

CASE NO. 634-AT-08

SUPPLEMENTAL MEMORANDUM

Champaign County
February 12, 2009

Department of
Petitioner: **Zoning Administrator**



Prepared by: **John Hall**
Zoning Administrator

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Authorize the County Board to approve Special Use Permits (SUP) and to change the requirements for the development of wind turbine developments (wind farms) to a County Board Special Use Permit (CBSUP) and a rezoning to the new Wind Farm Overlay Zoning District (WFO).

(B) Change the requirements for private wind turbines.

(C) Add a requirement for a County Board Special Use Permit for subdivisions in a Rural Residential Overlay District.

STATUS

This is the first meeting for this case. Additional documents of record are attached.

SOURCES FOR CONDITIONS

Attachment A briefly reviews the source or justification for all proposed standard conditions.

OTHER ISSUES RELATED TO WIND FARMS

Other issues of concern related to wind farms but for which no standard conditions have been proposed are the following:

- **Effects on adjacent property values.** Attachments B and C relate to the effects on adjacent (non-participating) property values. Both of these reports indicate no negative effects on adjacent property values.
- **Effects on spraying of agricultural land.** Attachments E and F are short articles reporting on the possible effects of agricultural spraying for both participating and non-participating lands. Note that the presence of a wind farm appears to create difficulties in aerial spraying and increased costs of aerial application on adjacent non-participating fields as well as the participating fields.

ADDITIONAL INFORMATION FOR PROPOSED CONDITIONS

Attachments D and G through K provide additional information for conditions that have already been proposed. Note that Attachments D and G relate to the condition to protect agricultural drainage that has not yet been drafted.

ATTACHMENTS

- A** Source Or Brief Justification Of All Proposed Standard Conditions
- B** Chapter One Executive Summary of *The Effect Of Wind Development On Local Property Values*. George Sterzinger, Fredric Beck, Damian Lostiuk. Renewable Energy Policy Project. 2003.
- C** *Impact of Wind Farms on Surrounding Property Values* by Peter Poletti. Presentation at the Illinois Windworking Group Conference. February 4, 2009.
- D** Section 7 of the Champaign County Stormwater Management Policy
- E** *Sky High Wind towers may limit aerial applications*. Agrinews. Vol. 31-No. 33. October 24, 2008.
- F** *Non-wind turbine landowners should investigate spraying impact*. Agrinews. Vol. 31-No. 33. October 24, 2008.
- G** Washington Department of Fish and Wildlife Wind Project Guidelines
- H** Pipeline Construction Standards And Policies for Agricultural Impact Mitigation Recommended by the Illinois Department of Agriculture (included separately)
- I** Road Upgrade And Maintenance between McLean County and High Trail Wind Farm and Old Trail Wind Farm (included separately)
- J** Road Upgrade And Maintenance between McLean County townships and High Trail Wind Farm and Old Trail Wind Farm (included separately)
- K** *The Possible Effects of Wind Energy on Illinois Birds and Bats*. Report of the Illinois Department of Natural Resources to Governor Rod Blagojevich and the 95th Illinois General Assembly. June 2007. (included separately)

Attachment A. Source Or Brief Justification Of All Proposed Standard Conditions
Case 634-AT-08 February 12, 2009

Standard Condition (Draft)	Purpose of Condition	Source or Justification	Notes
A. 1.	Clarify the area of the special use permit	None- good practice	
A.2. (a)	Prohibit wind farms within one-and one- half miles of municipality	Statutes	
A.2(b)	One mile separation from CR District	New York Model Ordinance requires 2,500 feet separation from Important Bird Areas. The CR District is intended to conserve the natural and scenic areas and is the principal rural residential district and is where the Forest Preserve Districts are located	One mile is arbitrary
B. 1.	Eliminate minimum lot requirements for wind farm	Wind farm is a unique development with unique requirements	
C.1.	1,000 feet separation to participating dwelling	<i>Model Ordinance</i>	The <i>Model Ordinance</i> gives no justification for the 1,000 feet
C.2.	1,200 feet separation for non-participating dwelling	Non-participating dwellings are not benefiting from the wind farm like participating dwellings and may merit greater separation	1,200 feet is arbitrary
C.3.	Allows waiver of above two conditions	<i>Model Ordinance</i>	
C.4.	Separation to adjacent participating property line	<i>Model Ordinance</i>	
C.5.	Separation to nearest street	<i>Model Ordinance</i>	
C.6.	Submittal of private waiver	Supplements the <i>Model Ordinance</i>	
C.7.	Separation distance from pipeline impact radius	None- good practice; allows pipeline impact radius to be waived in the special use permit rather than a variance	
D.1.	Design Safety Certification	<i>Model Ordinance</i>	State's Attorney must review for compliance with statutes
D.2.	Controls and brakes	<i>Model Ordinance</i>	
D.3.	Electrical components	<i>Model Ordinance</i>	State's Attorney must review for compliance with statutes
D.4.	Monopole construction	<i>Model Ordinance</i>	

Attachment A. Source Or Brief Justification Of All Proposed Standard Conditions
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Standard Condition (Draft)	Purpose of Condition	Source or Justification	Notes
D.5.	Maximum height	<i>Model Ordinance</i>	Maximum height allowed by Federal Aviation Administration (FAA)
D.6.	Paint color of tower & turbine	<i>Model Ordinance</i>	
D.7.	Applicable FAA requirements	<i>Model Ordinance</i> (modified)	American Bird Conservancy's Wind Energy Policy recommends minimum lighting so as to minimize avian mortality.
D.8.	Tower warnings	<i>Model Ordinance</i>	
D.9.	Prevent unauthorized climbing	<i>Model Ordinance</i>	
E.	Protect agricultural drainage (<i>Not drafted yet</i>)	<i>Stormwater Management Policy</i> and IDAG Recommendations	<i>Stormwater Management Policy</i> not sufficient by itself. IDAG Recommendations included with February 12, 2009, Supplemental Memorandum
F.	Use of Public Streets	<i>Model Ordinance</i> modified with: <ul style="list-style-type: none"> ▪ McLean County requirements ▪ Champaign County Engineer review 	McLean County requirements included with February 12, 2009, Supplemental Memorandum. Champaign County Engineer comments received but not yet incorporated
G.	Coordination with fire protection district	<i>Model Ordinance</i>	Some counties have required payments to FPD to offset specific costs
H.	Mitigate electromagnetic interference	<i>Model Ordinance</i>	Could be made more specific to clarify extent of required mitigation
I.	Allowable noise level	<i>Model Ordinance</i>	The Illinois Pollution Control Board requirements were included in the Preliminary Memorandum
J.	Endangered Species Consultation	Statutory requirement	
K.	Historic and Archaeological review	Required by other counties	Not a statutory requirement and may never be required since most of these resources are in the CR District

Attachment A. Source Or Brief Justification Of All Proposed Standard Conditions
Case 634-AT-08 February 12, 2009

Standard Condition (Draft)	Purpose of Condition	Source or Justification	Notes
L	Wildlife impacts	<p><i>Model Ordinance</i> modified with:</p> <ul style="list-style-type: none"> ▪ Washington State Department of Fish and Wildlife guidelines (included with February 12, 2009, Supplemental Memorandum) ▪ Review of other wind farm & wildlife guidelines 	<p>No IDNR requirements.</p> <p>Sangamon, Livingston, and Livingston and Macon Counties require post-construction monitoring in their Ordinances and LaSalle has required it as a special condition of approval</p> <p>Review comments have been provided from an environmental consultant and changes will be recommended</p>
M.	Shadow flicker	<i>Environmental Impacts of Wind-Energy Projects</i> (Committee on Environmental Impacts of Wind Energy, National Research Council)	Sangamon County Ordinance requires shadow flicker study
N.	Visual Impact Assessment	<i>Environmental Impacts of Wind-Energy Projects</i> (Committee on Environmental Impacts of Wind Energy, National Research Council)	
O.	Liability insurance	<i>Model Ordinance</i> (modified)	Modification based on a special condition of approval by Livingston County
P.	Operational conditions	<i>Model Ordinance</i>	
Q.	Decommissioning plan	<p><i>Model Ordinance</i> modified with:</p> <ul style="list-style-type: none"> ▪ Existing reclamation agreement standards 	Existing reclamation agreement standards established in Case 273-AT-00 Part B (included with Preliminary Memorandum)
R.	Complaint hotline	<p>Based on a special conditions of approval by LaSalle and Livingston Counties</p> <p>Also recommended in <i>Environmental Impacts of Wind-Energy Projects</i> (Committee on Environmental Impacts of Wind Energy, National Research Council)</p>	
S.	Expiration of County Board Special Use Permit if no construction within 10 years	Ford County has an expiration clause with a 36 month limit that can be extended	

ANALYTICAL REPORT | MAY 2003

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RENEWABLE ENERGY POLICY PROJECT

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CHAPTER I. PROJECT OVERVIEW

THE CLAIM AGAINST WIND DEVELOPMENT

Wind energy is the fastest growing domestic energy resource. Between 1998 and 2002 installed capacity grew from 1848 MW to 4685 MW, a compound growth rate of 26 percent. Since wind energy is now broadly competitive with many traditional generation resources, there is wide expectation that the growth rate of the past five years will continue. (Source for statistics: www.awea.org).

As the pace of wind project development has increased, opponents have raised claims in the media and at siting hearings that wind development will lower the value of property within view of the turbines. This is a serious charge that deserves to be seriously examined.

NO EXISTING EMPIRICAL SUPPORT

As a result of the expansion of capacity from 1998 to 2002, it is reasonable to expect any negative effect would be revealed in an analysis of how already existing projects have affected property values. A search for either European or United States studies on the effect of wind development on property values revealed that no systematic review has as yet been undertaken.

As noted above, the pace of development and siting hearings is likely to continue, which makes it important to do systematic research in order to establish whether there is any basis for the claims about harm to property values. (For recent press accounts of opposition claims see: *The Charleston Gazette*, WV, March 30, 2003; and *Copley News Service*, Ottawa, IL, April 11, 2003).

This REPP Analytical Report reviews data on property sales in the vicinity of wind projects and uses statistical analysis to determine whether and the extent to which the presence of a wind power project has had an influence on the prices at which properties have been sold. The hypothesis underlying this analysis is that if wind development can reasonably be claimed to hurt property values, then a careful review of the sales data should show a negative effect on property values within the viewshed of the projects.

A SERIOUS CHARGE SERIOUSLY EXAMINED

The first step in this analysis required assembling a database covering every wind development that came on-line after 1998 with 10 MW installed capacity or greater. (Note: For this Report we cut off projects that came on-line after 2001 because they would have insufficient data at this time to allow a reasonable analysis. These projects can be added in future Reports, however.) For the purposes of this analysis, the wind developments were considered to have a visual impact for the area within five miles of the turbines. The five mile threshold was selected because review of the literature and field experience suggests that although wind turbines may be visible beyond five miles, beyond this distance, they do not tend to be highly noticeable, and they have relatively little influence on the landscape's overall character and quality. For a time period covering roughly six years and straddling the on-line date of the projects, we gathered the records for all property sales for the view shed and for a community comparable to the view shed.

For all projects for which we could find sufficient data, we then conducted a statistical analysis to determine how property values changed over time in the view shed and in the comparable community. This database contained more than 25,000 records of property sales within the view shed and the selected comparable communities.

THREE CASE EXAMINATIONS

REPP looked at price changes for each of the ten projects in three ways: Case 1 looked at the changes in the view shed and comparable community for the entire period of the study; Case 2 looked at how property values changed in the view shed before and after the project came on-line; and Case 3 looked at how property values changed in the view shed and comparable community after the project came on-line.

