ERWIN•LOBO•BIELINSKI PLLC
FORENSIC ARCHITECTS AND ENGINEERS

TO: Susan Brander
Drayton Grant

COMPANY: Otsego 2000

FROM: Ronald Bielinski, PE, AIA, CIH, INCE

DATE: 2 August 2006

PROJECT # AND NAME: Jordanville Wind Project

RE: DEIS Noise Impact Preliminary Review

COPIES TO:

At your request, this writer performed a cursory review of the Noise Impact for the DEIS (document pages 112 to 118) and the "Jordanville Wind Project Acoustic Assessment", dated May 2006, prepared by Superna Energy LLC.

EPA disbanded their Noise group over 20 years ago, and there are no new noise-related data from them, however the background levels and basic information have not changed significantly. HUD, DOT and FAA have active noise groups, and most refer to the current "HUD Noise Guidebook" as what would be an acceptable analysis for residential receptors.

The analysis is based on a mathematical model which ignores site features and assumes all sound emitted from the source is hemispherical. To visualize what that means, you can imagine the light emitted from a light bulb resting on the ground. Then, have 75 strategically placed light bulbs, and imagine the total light emitted from the batch.

Depending on what the site is like, the above analysis can predict a value above or below what actually may occur when the installation is operational. Ground vegetation (bushes, trees) only provide a significant sound reduction when it is continuous for about 100 to 200 ft or more (depending on the density of the growth). A patch of trees along the road, for example, would have little effect. In addition, trees attenuate high frequency noise to a greater degree than low frequency noise. Dense vegetation that is at least 100 feet in depth will reduce the sound levels by 3 to 7 dB(A). Evergreens provide a better vegetative screen than deciduous trees. Keep in mind that if a vegetative screen does not currently exist, planting a vegetative screen may require 15 or more years of growth before it becomes effective.

777 Sixth Avenue Suite 29B New York NY 10001 (V) 212 924 8508 (F) 212 627 1829
271 North Avenue Suite 320 New Rochelle, NY 10801 (V) 914 738 7949 (F) 914 738 7940

Sound also travels along with the wind, and in this case, the wind direction would be known as the turbines only are operational when the wind is at the proper speed to allow them to produce power. In their acoustic assessment document, Appendix B, it appears that the turbine elevations have been accounted for in their analysis.

If the site is elevated compared to the surrounding community, the distance the sound will travel is further than if it is lower than the surrounding community. If the topography varies, than the actual receptor noise will vary (up or down) over the analysis area, based on the topography, ground attenuation, and location of barriers / reflective surfaces.

It would be worthwhile to spot check an existing installation (which had undergone a similar evaluation), with similar topography to the Jordanville Wind Farm, to see how the assumptions provided in the report compare their predicted value for that installation, with actual site measurements, to see how realistic their analysis is in "real life".

In the NYS DEC Policy Document, "Assessing and Mitigating Noise Impacts" it states:

> The sound level calculated for the point of reception should be related to ambient sound levels. Ambient sound levels can be either measured or assumed based on established references for the environmental setting and land use at the point of reception. For estimation purposes, ambient SPLs will vary from approximately 35 dB(A) in a wilderness area to approximately 87 dB(A) in a highly industrial setting. A quiet seemingly serene setting such as rural farm land will be at the lower end of the scale at about 45 dB(A), whereas an urban industrial area will be at the high end of this scale at around 79 dB(A) (EPA 550/9-79-100, November 1978). **If there is any concern that levels based on reference values do not accurately reflect ambient SPL, field measurements should be undertaken to determine ambient SPLs.** (my emphasis)

Based on the good practice and the HUD Guidebook, background sound levels should have been taken at the site's periphery, and at potential receptors, to truly understand the potential impact. For example, if the true background is 40 dB (rather than the quoted 45 dBA), the impact level moves from "intrusive" to "very noticeable", though the final sound level predicted remains the same. This may require additional mitigative measures, as the impact level has increased.

Another potential impact factor is the "Speech Interference Level"(SIL). The SIL is an arithmetic average of the predominant octave bands in the human voice range (500 to 4000 HZ). In reviewing the noise spectra (octave band analysis) for the G87 Wind Turbine, (pg 16 of the Acoustic Assessment document), 3 of the 4 highest sound power levels are in the SIL bands of 500, 1000, 2000 and 4000. What this means, is that normal

human speech at 50 to 60 dB, may be somewhat masked by the sound of the turbines, requiring the speaker to raise their voice level, to be understood.

The Assessment, in part 4.1, provides for several scenarios in which the turbine are relocated to accommodate the Hicks Rd residence. However, the impact of those scenarios given the new arrangement, is not provided. The number of turbines have not changed, just their relative position. In reviewing their sound contour map, several other residences are at or near the same contour level as what the Hicks Rd house is on, which would indicate that if the assumptions used in the study are only slightly at variance as what actually will occur, several other houses would require sound mitigation and / or an easement.

The means of predicting the sound levels (as shown by the contours) was fairly simplistic, in that the sound contours were developed for a flat site and the results superimposed over the EDR contour map. As most wind turbine projects are located at an elevated site, for practical reasons, this approach may be too simplistic, as several receptors are very close to the 50 dB contours, and an elevated site would typically expand these contour lines outward. There are two major sound level prediction software packages (Environmental Noise Model, and SoundPlan) which take into account site topography, height of the source, wind, etc.), but were not used as part of this study.

It is our preliminary recommendation to perform an existing background sound survey, that shows the current 24 hr day night level (DNL) and the L90, for both quiescent wind conditions (as defined by ANSI Standard S12.9-1993 "Quantities and Procedures for Description and Measurement of Environmental Sound"), and when the wind is at 18 mph, 33 ft above ground level, at strategic locations at the site's perimeter, and at receptor sites near or at the 45 to 50 dB contours.

If the project goes forward, these same locations can be re-measured (at quiescent wind and under the design assumptions – wind at 18 mph, 33 ft AGL).

Then, if levels are not as predicted, additional mitigation would be required.

Installations located elsewhere, that are operational and essentially similar to the proposed site can be visited, and evaluated to determine if their site performance is as predicted.