations should be provided for potentially sensitive public viewpoints. The Planning Commission may request that particular viewpoints be illustrated. Simulation photographs should be taken at 50mm (or digital equivalent) and illustrated on 11x17" printed copies for each simulation. If several photographic frames are required to illustrate the breath of the project from a particular viewpoint, illustrations should be provided of each 50mm frame plus a combined panorama view. The photograph should be taken in optimal viewing conditions and be free of unnecessary distractions such as power lines or wires. Any visible roads, site clearing or other project infrastructure should be depicted on the simulations.
- The report should identify all possible public viewing locations with a description of how the project would appear, how many turbines would be visible, and a photograph of the project ridge from each location. These locations may include town centers, recreation areas, publically accessible natural areas, publicly accessible historic sites, trails, and scenic sections of local or state roadways in town. Visibility of all project infrastructure including roads, power lines and site clearing, as well as lighting impacts should be discussed.
- The report should employ an acceptable visual impact methodology for explaining what the visual impacts of the project would be and why these may be acceptable or unacceptable. Of particular concern would be public recreation areas where there would be an expectation of a natural setting. An indication of impacts to private residences should be discussed generally.
- The report should identify mitigation methods that were employed. These may include turbine relocation, reductions in turbine height or numbers, hazard lighting mitigation by employing audio-visual warning systems, minimizing site clearing, revegetation of cut and fill slopes, undergrounding collector lines, or other methods.

Character of Antrim (Preliminary Observations)

Antrim is rural in character¹, but the hilly, mostly wooded terrain makes residential or forestry uses more common than agricultural uses. Antrim village in the southeast corner is the cultural and commercial center of town. Denser development is also clustered around several of the lakes especially Gregg Lake and Franklin Pierce Lake. Some commercial development extends along Routes 9 and 202. Meetinghouse Hill is an important historic landmark and there are many other historic sites around the town.

¹ Rural character is generally characterized by a clear separation between developed centers (villages and hamlets) and countryside (areas where open space predominates. Connections to the land itself may be important (agriculture, forestry, hunting, fishing, hiking, wildlife viewing and similar activities). Development patterns following historic patterns also contribute to rural character (buildings oriented parallel or perpendicular to the road, and close to the road rather than set back along long driveways). This pattern also conserves open space, thereby contributing to rural character.

Antrim's terrain varies from east to west. The eastern portions are flatter especially along the Contoocook River. Several hills or mountains including Riley Mountain, Meetinghouse Hill, Nabor Hill, Patten Hill and Holt Hill punctuate this portion of town. The western part of town is generally more rugged with an arc of higher hills and mountains extending from Bald Mountain in the south to Robb Mountain to Willard Mountain to Tuttle Hill. Bald Mountain, Goodhue Hill and Rob Mountain are all within preserved land. Antrim has a considerable number of protected lands especially along the western edge of town including an Audubon preserve around Willard Lake (DePierrefue-Willard Pond Wildlife Sanctuary), a Wildlife Management Area, and a Nature Conservancy preserve (Loverens Mill Cedar Swamp). There are several other protected parcels in the eastern and central portions of the town and a well developed system of trails connecting many of these areas.

The many lakes and ponds in town provide scenic focal points for recreational use. Some are also valued for power generation (Franklin Pierce Reservoir) and wildlife protection (Willard Pond). Gregg Lake is an important recreational focus with a town beach and picnic area as well as a nearby natural area with trails (Meadow Marsh).

General Observations about Wind Energy Project Siting in Antrim

The following thoughts are preliminary only and would require further study.

It appears that the ridgeline extending from Willard Mountain to Tuttle Hill is the most likely location for a larger scale wind energy project since the extended ridgeline offers the only place in town to interconnect a road system to accommodate a larger number of turbines (possibly 10 turbines). Although the wind resource is only marginal to fair, the site is located in close proximity to a transmission line. There appears to be a reasonably large population in close proximity and the site isn't too far from Concord and Keene. Smaller projects (1-3 turbines) could possibly be located on other hilltops in Antrim.

Because Antrim is well forested and quite hilly, visibility of a project on the Willard-Tuttle ridge appears to be relatively limited overall. The ridgeline occupies a significant portion of the western part of town but from most viewing locations other hills or mountains are also seen. Often these other hills appear higher either because they are higher (Bald Mountain) or because they are seen in closer proximity.

However, the project would be quite visible from two sensitive locations which would be important to examine closely. Both are in close proximity to the ridgeline. The project would be particularly visible from the northeast shoreline of Gregg Lake including from the town beach and picnic area (approximately 1.8 miles to the closest turbine). A number of camps along this part of the lake would view the project. The ridgeline is also visible from Meadow Marsh, a lovely natural area and the starting point for trails. Of more concern would be views from Willard Pond since this is a natural area where there

is a reasonable expectation of having an experience of a natural setting. (Turbines might be seen as close as 1.5 miles away but this would need to be confirmed through a simulation.) There is currently no development visible and motorized craft are not permitted on the Pond (unlike Gregg Lake which is a developed location with motorized uses). For both locations it would be important to have accurate simulations and viewshed mapping to help understand how the project would be seen and how much of each lake or pond would be affected. Because these are relatively small mountains, the larger turbines may appear proportionately large, but accurate simulations are necessary to understand this.

The project would be minimally visible from Meetinghouse Hill and primarily during leaf off periods. There are sufficient trees in this location that a project would be unlikely to dominate views. It would be important also to do studies from the trail up Bald Mountain. From this vantage point the turbines would appear very close, but there may be other views in other directions that are equally compelling. The approach into Antrim along Route 9 offers a quite dramatic glimpse toward the northeastern end of Tuttle Hill. This is not a highly scenic viewpoint and the view disappears quickly. Nevertheless, a simulation from this viewpoint would be useful to request.

Antrim is very different in character from Lempster. Views of the Lempster project are more limited and there are no important public gathering areas in close proximity. Antrim has a number of scenic resources that are worthy of protection. This does not mean that a wind project is inappropriate, but that careful review will be needed to ensure a balancing of these concerns.