Case 1 looked first at how prices changed over the entire period of study for the view shed and comparable region. Where possible, we tried to collect data for three years preceding and three years following the on-line date of the project. For the ten projects analyzed, property values increased faster in the view shed in eight of the ten projects. In the two projects where the view shed values increased slower than for the comparable community, special circumstances make the results questionable. Kern County, California is a site that has had wind development since 1981. Because of the existence of the old wind machines, the site does not provide a look at how the new wind turbines will affect property values. For Fayette County, Pennsylvania the statistical explanation was very poor. For the view shed the statistical analysis could explain only 2 percent of the total change in prices.

Case 2 compared how prices changed in the view shed before and after the projects came on-line. For the ten projects analyzed, in nine of the ten cases the property values increased faster after the project came on line than they did before. The only project to have slower property value growth after the on-line date was Kewaunee County, Wisconsin. Since Case 2 looks only at the view shed, it is possible that external factors drove up prices faster after the on-line date and that analysis is therefore picking up a factor other than the wind development.

Finally, **Case 3** looked at how prices changed for both the view shed and the comparable region, but only for the period after the projects came on-line. Once again, for nine of the ten projects analyzed, the property values increased faster in the view shed than they did for the comparable community. The only project to see faster property value increases in the comparable community was Kern County, California. The same caution applied to Case 1 is necessary in interpreting these results.

If property values had been harmed by being within the view-shed of major wind developments, then we expected that to be shown in a majority of the projects analyzed. Instead, to the contrary, we found that for the great majority of projects the property values actually rose more quickly in the view shed than they did in the comparable community. Moreover, values increased faster in the view shed after the projects came on-line than they did before. Finally, after projects came on-line, values increased faster in the view shed than they did in the comparable community. In all, we analyzed ten projects in three cases; we looked at thirty individual analyses and found that in twenty-six of those, property values in the affected view shed performed better than the alternative.

This study is an empirical review of the changes in property values over time and does not attempt to present a model to explain all the influences on property values. The analysis we conducted was done solely to determine whether the existing data could be interpreted as supporting the claim that wind development harms property values. It would be desirable in future studies to expand the variables incorporated into the analysis and to refine the view shed in order to look at the relationship between property values and the precise distance from development. However, the limitations imposed by gathering data for a consistent analysis of all major developments done post-1998 made those refinements impossible for this study. The statistical analysis of all property sales in the view shed and the comparable community done for this Report provides no evidence that wind development has harmed property values within the view shed. The results from one of the three Cases analyzed are summarized in Table 1 and Figure 1 below.

REGRESSION ANALYSIS

REPP used standard simple statistical regression analyses to determine how property values changed over time in the view shed and the comparable community. In very general terms, a regression analysis “fits” a linear relationship, a line, to the available database. The calculated line will have a slope, which in our analysis is the monthly change in average price for the area and time period studied. Once we gathered the data and conducted the regression analysis, we compared the slope of the line for the view shed with the slope of the line for the comparable community (or for the view shed before and after the wind project came on-line).

TABLE 1: SUMMARY OF STATISTICAL MODEL RESULTS FOR CASE 1

Project/On-Line Date	Monthly Average Price Change (\$/month)	
	View Shed	Comparable
Riverside County, CA	\$1,719.65	\$814.17
Madison County, NY (Madison)	\$576.22	\$245.51
Carson County, TX	\$620.47	\$296.54
Kewaunee County, WI	\$434.48	\$118.18
Searsburg, VT	\$536.41	\$330.81
Madison County, NY (Fenner)	\$368.47	\$245.51
Somerset County, PA	\$190.07	\$100.06
Buena Vista County, IA	\$401.86	\$341.87
Kern County, CA	\$492.38	\$684.16
Fayette County, PA	\$115.96	\$479.20

While regression analysis gives the best fit for the data available, it is also important to consider how “good” (in a statistical sense) the fit of the line to the data is. The regression will predict values that can be compared to the actual or observed values. One way to measure how well the regression line fits the data calculates what percentage of the actual variation is explained by the predicted values. A high percentage number, over 70%, is generally a good fit. A low number, below 20%, means that very little of the actual variation is explained by the analysis. Because this initial study had to rely on a database constructed after the fact, lack of data points and high variation in the data that was gathered meant that the statistical fit was poor for several of the projects analyzed. If the calculated linear relationship does not give a good fit, then the results have to be looked at cautiously.

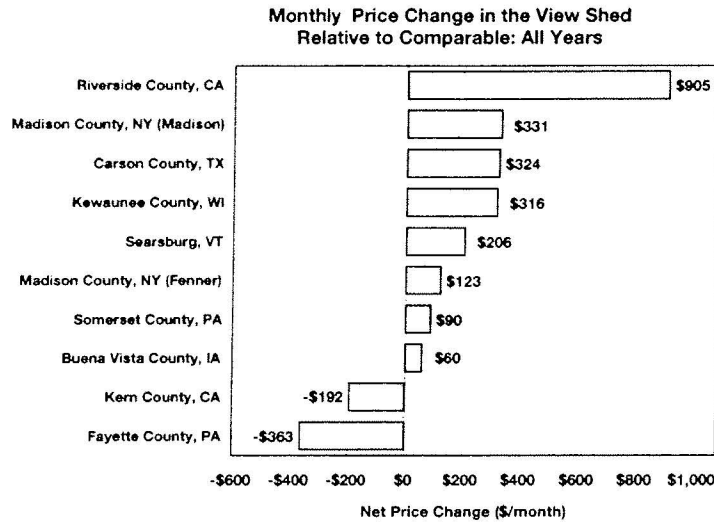


FIGURE I: MONTHLY PRICE CHANGE IN THE VIEW SHED
RELATIVE TO COMPARABLE: ALL YEARS

CASE RESULT DETAILS

Although there is some variation in the three Cases studied, the results point to the same conclusion: the statistical evidence does not support a contention that property values within the view shed of wind developments suffer or perform poorer than in a comparable region. For the great majority of projects in all three of the Cases studied, the property values in the view shed actually go up faster than values in the comparable region. Analytical results for all three cases are summarized in Table 2 below.

TABLE 2: DETAILED STATISTICAL MODEL RESULTS

Location: Buena Vista County, IA
Project: Storm Lake I & II

Model	Dataset	Dates	Rate of Change (\$/month)	Model Fit (R ²)	Result
Case 1	View shed, all data	Jan 96 - Oct 02	\$401.86	0.67	The rate of change in average view shed sales price is 18% greater than the rate of change of the comparable over the study period.
	Comparable, all data	Jan 96 - Oct 02	\$341.87	0.72	
Case 2	View shed, before	Jan 96 - Apr 99	\$370.52	0.51	The rate of change in average view shed sales price is 70% greater after the on-line date than the rate of change before the on-line date.
	View shed, after	May 99 - Oct 02	\$631.12	0.53	
Case 3	View shed, after	May 99 - Oct 02	\$631.12	0.53	The rate of change in average view shed sales price after the on-line date is 2.7 times greater than the rate of change of the comparable after the on-line date.
	Comparable, after	May 99 - Oct 02	\$234.84	0.23	

Location: Carson County, TX
Project: Llano Estacado

Model	Dataset	Dates	Rate of Change (\$/ month)	Model Fit (R2)	Result
Case 1	View shed, all data	Jan 98 - Dec 02	\$620.47	0.49	The rate of change in average view shed sales price is 2.1 times greater than the rate of change of the comparable over the study period.
	Comparable, all data	Jan 98 - Dec 02	\$296.54	0.33	
Case 2	View shed, before	Jan 98 - Oct 01	\$553.92	0.24	The rate of change in average view shed sales price after the on-line date is 3.4 times greater than the rate of change before the on-line date.
	View shed, after	Nov 01 - Dec 02	\$1,879.76	0.83	
Case 3	View shed, after	Nov 01 - Dec 02	\$1,879.76	0.83	The rate of change in average view shed sales price after the on-line date increased at 13.4 times the rate of decrease in the comparable after the on-line date.
	Comparable, after	Nov 01 - Dec 02	-\$140.14	0.02	

Location: Fayette County, PA
Project: Mill Run

Model	Dataset	Dates	Rate of Change (\$/ month)	Model Fit (R2)	Result
Case 1	View shed, all data	Dec 97-Dec 02	\$115.96	0.02	The rate of change in average view shed sales price is 24% of the rate of change of the comparable over the study period.
	Comparable, all data	Dec 97-Dec 02	\$479.20	0.24	
Case 2	View shed, before	Dec 97 - Nov 01	-\$413.68	0.19	The rate of change in average view shed sales price after the on-line date increased at 3.8 times the rate of decrease before the on-line date.
	View shed, after	Oct 01-Dec 02	\$1,562.79	0.32	
Case 3	View shed, after	Oct 01-Dec 02	\$1,562.79	0.32	The rate of change in average view shed sales price after the on-line date is 13.5 times greater than the rate of change of the comparable after the on-line date.
	Comparable, after	Oct 01-Dec 02	\$115.86	0.00	

Location: Kern County, CA
Project: Pacific Crest, Cameron Ridge, Oak Creek Phase II

Model	Dataset	Dates	Rate of Change (\$/ month)	Model Fit (R2)	Result
Case 1	View shed, all data	Jan 96 - Dec 02	\$492.38	0.72	The rate of change in average view shed sales price is 28% less than the rate of change of the comparable over the study period.
	Comparable, all data	Jan 96 - Dec 02	\$684.16	0.74	
Case 2	View shed, before	Jan 96-Feb 99	\$568.15	0.44	The rate of change in average view shed sales price is 38% greater after the on-line date than the rate of change before the on-line date.
	View shed, after	Mar 99 - Dec 02	\$786.60	0.75	
Case 3	View shed, after	Mar 99 - Dec 02	\$786.60	0.75	The rate of change in average view shed sales price after the on-line date is 29% less than the rate of change of the comparable after the on-line date.
	Comparable, after	Mar 99 - Dec 02	\$1,115.10	0.95	

Location: Kewaunee County, WI**Project: Red River (Rosiere), Lincoln (Rosiere), Lincoln (Gregorville)**

Model	Dataset	Dates	Rate of Change (\$/month)	Model Fit (R2)	Result
Case 1	View shed, all data	Jan 96 - Sep 02	\$434.48	0.26	The rate of change in average view shed sales price is 3.7 times greater than the rate of change of the comparable over the study period.
	Comparable, all data	Jan 96 - Sep 02	\$118.18	0.05	
Case 2	View shed, before	Jan 96 - May 99	-\$238.67	0.02	The increase in average view shed sales price after the on-line date is 3.5 times the decrease in view shed sales price before the on-line date.
	View shed, after	Jun 99 - Sep 02	\$840.03	0.32	
Case 3	View shed, after	Jun 99 - Sep 02	\$840.03	0.32	The average view shed sales price after the on-line date increases 33% quicker than the comparable sales price decreases after the on-line date.
	Comparable, after	Jun 99 - Sep 02	-\$630.10	0.37	

Location: Madison County, NY**Project: Madison**

Model	Dataset	Dates	Rate of Change (\$/month)	Model Fit (R2)	Result
Case 1	View shed, all data	Jan 97 - Jan 03	\$576.22	0.29	The rate of change in average view shed sales price is 2.3 times greater than the rate of change of the comparable over the study period.
	Comparable, all data	Jan 97 - Jan 03	\$245.51	0.34	
Case 2	View shed, before	Jan 97 - Aug 00	\$129.32	0.01	The rate of change in average view shed sales price after the on-line date is 10.3 times greater than the rate of change before the on-line date.
	View shed, after	Sep 00 - Jan 03	\$1,332.24	0.28	
Case 3	View shed, after	Sep 00 - Jan 03	\$1,332.24	0.28	The rate of change in average view shed sales price after the on-line date increased at 3.2 times the rate of decrease in the comparable after the on-line date.
	Comparable, after	Sep 00 - Jan 03	-\$418.71	0.39	

Location: Madison County, NY**Project: Fenner**

Model	Dataset	Dates	Rate of Change (\$/month)	Model Fit (R2)	Result
Case 1	View shed, all data	Jan 97 - Jan 03	\$368.47	0.35	The rate of change in average view shed sales price is 50% greater than the rate of change of the comparable over the study period.
	Comparable, all data	Jan 97 - Jan 03	\$245.51	0.34	
Case 2	View shed, before	Jan 97 - Nov 01	\$587.95	0.50	The rate of decrease in average view shed sales price after the on-line date is 29% lower than the rate of sales price increase before the on-line date.
	View shed, after	Dec 01 - Jan 03	-\$418.98	0.04	
Case 3	View shed, after	Dec 01 - Jan 03	-\$418.98	0.04	The rate of decrease in average view shed sales price after the on-line date is 37% less than the rate of decrease of the comparable after the on-line date.
	Comparable, after	Dec 01 - Jan 03	-\$663.38	0.63	

Location: Riverside County, CA

Project: Cabazon, Enron, Energy Unlimited, Mountain View Power Partners I & II, Westwind

Model	Dataset	Dates	Rate of Change (\$/month)	Model Fit (R2)	Result
Case 1	View shed, all data	Jan 96 - Nov 02	\$1,719.65	0.92	The rate of change in average view shed sales price is 2.1 times greater than the rate of change of the comparable over the study period.
	Comparable, all data	Jan 96 - Nov 02	\$814.17	0.81	
Case 2	View shed, before	Jan 96 - Apr 99	\$1,062.83	0.68	The rate of change in average view shed sales price is 86% greater after the on-line date than the rate of change before the on-line date.
	View shed, after	May 99 - Nov 02	\$1,978.88	0.81	
Case 3	View shed, after	May 99 - Nov 02	\$1,978.88	0.81	The rate of change in average view shed sales price after the on-line date is 63% greater than the rate of change of the comparable after the on-line date.
	Comparable, after	May 99 - Nov 02	\$1,212.14	0.74	

Location: Bennington and Windham Counties, VT

Project: Searsburg

Model	Dataset	Dates	Rate of Change (\$/month)	Model Fit (R2)	Result
Case 1	View shed, all data	Jan 94 - Oct 02	\$536.41	0.70	The rate of change in average view shed sales price is 62% greater than the rate of change of the comparable over the study period.
	Comparable, all data	Jan 94 - Oct 02	\$330.81	0.45	
Case 2	View shed, before	Jan 94 - Jan 97	-\$301.52	0.88	The rate of change in average view shed sales price after the on-line date increased at 2.6 times the rate of decrease before the on-line date.
	View shed, after	Feb 97 - Oct 02	\$771.06	0.71	
Case 3	View shed, after	Feb 97 - Oct 02	\$771.06	0.71	The rate of change in average view shed sales price after the on-line date is 18% greater than the rate of change of the comparable after the on-line date.
	Comparable, after	Feb 97 - Oct 02	\$655.20	0.78	

Location: Somerset County, PA

Project: Excelon, Green Mountain

Model	Dataset	Dates	Rate of Change (\$/month)	Model Fit (R2)	Result
Case 1	View shed, all data	Jan 97 - Oct 02	\$190.07	0.30	The rate of change in average view shed sales price is 90% greater than the rate of change of the comparable over the study period.
	Comparable, all data	Jan 97 - Oct 02	\$100.06	0.07	
Case 2	View shed, before	Jan 97 - Apr 00	\$277.99	0.37	The rate of change in average view shed sales price after the on-line date is 3.5 times greater than the rate of change before the on-line date.
	View shed, after	May 00 - Oct 02	\$969.59	0.62	
Case 3	View shed, after	May 00 - Oct 02	\$969.59	0.62	The rate of change in average view shed sales price after the on-line date increased at 2.3 times the rate of decrease in the comparable after the on-line date.
	Comparable, after	May 00 - Oct 02	-\$418.73	0.23	

Each of the three Cases takes a different approach to evaluating the price changes in the view shed and comparable community. By finding consistent results in all three Cases, the different approaches help to address concerns that could be raised about individual approaches. The selection of the comparable community is based upon a combination of demographic statistics and the impressions of local assessors and is inherently subjective. It is possible that arguments about the legitimacy of the selection of the comparable could arise and be used to question the legitimacy of the basic conclusion. However, since Case 2 looks only at the view shed and since the results of the Case 2 analysis are completely consistent with the other Cases, the selection of the comparable community will not be crucial to the legitimacy of the overall conclusion. To take another example, Case 1 uses data from the entire time period, both before and after the on-line date. We anticipate possible criticisms of this Case as masking the “pure” effect of the development that would only occur after the project came on-line. However, Cases 2 and 3 look separately at the before and after time periods and produce results basically identical to the Case 1 results. Because all three Cases produce similar results, Cases 2 and 3 answer the concerns about Case 1.

THE DATABASE

The results of the analysis depend greatly upon the quality of the database that supports the analysis. The Report is based on a detailed empirical investigation into the effects of wind development on property values. The study first identified the 27 wind projects over 10 MW installed capacity that have come on-line since 1998. REPP chose the 1998 on-line date as a selection criterion for the database because it represented projects that used the new generation of wind machines that are both taller and quieter than earlier generations. (REPP did not consider projects that came on-line in 2002 or after since there would be too little data on property values after the on-line date to support an analysis. These projects can be added to the overall database and used for subsequent updates of this analysis, however.) REPP chose the 10 MW installed capacity as the other criterion because if the presence of wind turbines is having a negative affect it, should be more pronounced in projects with a large rather than small number of installations. In addition, we used the 10 MW cut-off to assure that the sample of projects did not include an over-weighting of projects using a small number of turbines.

Of the 27 projects that came on-line in 1998 or after and that were 10MW or larger installed capacity, for a variety of reasons, 17 had insufficient data to pursue any statistical analysis. For six of the 17 projects we acquired the data, but determined that there were too few sales to support a statistical analysis. For two of the remaining 11, state law prohibited release of property sales information. The remaining nine projects had a combination of factors such as low sales, no electronic data, and paper data available only in the office. (For a project-by-project explanation, see Chapter 2 of the Report.)

For each of the remaining ten projects, we assembled a database covering roughly a six-year period from 1996 to the present. For each of these projects we obtained individual records of all property sales in the “view shed” of the development for this six-year period. We also constructed a similar database for a “comparable community” that is a reasonably close community with similar demographic characteristics. For each of the projects, we selected the comparable community on the basis of the demographics of the community and after discussing the appropriateness of the community with local property assessors. As shown in Table 3 below, the database of view shed and comparable sales included more than 25,000 individual property sales. The initial included database of view shed and comparable sales included over 25,000 individual property sales. After review and culling, the final data set includes over 24,300 individual property sales, as shown in Table 3 below.

TABLE 3: NUMBER OF PROPERTY SALES ANALYZED, BY PROJECT

Project/On-Line Date	Viewshed Sales	Comparable Sales	Total Sales
Searsburg, VT / 1997	2,788	552	3,340
Kern County, CA / 1999	745	2,122	2,867
Riverside County, CA / 1999	5,513	3,592	9,105
Buena Vista County, IA / 1999	1,557	1,656	3,213
Howard County, TX / 1999*	2,192	n/a	2,192
Kewaunee County, WI / 1999	329	295	624
Madison Co./Madison, NY / 2000	219	591	810
Madison Co./Fenner, NY / 2000**	453	591	1,044
Somerset County, PA / 2000	962	422	1,384
Fayette County, PA / 2001	39	50	89
Carson County, TX / 2001	45	224	269
TOTAL	14,842	9,504	24,346

*Howard County, TX comparable data not received at time of publication.

**Both wind projects in Madison County, NY, use the same comparable. Column totals adjusted to eliminate double counting.

RECOMMENDATIONS

The results of this analysis of property sales in the vicinity of the post-1998 projects suggest that there is no support for the claim that wind development will harm property values. The data represents the experience up to a point in time. The database will change as new projects come on-line and as more data becomes available for the sites already analyzed. In order to make the results obtained from this initial analysis as useful as possible to siting authorities and others interested in and involved with wind development, it will be important to maintain and update this database and to add newer projects as they come on-line.

Gathering data on property sales after the fact is difficult at best. We recommend that the database and analysis be maintained, expanded and updated on a regular basis. This would entail regularly updating property sales for the projects already analyzed and adding new projects when they cross a predetermined threshold, for example financial closing. In this way the results and conclusions of this analysis can be regularly and quickly updated.

ATTACHMENT C



Peter Poletti
Poletti and Associates, Inc.

Impact of Wind Farms on Surrounding Property Values.

- Is the XYZ Wind Farm located so as to minimize any effect on property values?

Land Use

- Land uses in area.
- Topography.
- Vegetative patterns.

Information Sources

- Review of literature
- Personal inspection of study areas and operating wind farms
- Inspection of the XYZ Wind Farm Area.
- Review and analysis of property transactions at the assessor's offices located in areas of an existing wind farm

↓
review of the farm
assessor's offices

Methodology

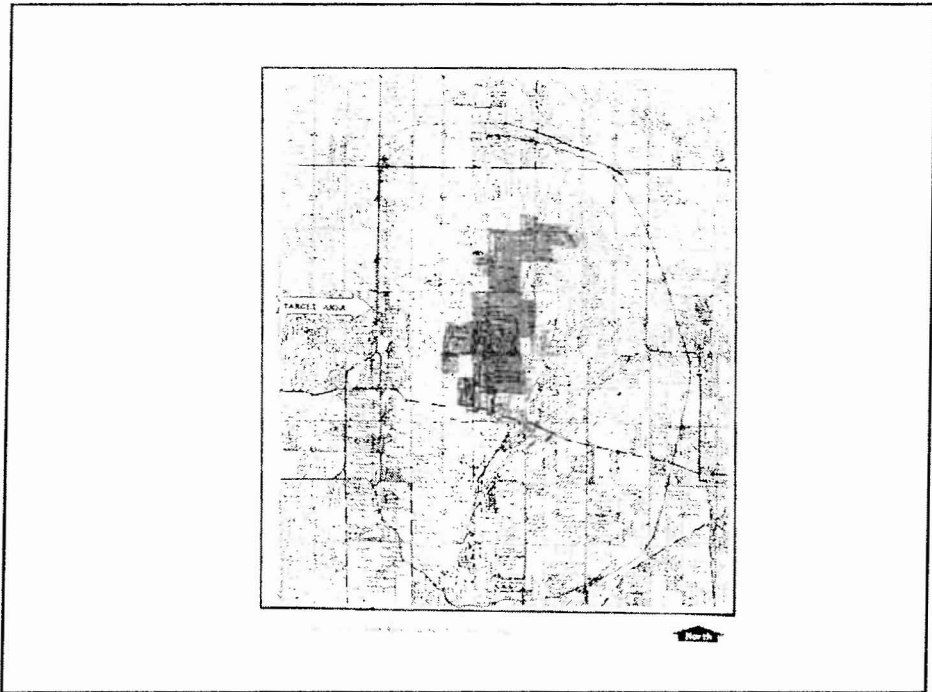
- Comparison of sale prices within Target Area to sale prices of similar properties within a Control Area.
- Target Area: A zone in proximity to a wind farm that is defined by a combination of distance, visibility, and intervening land uses
- Control Area: Region outside of the target area that is considered a zone where property values would not be affected by proximity to an operating wind farm.
- Averages within the Target and Control areas are then subjected to a Student's t Test to determine if there is a true difference in the means. If the calculated t value is less than the Standard t value, there is no statistically significant difference between the two averages.

Data Information

- Sales and information concerning those sales were obtained at local assessor's offices.
- Sales between related parties such as family members, result of judicial action, bank foreclosures, or to an energy company were not used in the analysis.
- These sales are not considered arm's length transactions.
- Collection of anecdotal data

MENDOTA HILLS

Located In Lee County, Illinois near the
Community of Paw Paw.



Property Types

- Agricultural Tracts
- Residential Tracts
- Single-Family Residences

Mendota Results

Type	Target	Control	Target	Control	Stat. Diff.
			3rd	4th	
January 2005 thru March 2008:					
Ag. Land (500 Ac.):	3	38	\$5,798	\$5,594	No
Resid. Tracts <i>5 ac</i>	12	19	\$16,873	\$14,515	
Not Inc. Cobb Lane:	11	19	\$15,517	\$14,515	No
Residences: <i>1000 1955</i>	18	10	\$96.68	\$115.52	No
Post 1955 Resid.:	7	19	\$132.56	\$134.48	No

See market repr. value

1 that was too high - no record

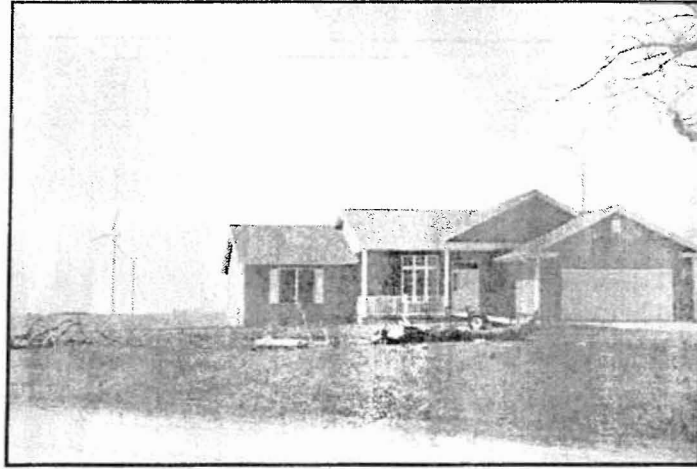
will be target value

965 Bingham Rd.

spec. none - consider after turbine

- House built in 2005 and placed on Market
- Seven Turbines within 1,500 feet of the house.
- 1,786 square feet; 5 Ac. of land.
- Asking Price was \$329,900
- Final Selling Price was \$265,000.

965 Bingham Rd.



Aerial Photograph of 965 Bingham.



1000 sq ft approx from wood frame

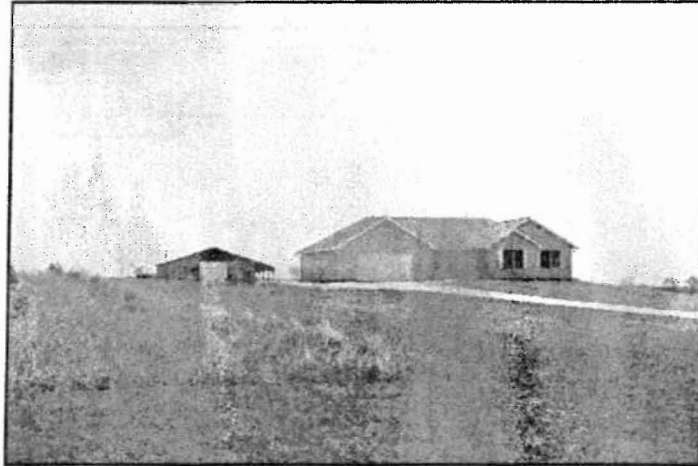
965 Bingham Sales Comparison Chart

Property	965 Bingham	3569 Paw Paw	658 Ogee	664 Ogee	1995 Cotton Tail	1992 Quail Hollow
Sale Date:	8/27/2008	8/19/2007	5/17/2007	9/17/2007	9/5/2007	8/10/2007
Sale Price:	\$265,000	\$285,000	\$275,000	\$400,000	\$249,900	\$360,300
Size:	1,786	1,660	1,881	2,316	1,916	2,532
Lot:	5	1.89	5	7	1.134	2.44
Basement:	Full	Full	Full	Full	Full	Full
Const.:	Frame	Frame	Frame	Frame	Frame	Brick
Style:	1Sty	1Sty	1Sty	1Sty	1Sty	1Sty
Quality:	Avg.	Sim.	Sim.	Sim.	Sim.	Superior
Cond.:	Good	Good	Good	Good	Good	Good
Adj. Price:		\$263,688	\$243,125	\$348,625	\$287,403	\$376,200
\$/Ft ²	\$148.38	\$158.85	\$129.25	\$150.53	\$150.00	\$148.58

3569 Paw Paw



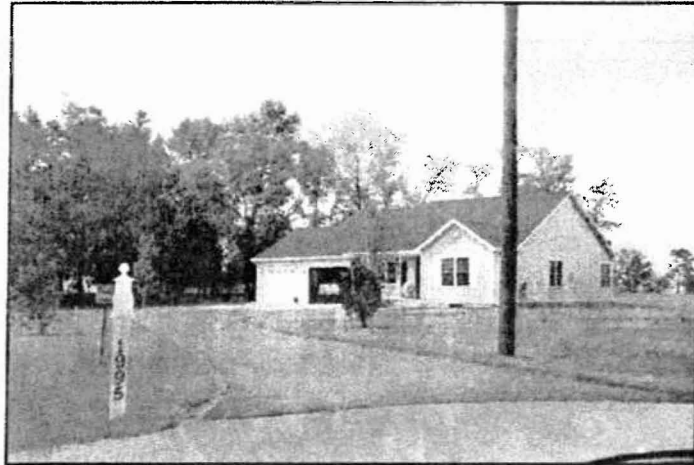
658 Ogee Rd.



664 Ogee Rd.



1995 Cotton Tail



1832 Quail Hollow



with
sales
prior
later

Additional Data

New Construction Near Mendota Hills

Target:	Parcel	Address	Tract Size	Owner	Type	Year	Size	Target Dist.
	1 01 12 19 200 005	1180 CRESTLAKE	5.00	OSTERREICHER	1 STY	2003	1,690	5,024
	2 01 12 19 200 007	1180 CRESTLAKE	5.00	BRIDGES	2 STY	2007	2,642	5,608
	3 01 12 19 200 006	1185 CRESTLAKE	5.00	DAVISON	1 STY	2005	1,876	5,843
	4 06 01 03 47 100	308 BRUCK MEADOW	2.50	SPWALSKI	2 STY	2005	1,850	4,345
	5 07 01 15 47 104	408 BRUCK MEADOW	2.50	TERARD	2 STY	2003	2,500	4,345
	6 03 01 15 47 093	514 BRUCK MEADOW	2.50	CIELESIAK	2 STY	2007	1,750	4,345
	7 09 01 15 47 107	308 BRUCK MEADOW	2.50	MORIN	1 STY	2005	1,450	4,345
	8 03 01 15 47 091	512 BRUCK MEADOW	2.50	WIS	1 STY	2005	2,129	4,400
	9 03 01 15 47 092	510 BRUCK MEADOW	2.50	MORIN	1 STY	2005	1,875	4,400
	10 07 07 05 47 104	212 BRUCK MEADOW	2.50	FRASER	1 STY	2006	2,112	4,400
	11 01 14 01 47 011	600 BERMAN	2.50	PAUL	12 MFL	2007	1,750	4,400
	12 01 14 01 01 078	400 BINGHAM	2.50	FRANZ	1 STY	2006	1,700	4,400
	13 01 14 01 01 079	402 BINGHAM	2.50	FRANZ	1 STY	2006	1,700	4,400

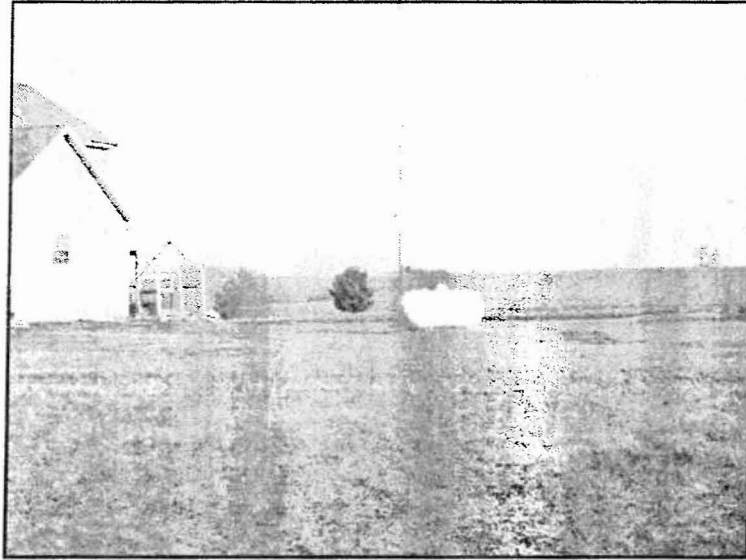
Meadowbrook Subdivision

- Located 0.8 miles from turbines
- Lot prices increased from \$35,500 to \$47,900
- 9 of 11 lots are sold
- 8 of sales occurred after construction of wind farm
- 7 houses constructed after the wind farm
- New 47 lot addition planned.

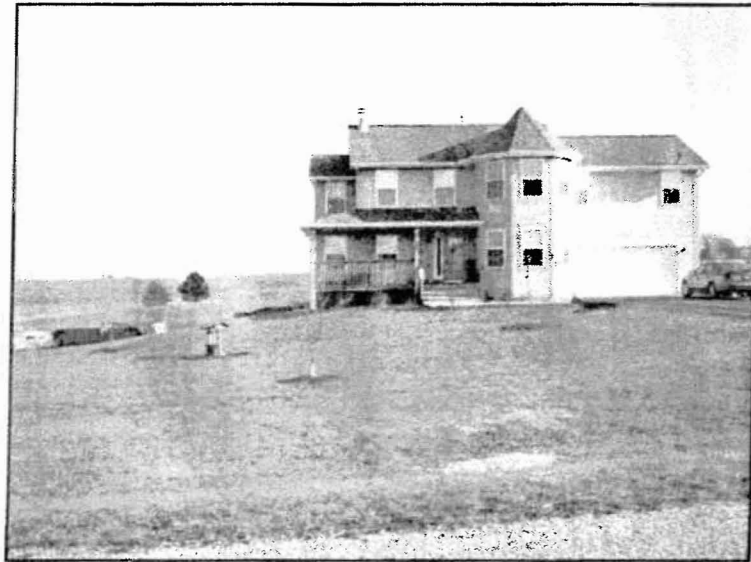
Meadowbrook Sub. And Wind Farm



View of Turbines from Meadowbrook Sub.



House within Meadowbrook Sub



Conclusion

- Based on these studies, there is no statistical difference between sale prices of properties located within proximity to an operating wind farm and those properties located some distance from an operating wind farm.

6.4 Alternative Stormwater Storage Areas - Continued

and including the 50-year storm event. Open waterways such as surface overflow swales shall be designed into the grading plan to receive all excess stormwater runoff. Depressing sidewalks across such overflow swales to meet this requirement shall be acceptable. Street ponding shall be allowed only for the conveyance of stormwater runoff and will be subject to approval by the public body accepting dedication of the street.

C. Rooftop Storm Water Storage

Rooftop storage of excess storm water shall be designed and constructed to provide permanent control inlets and parapet walls to contain excess storm water. Adequate structural roof design must be provided to ensure that roof deflection does not occur which could cause the roofing material to fail and result in leakage. Overflow areas must be provided to ensure that the weight of storm water will never exceed the structural capacity of the roof. Any rooftop storage of excess stormwater shall be approved only upon submission of building plans signed and sealed by a licensed structural engineer or architect attesting to the structural adequacy of the design.

D. Automobile Parking Lot Storage Areas

Automobile parking lots may be designed to provide temporary detention storage on a portion of their surfaces. Automobile parking facilities used to store excess storm water may be constructed having a maximum depth of stored storm water of 0.6 feet; and these areas shall be located in the most remote, least used areas of the parking facility. Design and construction of automobile parking in storm water areas must insure that there is minimal damage to the parking facility due to flooding, including minimal damage to the subbase. Warning signs shall be mounted at appropriate locations to warn of possible flood conditions during storm periods.

E. Underground Storm Water Storage

Underground storm water storage facilities must be designed for easy access in order to remove accumulated sediment and debris. These facilities must be provided with a positive gravity outlet unless otherwise approved by the reviewing authority.

Section 7 Protecting Existing Drainage

7.1 Natural Drainage

- A. Existing perennial streams shall not be modified to accommodate onsite flows of stormwater. Streambanks may be modified, however, incident to the installation of excess stormwater runoff outfalls, necessary to ensure safety or bank stabilization, and/or for the improvement of aquatic habitats.

7.1 Natural Drainage - Continued

- B. Other natural drainage features such as depressional storage areas and swales shall be incorporated into the drainage system.

7.2 Agricultural Drainage Improvements

- A. The outlet for existing agricultural drainage tile will be located and the capacity of the outlet shall be maintained for the watershed upstream of the development area.
- B. Existing easements for any agricultural drainage tile located underneath areas that will be developed shall be preserved. If no easement exists an easement shall be granted for access and maintenance as provided in Section 9 below. Such easements shall be of sufficient width and located to provide for continued functioning and necessary maintenance of drainage facilities. No buildings or permanent structures including paved areas but excluding streets, sidewalks, or driveways, which cross the easement by the shortest possible route may be located within the easement without the consent and approval of any public body to which the easement is granted.
- C. All agricultural drainage tile located underneath areas that will be developed shall be replaced with non-perforated conduit to prevent root blockage provided however that drainage district tile may remain with the approval of the drainage district.
- D. Agricultural drainage tile which, due to development, will be located underneath roadways, drives, or parking areas as allowed by Paragraph C above shall be replaced with ductile iron, or reinforced concrete pipe or equivalent material approved by the reviewing authority as needed to prevent the collapse of the agricultural drainage conduit.
- E. Agricultural drainage tile may be relocated within development areas upon approval of the reviewing authority. Such relocation shall maintain sufficient slope and capacity to prevent sedimentation and to prevent an increase in scouring or structural damage to the conduit. Such relocation shall only be with the consent and approval of the drainage district which is responsible for maintaining the tile. If the tile is not under the authority of a drainage district the reviewing authority shall consider the interests of those landowners who are served by the tile.
- F. No storm sewer inlet, outlet, or detention basin outlet shall be connected to farm drainage tile unless flow is restricted to an amount equal to or less than the discharge capacity of the tile. Such connection shall only be made with the consent and approval of the drainage district responsible for maintaining the tile. If the tile is not under the authority of a drainage district the reviewing authority shall consider the interests of those landowners who are served by the tile.
- G. No fill shall be placed nor grade altered in such a manner that it will cause surface water upstream of the development to pond or direct surface flows in such a way as to

7.2 Agricultural Drainage Improvements - Continued

create a nuisance.

- H. All surface runoff water shall exit the development at nonerosive velocities. All subsurface flows shall exit the development at such a velocity so as to prevent an increase in scouring or structural damage to off-site tile drains.
- I. Sizing of culvert crossings shall consider entrance and exit losses as well as tailwater conditions on the culvert.

Section 8 Joint Construction

Storm water storage areas may be planned and constructed jointly by two or more landowners so long as compliance with this policy is maintained.

Section 9 Easements

Easements to the County, township, drainage district or other public authority to provide for maintenance of public drainage facilities which serve the site and which are or are to be dedicated to, owned by, or under the control of such public authority shall be granted to further this policy when the need for such facility is in whole or in part specifically and uniquely attributable to the proposed development. All known agricultural drainage tile located underneath areas to be developed shall be granted an easement if no written easement exists prior to development. Such easement shall be approved in writing by the public body to which they are granted and recorded in the Champaign County Recorders Office before the reviewing authority issues any final approval except in the case of subdivisions where such easements are shown on the plat.

Section 10 Rule of Construction

These policy guidelines shall be construed liberally in the interests of the public so as to protect the public health, safety, and welfare.

Section 11 Waivers

Any or all of these policies may be waived or varied by the reviewing authority in accord with the applicable provisions of Article 18 of the Champaign County Subdivision Regulations or Section 9.1.9 of the Champaign County Zoning Ordinance.

AGRI NEWS

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Sky High

Wind towers may limit aerial applications

By TOM C. DORAN
AgriNews Publications

BLOOMINGTON, Ill. — Wind farms are becoming a major contributor in the quest toward more renewable energy, but growers need to be aware of potential agricultural production limitations these towers could create.

The construction of wind turbines has not only benefited the national energy picture, but also provided additional income to landowners.

However, 300-foot or taller turbines also are creating some unforeseen challenges and misconceptions among growers who utilize aerial application.

Due to safety concerns, agricultural aerial applicators are not able to fly into some areas with wind turbines, and are forced to add a surcharge in other areas with towers due to the additional costs of liability insurance and fuel.

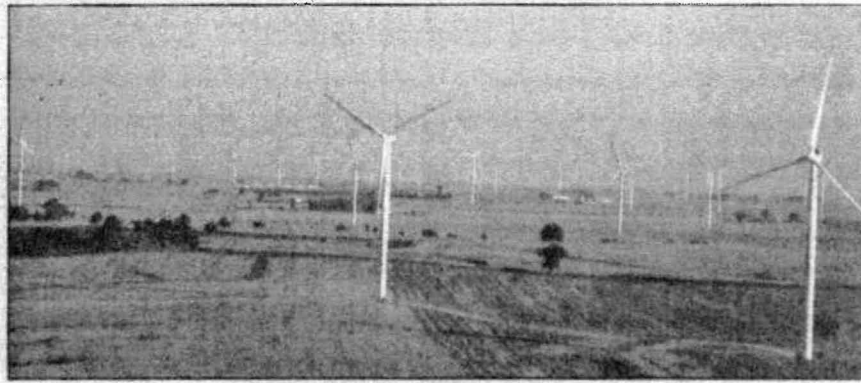
State and national aerial applicator organizations are urging wind farm developers to work with them toward improving their safety.

"We're not opposed to wind energy towers. We're just concerned about their placement," said Andrew Moon, executive director of the National Agricultural Applicators Association.

"You can't argue against clean energy, but if you can take into account the well being of other people and what kind of criteria they need to do their job such as in our industry, the placement of these things is important."

John Payne, president of the Illinois Fertilizer and Chemical Association, concurred this is not an anti-wind message.

"It's just when farmers go in and negotiate these contracts (with wind companies) they really need to understand that if aerial application is something important to them, then they should use that as a negotiation tool because they're going to be paying more for it if they can get it at all," Payne said.



Aerial applicators are required to fly low to the ground to prevent crop treatments from drifting, keep the chemical on target, follow all product label directions and restrictions and keep buffer zones between the target field and sensitive sites such as waterways and wildlife areas.

As the usage of fungicide and insecticide becomes more of a mainstay of crop production and provides a potential for yield increases, giving up a five to 10 bushels an acre boost needs to be factored in when negotiating for a wind tower on one's land, according to Payne.

"Obviously in the last few years there has been a lot of emphasis on the whole fungicide aspect and, yes, it is an important tool. Sometimes insecticides or herbicides are very important tools as well as getting fertilizer on by air," said Scott Schertz of Schertz Aerial Service in Hudson.

"Overall, it is important for farmers to have a platform available to protect their crops when they can't get into the fields practically because the crops are too wet or other situations.

"It is a important tool for agriculture that is well established, that has been a normal part of the existing farm practice in this area.

"They are a real safety hazard, and it is very intimidating to work around them. It is additional fuel and addi-

tional planning time to do some of what is around them and even next to them."

Chuck Holzwarth, who operates a flying service at Virden, said "if there's a field we can do, we'll do it."

"But I'm absolutely not going to send me or one of my pilots into a field with a bunch of towers around it and get killed," he stressed. "That's the bottom line."

Landowners with a tower may not only be impacted in terms of aerial spraying, but also their neighbors who may not have a turbine.

"Whether you have a turbine on the ground or you don't but have turbines all around your ground, it may or may not ever be able to be sprayed with an airplane again," Holzwarth said.

"It depends on the location of the neighboring obstructions, and if they impact our operations even if we can do it, they are still going to get a surcharge for it," Schertz said. "Any time that a wind tower is involved, and it is an obstruction of our normal routine,

we do enforce the surcharge. On my work order, if it is within a mile and it obstructs our operations, there is a surcharge.

"Obviously, if there is a field where a wind tower is strictly beside and we don't have to go crossways at all, for instance, I don't charge for it.

"But if you have a situation where the field is clear but you've to them all the way around it, that's a huge issue."

Holzwarth said that wind energy companies "tell farmer's they've talked to professionals about aerial application and the professionals tell them this and that. I don't know who they're calling professionals, but it's not anybody who is sitting in an airplane."

"I will admit I am biased. I question if it is in the long term interest of landowners to get involved with those items," Schertz said.

"But strictly from the aerial application side, a little cooperation from the wind power companies would certainly help and I would say I've had very little.

See LIMIT, page A6

THIS WEEK

Cash Rent



...tilling on a fixed rent in the current economic environment difficult task.

Page A2

Farm Policy



...concerns about the 8th farm economy slow growing.

Page A11

Low Tractors



...John Deere introduced new 6D Series tractors to Drive Green Media.

Page B3

Mail To



reaches milestone

erate every ns of els of

Although 20,000 MW is an important milestone, wind power provides just over 1.5 percent of the nation's electricity, far below the potential identified by experts, according to AWEA.

Still, it is one of the fastest-growing electricity sources today, providing 35 percent of the total new capacity added in 2007 — second only to natural gas.

The United States had 1,000 MW of wind power installed by 1985; 2,000 MW installed by 1999; and 5,000 MW by 2003.

Its first 10,000 MW was installed by mid-2006.

conduct a study on the safe height and distance that wind turbines can be installed in relation to aviation sites.

The amendment was included in the version passed by the U.S. House and awaits action by the Senate.

"These vertical obstacle are a major safety concern to aerial applicators and significantly hamper agricultural production," according to the issue brief.

Since 1995, 7.1 percent of all aerial application fatalities are the result of collisions with towers

"Wind energy towers pose the greatest safety and accessibility concerns to agricultural aviators because of their projected rapid growth in the coming years and the manner in which many of these towers are often clustered closely together," the NAAA said in the brief.

"Without wise placement and proper marking of towers in agricultural areas, farmers may be at risk of losing important aerial application services performed on their cropland.

"Towers sited directly in the flight path of aerial applicators' landing strips and/or hampering the accessibility of treatable cropland could literally shutdown aerial applicators' businesses.

"This would detrimentally affect, in some instances, the only method farmers have available to them when the time comes to apply crop protection chemicals, fertilizers and seeds to foster crop growth.

"Aircraft help in treating wet fields when crop foliage is too heavy to allow ground rigs to enter. An aircraft can accom-

account the safety and agricultural production issues of the aerial applicator.

"Erection of these towers should be away from the prime agricultural land."

The NAAA established the following safety guidelines that it requests be met before the construction of towers:

■ Petitions for constructing towers should be provided to the local government zoning authority, landowners and or farmers and aerial applicators within at least a one-half mile radius of a proposed tower, and the state or regional agricultural aviation association, no later than 30 days before tower construction permits are considered for approval.

This information should include the proposed location of each turbine generator, each meteorological tower including the height to be associated with the wind farm, the distribution sub-station and any connecting power lines from the generators, and power lines connecting the sub-station to the existing electrical power grid;

■ Towers should not be erected on prime agricultural land in a manner that may inhibit aerial applicators' access and ability to treat the land;

■ If a proposed tower is to

be placed in proximity to the towers, treat:

■ In the event that a proposed tower is constructed on prime agricultural land or in the vicinity of such land, towers should be freestanding without guy wires. Furthermore, towers should be lit and well marked so they are clearly visible to aerial applicators;

■ Towers erected with guide wires, particularly the meteorological testing towers, should be marked with two visible warning spheres on each guy wire, highly visible sleeves on the lower end of the cables that extend at least eight feet above the height of the highest crop that may be grown there, and properly lit;

■ In the event that a number of proposed towers are to be constructed on prime agricultural land or in the vicinity of such land, the towers should be constructed in a linear pattern, not a disordered, clustered pattern that would make an area completely inaccessible by air; and

■ During construction and upon completion, the operator of the wind farm should provide detailed field layout information to the local government zoning authority and make this information available to those working in close proximity to that area.

Limit

From page one

"The placement is a huge issue on how difficult it is to work around them, and obviously they have their own interest and they are not very concerned about other stakeholder interest in safety."

Schertz noted that his business has been impacted by wind farms already constructed in central Illinois.

A small amount of the impact has been felt in areas where Schertz can no longer spray due to turbines in those fields.

"Another part of the impact has been some people have not asked us to spray because of that. I really thing that has probably been a bigger impact," Schertz said.

"I'm not saying that maybe they knew already that it was too much of a mess and there wasn't any point of asking,

but I have noticed a decrease in market share in areas where there are a lot of them."

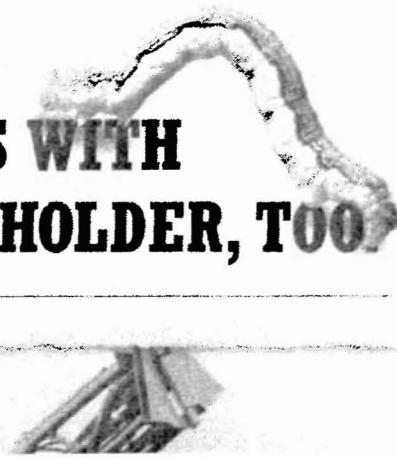
Schertz was asked if the downdraft of the blade rotation causes concern for pilots.

"Yes it is an impact. It isn't necessarily what I would call a downdraft, but it does disrupt the airflow and obviously an airplane is operating in that air.

"So if it is to the point basically that they're able to extract energy out of the air, they're disturbing the air. The more power they pull out, the more it disturbs it, and it is rough around them when you're into that situation.

"Yes, that is another factor. I mean they are not static obstacles. They impact the air and they're variable. It adds a lot of complexity to the operation."

**D WITH
URS COMES WITH
AND A CUP HOLDER, TOO**



Non-wind turbine landowners should investigate spraying impact

By **TOM C. DORAN**

AgriNews Publications

BLOOMINGTON, Ill. — Aerial application may not only be limited to farmland with wind turbines, but also nearby, and landowners should take steps to assess the potential impact.

With wind farms sprouting up throughout the Midwest, some aerial sprayers may not be able or want to apply chemicals on land with turbines, depending on the layout and the number of towers in a particular area.

In other cases, the location or number of turbines on one property may either limit an aerial applicator's

access to adjacent property without a tower or increase the application cost due to the higher risk.

Jerry Quick, Illinois Farm Bureau senior counsel, who has conducted wind farm informational meetings throughout the state, was asked what advice he would have for a landowner whose aerial application options are limited by his neighbor's wind towers.

"They need to discuss that with their personal legal counsel, and perhaps the also need to discuss that with the wind company and see what they have to offer. They should also talk to the sprayer," Quick said.

He added that at least one wind energy company has said they would

"turn off the turbines for a period of time to enhance the spraying process."

From a legal standpoint, the rights of the non-wind tower landowner and the potential for aerial application limitations have not been addressed in any case study.

"To the best of my knowledge, there is nothing out there at the present time. Also I am not aware of anything moving through the court system where there has not been a final decision but it has actually been filed," Quick said.

Any policies regarding where an aerial applicator can spray when wind towers are involved are up to the discretion of the individual fliers.

Quick includes in his presentations on wind farm legal issues comments about aerial sprayer in this scenario.

"I'm not saying, nor do I believe, nor have I learned that it's impossible to have aerial spraying if you have wind turbines," he said.

"But what I am saying is you need to think about how this might impact your ability to get aerial spraying because there may be some aerial sprayers out there who, depending on your configuration and numbers, will not do it or they'll do it but it's going to cost you more.

"You just need to know upfront. Find out how this is going to impact you. Hopefully, it won't, but it might."

Auction Calendar

Fri., Oct. 24 – 58.8 Acres, 9 a.m., Jack Riley, **Toulon, Ill.**, John Leezer/Jim Maloof Realtor, (309) 286-2221.

Fri., Oct. 24 – 42 Acres m/l, 9 a.m., Ted Fairfield, **Toulon, Ill.**, John Leezer/Jim Maloof Realtor, (309) 286-2221.

Fri., Oct. 24 – 182.55 Acres in 2 Tracts, 11 a.m., Jeanne Tepen & Darrell L. Smith, **Jacksonville, Ill.**, Middendorf Bros., (217) 243-5486.

Fri., Oct. 24 – 192 Acres, 11 a.m., Lawrence Eager Trust, **Earlville, Ill.**, McConville Realty & Auction, (815) 539-5673.

Sat., Oct. 25 – Fall Consignment Auction, 9:30 a.m., **Pecatonica, Ill.**, N.I.T.E. Equipment, (815) 239-9096.

Sat., Oct. 25 – Real Estate & Farm Equipment.

& Monroe Marquard Estates, **Venedy, Ill.**, Mark Krausz Auction Service, (618) 588-4917.

Sat., Nov. 1 – Estate Auction, 10 a.m., Dennis Bombal Estate, **St. Elmo, Ill.**, Hannagan Auction Company, (618) 829-5248.

Sat., Nov. 1 – John Deere Signs & Memorabilia, 10 a.m., Verlan Heberer, **Moline, Ill.**, Aumann Auctions, (888) 282-8648.

Sat., Nov. 1 – 300 Acres, 10:02 a.m., Steffensmeier Family, **Mt. Pleasant, Iowa**, Richard Realty, (319) 385-2000.

Sat., Nov. 1 – Farm Equipment, 10:30 a.m. CST, Paul Simatovich, **Valparaiso, Ind.**, Niemeyer Auction Service & Realty, (219) 696-7212.

Sat., Nov. 1 – 240 Acres-Personal Property, 10:30 a.m., Bernadine Worland Estate, **Clare, Ill.**, (317) 786-9659.

Culp Trust & First Mid-Illinois Bank & Trust, **Neoga, Ill.**, Schmid Auction & Realty Co., (217) 857-1507.

Fri., Nov. 14 – 240.86 Acres m/l in 3 Tracts, 10 a.m., Glenda Waterfield, Marsha Willander & Judith Montgomery, **Fairview, Ill.**, Van Adkisson Auction Service, LLC, (309) 426-2000.

Fri., Nov. 14 – 120 Acres m/l in 1 Tract, 10:30 a.m., Steve & Lorna Cox, **Marshall, Ill.**, Haycraft Auction Co., Inc., (217) 935-6286.

Fri., Nov. 14 – 62 Acres, 10:30 a.m., Richard Scheer, **Seneca, Ill.**, McConville Realty & Auction, (815) 246-7020.

Sat., Nov. 15 – Farm Equipment Consignment, 9:30 a.m., **Thorntown, Ind.**, Collins Equipment, (765) 436-7300.

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August 2003

SECTION 1

BASELINE AND MONITORING STUDIES FOR WIND PROJECTS

PRE-PROJECT ASSESSMENT

The primary purposes of pre-project assessment studies are to 1) collect information suitable for predicting the potential impacts of the project on wildlife and plants and 2) design the project layout (e.g., turbine locations) so that impacts on biological resources are avoided and minimized. To the extent possible, this pre-project assessment may utilize existing information from projects in comparable habitat types in locations close to the proposed project. The site-specific components and the duration of the assessment should depend on the size of the project, the availability and extent of existing and applicable information in the vicinity of the project, the habitats potentially affected, the likelihood and timing of occurrence of Threatened and Endangered and other Sensitive-Status species at the site, and other factors such as issues and concerns identified during public scoping. Each component is discussed below. The results of the information review and baseline studies should be reported to the affected stakeholders (e.g., state and federal wildlife agencies) in a timely fashion.

Information Review

Existing information on species and potential habitats in the vicinity of the project area should be reviewed and if appropriate, mapped. Sources of existing information should include resource agencies, local experts, recognized databases (e.g., Priority Habitats and Species [PHS] database), and data gathered at other nearby wind plants or other types of projects. This information should be used to develop a current state-of-the-art field and analysis protocol that is reviewed and approved by the state wildlife agency.

Habitat Mapping

Key information about general vegetation and land cover types, wildlife habitat, habitat quality, extent of noxious weeds, and physical characteristics within the project area should be collected and compiled using current state-of-the-art protocols.

Raptor Nest Surveys

At a minimum, one raptor nest survey during breeding season within 1-mile of the project site¹ should be conducted to determine the location and species of active nests potentially disturbed by construction activities, and to identify active and potentially active nest sites with the highest likelihood of impacts from the operation of the wind plant. A larger survey area (e.g., a 2-mile buffer) is recommended if there is some likelihood of the

¹ Site -- a project "site" for the purposes of addressing potential raptor nest disturbances is defined as the furthest extent of a ground disturbing activity and includes gravel sites used for construction, overhead and underground electrical routes, new and upgraded substations.

occurrence of nesting state and/or federally threatened and endangered raptor species (e.g., ferruginous hawk, bald eagle, golden eagle), or if empirical data on displacement impacts may be monitored after construction (see Research-Orientated Studies Below).

General Avian Use Surveys

A minimum of one full season of avian use surveys is recommended following current state-of-the-art protocols to estimate the use of the project area by avian species/groups of interest during the season of most concern (usually spring/early summer). Additional seasonal data (e.g. fall or winter) is recommended in the following cases: 1) use of the site for the avian groups of concern is estimated to be high relative to other projects, 2) there is very little existing data regarding seasonal use of the project site, and/or 3) the project is especially large. This additional avian use data should be collected to refine impact predictions and make decisions on project layout.

Surveys for Threatened, Endangered and Sensitive Species

If existing information suggests the probable occurrence of state and/or federal threatened or endangered or sensitive-status species on the project site at a level of concern, focused surveys are recommended during the appropriate season to determine the presence or likelihood of presence of the species. For example, if bald eagles are expected to winter in concentrations in the project vicinity, targeted surveys to estimate bald eagle use of the site would be appropriate.

MINIMIZATION OF WILDLIFE IMPACTS

One goal of the pre-project assessment is to help design the project to avoid, reduce and minimize impacts to habitat and wildlife. Below are some considerations for avoiding and minimizing impacts to wildlife.

Avoid Impacts

- Encourage development in agricultural and already disturbed lands, including using existing transmission corridors and roads where possible.
- Use of tubular towers is recommended to reduce the ability of birds to perch on towers and to possibly reduce the risk of collision. Discourage the use of lattice towers, particularly those with horizontal cross-members.
- Discourage tower types that employ guy wires. If guy wired towers are approved, encourage the requirement of bird flight diverters on the guy wires.
- Avoid high bird concentration areas, especially concentration areas of sensitive status species, and breeding sites.
- Discourage the use of rodenticides to control rodent burrowing around towers.
- Encourage the protection of PHS priority habitats.

Minimize Impacts

- Minimize use of overhead power lines.²
- When overhead lines are used, use designs that avoid and minimize impacts to raptors and other birds (e.g., adequate conductor spacing, use of perch guards).
- Minimize the use of lights on towers, in accordance with federal, state, and local requirements, wherever possible because they may attract flying wildlife to the vicinity of the turbines in certain conditions.
- Encourage the control of noxious weeds in accordance with federal, state, and local laws. Encourage the control of detrimental weedy species that invade existing habitat as a result of disturbance from construction and operation.
- Encourage the requirement of a complete road siting and management plan, including vehicle-driving speeds that minimize wildlife mortality.
- Encourage the requirement of a fire protection plan.

Reduce or Eliminate Impacts Over Time

- Encourage a decommissioning condition that would require removal of the turbines and infrastructure when it ceases operation, and restoration of the site to approximate pre-project conditions.

OPERATIONAL MONITORING

As is the case with most development, some mortality of bats and birds is expected to result from wind power projects. However, it is anticipated that significant impacts to wildlife can be avoided or lessened at most wind projects if proper pre-project assessment is implemented and good project design and management practices are established. Monitoring studies, such as carcass surveys, using current state-of-the-art protocols are required to determine the actual direct impacts of the wind farm on birds. The duration and scope of the monitoring should depend on the size of the project, and the availability of existing monitoring data at projects in comparable habitat types.

A Technical Advisory Committee (TAC) is recommended to be responsible for reviewing results of monitoring data and making suggestions to the permitting agency regarding the need to adjust mitigation and monitoring requirements based on results of initial monitoring data and available data from other projects. The range of possible adjustments to the monitoring and mitigation requirements should be clearly stated in the project permit (e.g., Conditional Use Permit). Adjustments should be made if unanticipated impacts become apparent from monitoring data. Examples of such changes

² However, use of overhead power lines might be warranted if habitat type is of concern.

may include additional monitoring or research focused to understand the identified impacts (e.g., bats) and creation of raptor nesting structures (artificial or natural, on or off-site) if significant impacts to raptor species are identified. Adjustments that are not feasible because they would make the wind project un-financeable include removing turbines or shutting down turbines during certain periods of the year. Adjustments can also reduce monitoring requirements based on monitoring data and site-specific conditions.

Potential members to the TAC include stakeholders such as state and federal wildlife agencies, the developers, environmental groups, landowners, and county representatives. Protocols for conducting the monitoring study and procedures for reporting and handling, and rehabilitating injured wildlife should be reviewed by the TAC. Progress reports summarizing the monitoring results should be reported to the TAC on a quarterly basis. Reporting schedules and scope of reports will be developed in the event of unusual unanticipated avian mortality.

RESEARCH-ORIENTED STUDIES

Standard pre-project assessment studies and standard fatality operational monitoring have been distinguished from more research-orientated studies. At some projects, additional studies that utilize pre-construction data may be conducted to test specific research hypotheses about impacts to a particular species or group of species. Rather than being necessary for pre-permit assessment, such studies are often more research-oriented and often are focused on indirect impacts, such as displacement, that provide information for future projects. Examples include the use of gradient analysis in understanding the level of displacement of grassland nesting birds as a function of distance from turbines or raptor nest monitoring comparing density and nest success before and after operation of the wind plant. If such studies are determined to be important to the overall understanding of wind energy/wildlife interactions, they should be designed to follow appropriate experimental designs and state of the art protocols (Anderson et al. 1999, Morrison et al. 2002). Funding for these more research- oriented studies should be solicited from multiple sources, including the wind industry, environmental groups, state and federal agencies, advocacy groups and other sources.

REFERENCES

- Anderson, R.L., M.L. Morrison, K. Sinclair, M.D. Strickland. 1999. Studying wind energy/bird interactions: a guidance document. National Wind Coordinating Committee Avian Subcommittee.
- Morrison, M.L., W.M. Block, M.D. Strickland, and W.L. Kendall. 2001. Wildlife study design. Springer-Verlag New York, Inc., New York, NY. 210 pp.

SECTION 2 WIND PROJECT HABITAT MITIGATION

General Principles for Wind Project Siting and Mitigation

These principles are intended for projects proposed for sites east of the Cascades, where almost all wind projects have been proposed to date. These principles would require review and revision for sites west of the Cascades.

- Implementation of the mitigation measures contained in this proposal are presumed to fully mitigate for habitat losses for all species, including species classified as “protected,” in the Washington Administrative Code, but excluding species classified as state “endangered” or federally “threatened” or “endangered,” for which additional species- and site-specific mitigation may be necessary.
- Wind project developers should be encouraged to site wind power projects on disturbed lands (i.e., developed, cultivated, or otherwise disturbed by road or other corridors).
- Wind project developers should be encouraged to place linear facilities (such as collector cable routes, transmission line routes, or access roads) in or adjacent to existing disturbed corridors in order to minimize habitat fragmentation and degradation.
- Wind project developers should be discouraged from using or degrading high value habitat areas, especially shrub-steppe habitat in “excellent” condition.
- Wind project developers are responsible for acquiring replacement habitat under this proposal and for management of such lands for the life of the project, unless otherwise indicated.
- WDFW mitigation guidance seeks to recognize the full range of environmental benefits and impacts of development in determining appropriate mitigation, including the fact that wind is a renewable energy resource that can replace fossil fuels and other energy sources that have serious environmental consequences to plant and animal species and habitats.

MITIGATION FOR PERMANENT HABITAT IMPACTS

A. No mitigation required for cropland, developed, or disturbed areas

No mitigation will be required for impacts to lands that have little or no habitat value. Examples include lands that are:

- Currently being cultivated;
- Developed (long term); or
- Disturbed by an active road or other corridor that eliminates natural habitat values.

B. Criteria for Mitigation by Acquisition of Replacement Habitat

In each of the mitigation categories listed below, the criteria indicate that the replacement habitat should be:

- Like-kind (e.g., shrub-steppe for shrub-steppe; grassland for grassland) and/or of equal or higher habitat value than the impacted area, noting that an alternative ratio may be negotiated by a wind developer and WDFW for replacement habitat that differs from impacted habitat;
- Given legal protection (through acquisition in fee, a conservation easement, or other means);
- Protected from degradation for the life of the project to improve habitat function and value over time;
- In the same geographical region as the impacted habitat; and
- Jointly agreed upon by the wind developer and WDFW.

If a wind power applicant meets these criteria, then the following ratios apply:

1. Acquisition of Replacement Habitat Subject to Imminent Development – 1:1

One acre of suitable replacement habitat will be accepted as mitigation for one acre of permanently impacted habitat where the replacement habitat is subject to imminent development – that is, there is a credible plan to develop the replacement habitat within five years and WDFW concurs with this assessment.

Rationale: There is no net loss of habitat function or value where the replacement habitat would be lost but for its acquisition as mitigation. In fact, there should be a net gain in habitat value over time since protection of the replacement habitat (of equal or better value than the impacted area) will usually result in improved habitat value.

2. Acquisition of Grassland, CRP Replacement Habitat – 1:1

One acre of suitable replacement grassland or CRP habitat will be accepted as mitigation for one acre of such habitat that is permanently impacted.

Rationale: Habitat values are protected under this approach because:

- Development of degraded grasslands or CRP habitat is preferable to development of shrub-steppe or other high value habitats.
- The replacement habitat was at some risk of development and is now given permanent protection.
- The replacement habitat is likely to improve in habitat function and value over time as degrading forces are removed.
- The value of the replacement habitat is equal to or better than the habitat value of the impacted area.
- The 1:1 ratio combines a number of factors -- which could require much time, effort, and expense to analyze and process -- in a simple and equitable approach.

3. Acquisition of Shrub-Steppe, Other High-Value Habitat– 2:1

Two acres of suitable shrub-steppe or other high-value replacement habitat will be accepted as mitigation for one acre of permanently impacted shrub-steppe or other high-value habitat. In this context, “other high-value habitat” includes lithosol/shrub matrix (plant communities on lithosol soils intermixed with other plant communities on deeper soils).

Rationale: A net gain in habitat value is likely under this approach because the replacement habitat:

- Was at some risk of development and is now given permanent protection.
- Is likely to improve in habitat function and value over time as degrading forces are reduced on the protected area.
- Value is equal to or better than the habitat value of the impacted area.
- The 2:1 ratio combines a number of factors -- which could require much time, effort, and expense to analyze and process -- in a simple and equitable approach.

Exception for habitat in “excellent” condition: Where a wind project will affect habitat in “excellent” condition (based on federal methodologies for assessing range land, or other method acceptable to WDFW), wind project developers will engage in additional consultation with WDFW regarding suitable mitigation requirements for such habitat.

MITIGATION FOR TEMPORARY IMPACTS TO HABITAT

Temporary impacts to habitat are those that are anticipated to end when construction is complete and land has been restored. Temporary impacts include trenching for placement of underground cables, construction staging areas, lay-down areas, and temporary construction access. Temporary impacts also include the portions of road corridors that are used during construction but that are re-vegetated at the end of construction, but do not include the portions of roads that continue to be used for project operations (which are considered permanently affected). The goal of restoration of temporary impacts should be to restore the disturbed habitat to a condition that is at least as good as its pre-project condition.

A. No Mitigation Required for Temporary Impacts to Cropland, Developed or Disturbed Areas (same as for permanent impacts)

B. Restoration, Mitigation for Temporary Impacts to Grass, CRP Lands -- 0.1:1

Temporary impacts to grassland or CRP habitat can be mitigated by:

- Implementing a WDFW approved restoration plan for the impacted area. A restoration plan should include site preparation, reseeding with appropriate vegetation, noxious weed control, and protection from degradation (irrigation

or planting with live plants will not be required).

- Acquiring 0.1 acres of suitable replacement habitat for every acre temporarily impacted by the project.
- A good faith effort should be made to restore the impacted area, however long-term performance targets should not be imposed since temporal losses and the possibility of restoration failure are incorporated into the acquisition and improvement of replacement habitat.
- WDFW and a wind developer may agree on other ratios and terms where doing so is mutually beneficial.

C. Restoration, Mitigation for Temporary Impacts to Shrub-steppe Habitat—0.5:1

Temporary impacts to shrub-steppe habitat can be mitigated by:

- Implementing a WDFW approved restoration plan for the impacted area. A restoration plan should include site preparation, reseeding with appropriate vegetation, noxious weed control, and protection from degradation (irrigation or planting with live plants will not be required).
- Acquiring 0.5 acres of suitable replacement habitat for every acre temporarily impacted by the project.
- A good faith effort should be made to restore the impacted area, however long-term performance targets should not be imposed since temporal losses and the possibility of restoration failure are incorporated into the acquisition and improvement of replacement habitat.
- WDFW and a wind developer may agree on other ratios and terms where doing so is mutually beneficial.

Customized Acquisition and Restoration Packages – This Habitat Mitigation proposal should not be viewed as preventing or discouraging WDFW and wind developers from negotiating “customized” or “alternative” mitigation packages where circumstances make it desirable for both parties to use accepted methodologies (such as NRDA or an alternative mitigation option) to do so.

SECTION 3 WIND POWER ALTERNATIVE MITIGATION PILOT PROGRAM

INTRODUCTION: This pilot program offers an alternative to conventional mitigation for wind projects that can greatly improve the habitat value per mitigation dollar as well as provide a more streamlined and efficient mitigation process for applicants. A significant feature of the pilot program is that it links targeted acquisition by WDFW of the highest value habitat in central and eastern Washington³ with sustained “stewardship” funding from wind projects to restore, manage, and monitor these critical habitat areas. Fortunately, many of the areas that have the highest habitat values are also low cost, providing an outstanding opportunity to maximize the value of mitigation funds.

Because the Alternative Mitigation Pilot Program is experimental in nature, the fee will be reviewed annually, and adjusted as necessary, by WDFW to ensure that it is equitable, compared to the conventional mitigation option in Section 2, and provides incentives to encourage significant participation by wind developers. In addition, the Alternative Mitigation Pilot Program will be reviewed and evaluated at the end of five years, along with the other sections of the Wind Power Guidelines.

GOAL: The goal of the Wind Power Alternative Mitigation Pilot Program is to provide an optional and streamlined approach to mitigation that results in better habitat value and is more attractive to wind developers than conventional “on-site” mitigation.

PRE-PROJECT ASSESSMENT, OPERATIONAL MONITORING

A wind project applicant may either:

1. Follow the guidance set forth in Section 1 of the Wind Power Guidelines document (Baseline and Monitoring Studies for Wind Projects), or
2. Follow a streamlined process (to be negotiated with WDFW) if the project is to be sited in an area that has been determined by WDFW to present a low probability of significant risk to wildlife (and efforts have been made to avoid and minimize wildlife impacts).

ALTERNATIVE HABITAT MITIGATION

After determination by the wind project applicant, in consultation with WDFW, of the project’s impact on habitat (in terms of acres permanently and temporarily impacted, and the type and general quality of habitat impacted), the applicant and WDFW will identify the appropriate annual fee for the life of the project⁴, based on an Alternative Mitigation Fee Rate of \$55.00/acre/year for each acre of replacement habitat that would be owed

³ At the time of this writing, a request is being made to the State Legislature for an appropriation in the 2004 Supplemental Operating Budget.

⁴ “Life of the project” is defined as beginning at the end of the first year of commercial operation and ending with implementation of the project decommissioning plan.

using the ratios and analysis contained in Section 2.⁵

As noted above, the Alternative Mitigation Fee Rate will be reviewed annually, and adjusted as necessary, by WDFW. Changes to the fee will be applied to future wind development proposals (for which mitigation has not yet been determined); changes in the fee will not be applied retroactively.

General provisions:

- The fee listed above is based on habitat in “average” condition and can be increased or decreased by up to 25% to account for differences in habitat quality.
- The applicant will be required to implement an approved restoration plan for temporarily impacted areas (in accordance with Section 2).
- In cases where the project impacts a mixture of habitat types, the fee schedule will be applied accordingly (to the nearest acre).
- The annual fee will be used primarily to support “stewardship” of high-value habitat in the same ecological region as the project (for management, monitoring, restoration, protection from degradation). It is envisioned that these annual stewardship funds will be applied to strategically important habitat in central and eastern Washington that is newly acquired by WDFW. The annual fees will be deposited into a dedicated WDFW account and may also be used for acquisition.
- If the applicant and WDFW cannot agree on a mutually advantageous “package” under the alternative mitigation program, the conventional mitigation guidance in Section 2 will be applied to the project.

⁵ To determine Alternative Mitigation Fee, use the guidance provided in Section 2 to:

- 1) Determine acres permanently and temporarily impacted by project for the shrub-steppe and grass categories (i.e., permanently impacted shrub-steppe, permanently impacted grass/CRP, temporarily impacted shrub-steppe, and temporarily impacted grass/CRP);
- 2) Multiply the acres in each of the four categories by the applicable ratio (e.g., shrub-steppe acres permanently impacted x 2.0);
- 3) Sum the acreage of the four categories to arrive at the total acres of mitigation owed; and
- 4) Multiply this total by the Alternative Mitigation Fee Rate to arrive at total annual payment for the project.



Assistant Prosecutors:

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May 20, 2008

All Champaign County Township Trustees
Champaign County Commissioners
Logan-Union-Champaign Planning Commission
Champaign County Community Improvement Corporation
Wayne Township Zoning Commission Members
Union Township Zoning Commission Members

Greetings,

I am pleased to present to you the report of the Champaign County Wind Turbine Study Group ("WTSG").

This report is a culmination of eight months of effort (five months of weekly meetings to study the issues and another three months drafting and rewriting the final product) by representatives of township and county government, industry, agriculture and community activists.

The report contains neither draft model legislation nor a recommendation for or against endorsement of "wind turbines."

Rather, the report contains the results of the research and critical analysis compiled by members of the WTSG regarding fourteen readily identifiable issues associated with wind energy development. The WTSG chose to present its work product in a format that is easy to read and understand. Each issue is specifically defined, with accompanying information assessments and recommendations for action.

The WTSG wants local decision-makers to utilize this report as part of the total consideration process when or if their particular jurisdiction contemplates taking legislative or regulatory action with regard to wind energy development.

I am very proud of the commitment WTSG members showed in our 7 a.m. weekly meetings. I want to also recognize Christopher A. Walker, Esq. for his extraordinary efforts in serving the WTSG as recording secretary for purposes of drafting and rewriting this report.

I urge interested readers to use the WTSG report as starting point when considering their own feelings on wind energy development. While this document will not settle the debate, it will most certainly assist our citizenry in determining what is in the best interests of the Champaign County community where wind energy comes to mind.

Thank you for your consideration.

Very Truly Yours,



Nick A. Selvaggio
Chair, Champaign County Wind Turbine Study Group
Champaign County Prosecuting Attorney

Enclosures

cc: Champaign County Wind Turbine Study Group
file

Champaign County, Ohio
Wind Turbine Study Group

“To inform the decision-makers”

May 2008

Jon Berry, Champaign County Farm Bureau

Jason Dagger, Champaign County Farm Bureau

Hon. Grant Johnson, Wayne Township Trustee

Julie Johnson, Union Neighbors United

Diane McConnell, Union Neighbors United

Mike Pullins, Everpower Renewables Corp.

Hon. Nick A. Selvaggio, Champaign County Prosecuting Attorney

Hon. Fereidoun Shokouhi, Champaign County Engineer

Mike Speerschneider, Everpower Renewables Corp.

Hon. Jim Virts, Union Township Trustee

Christopher A. Walker, Esq., Union Neighbors United

Foreword

BACKGROUND OF THE WTSG

In May 2007, a local citizen's group, Union Neighbors United, called upon its Champaign County, Ohio elected officials to provide a forum from which discussion could be held on issues surrounding proposed wind turbine development in their township. This group of citizens wanted to explore acceptable approaches to wind energy regulation to ensure that wind energy development would have the least amount of impact on the health, safety and welfare of Champaign County residents and its surrounding habitat.

In the months that followed, farmers and owners of undeveloped lands solicited their local governmental leaders for equal opportunity to engage in dialogue that would enable them to voice support for wind turbine placement. These groups of citizens felt strongly that this type of renewable resource would provide the prospects of clean energy, jobs and economic development to Champaign County.

In September 2007, the Champaign County Prosecutor's Office agreed to facilitate a series of weekly community meetings. Participants would be culled from a balanced set of primary stakeholders for the purpose of sharing information, exchanging ideas and exploring areas of mutual agreement regarding the potential placement of wind turbines in Champaign County.

The result was the formation of the Champaign County Wind Turbine Study Group (WTSG). Champaign County Prosecutor Nick A. Selvaggio solicited named representatives from Champaign County Farm Bureau, Champaign County Township Trustees Association, Everpower Renewables Corp., Logan-Union-Champaign Regional Planning Commission, and Union Neighbors United to critically debate the merits and consequences of wind energy development in Champaign County. Although participation in the discussions would be limited to named WTSG members, the WTSG felt that by having its meetings open to the public, it would guarantee transparent access to materials studied and viewpoints debated.

For twenty-four weeks, members of the WTSG were given the opportunity to present research materials from a previously developed list of agreed upon topics. Upon the completion of one presentation, the other stakeholders were given the opportunity to present similar or alternative viewpoints and materials on the same topic. Meeting notes were taken and a compilation of materials presented were retained for bibliographical reference and possible future use.

MISSION OF THE WTSG

The stated mission of the WTSG was "to inform the decision-makers." Specifically, the WTSG wanted to acquire, organize and assess relevant topical information on a variety of wind energy issues. Using the acquired resources, the WTSG would seek to provide input and formulate recommendations to local

decision-makers who might be considering a governmental response to potential wind energy development in their region of Champaign County.

WTSG members were mindful that Ohio law places governing responsibility for electrical generation projects over 50 megawatts on the Public Utilities Commission of Ohio (PUCO) and its Power Siting Board. WTSG members considered whether their informational gathering role should result in formulating regulatory guidelines to local leaders. WTSG members decided that they would not draft model ordinances for local governments to consider. Instead, the WTSG chose to develop a report based on informational assessments and recommendations of multiple issues related to wind energy development.

The WTSG was not created by Ohio statutory law. The WTSG has no formal or statutory rule-making authority. The WTSG is comprised of an informal group of concerned community stakeholders that were assembled to study the merits of wind energy development. But for WTSG industry representatives, the members of the WTSG have no specialized knowledge or training in wind energy development. Thus, this document is limited in its ability to be an authoritative guideline on wind energy development due to the educational limitations of its membership.

Yet, WTSG members were vigilant in acquiring information from a variety of sources. They discovered an overwhelming amount of information available from government agencies, private companies, consultants and organizations from proponents and opponents of wind energy. In addition, news articles and anecdotal stories were found available for review. The materials collected by the WTSG are available in total and can be assessed, with the report, at the Champaign County Public Library.

For every document discovered, there were many others not retrieved for review. As such, any cited materials herein should not be considered to be an exhaustive list of available resources. To the extent that readers of this document wish to consider additional information to assess and weigh the credibility of the information and conclusions set forth in this report, readers are cautioned to consider relevant research and data from qualified experts.

In addition to reviewing this document and reading other materials, the WTSG encourages local decision-makers studying wind energy development to visit operating wind farms and consult with other local officials who have previously studied similar issues in their own communities.

FINDINGS AND RECOMMENDATIONS OF THE WTSG

The findings and recommendations of the WTSG are topically organized as follows:

The WTSG studied fourteen (14) different wind energy development topics: Aesthetics, Blade Throw, Decommissioning, Economics, Environmental Impacts, FAA Lighting, Fire/Emergency Response, Ice Shed/Throw, Noise, Road Infrastructure, Shadow Flicker, Telecommunications, Turbine Collapse and Vandalism. The findings and recommendations of the WTSG are topically presented in alphabetical order.

The reader will notice that there are varying page lengths of discussion to some of the topics presented herein. The WTSG cautions the reader not to infer that a higher priority or significance was allocated to a topic simply based on the resulting “page length differential.” The WTSG considers each topic equally important to forming a healthy, safe, efficient and economically viable wind energy development plan for our community. Instead, the WTSG trusts that the reader will recognize that a topic’s resulting page length was attributable to the WTSG’s finding that certain topics merited more vigorous debate based on the nature and content of the material available for review and analysis.

For each topic covered, the WTSG defines the problem or issue involved. A summary assessment of the information presented is then provided. The WTSG concludes a review of the topic by offering recommendations for the decision-maker on how to mitigate any potential adverse impact that the particular problem may have on the local community. Where the WTSG failed to reach unanimity on a particular subject, the alternative viewpoint(s) were provided for the reader’s consideration.

A complete bibliography of information as chronologically presented to and considered by the WTSG is included in the appendix.

In summary, consideration should be given to balancing the positive and negative impacts of wind energy on host properties, nonparticipating properties, and the overall community. Decision-makers should take into account cumulative impacts of wind energy projects in the context of other development in the region. Residents, businesses and entities in the vicinity of proposed sites can benefit from a transparent governmental review process in which occasions to voice support, opposition or concern may be made. Opportunities exist to mitigate the negative impacts of wind turbine developments through zoning ordinances and use of scientifically accepted methodology.

The WTSG recognizes there are practical arguments for encouraging the WTSG to continue its study of the issues through the coming months and even years. As technology evolves and more research is published and peer reviewed, calls for further debate will most certainly ensue. However, the WTSG recognizes that perpetuating the discussion only serves to delay the delivery of information to Champaign County’s leadership. At some point, the findings must translate into action. It is hoped that this document and its referenced materials will assist our governmental representatives in formulating an action plan that will serve the public good of Champaign County, Ohio.

- Nick A. Selvaggio, WTSG Chair

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1. Aesthetics:

Definition of Issue:

- Aesthetics has been raised as a concern about wind-energy projects. While some people think turbines are pleasing to view, others likely will not agree. Taking care to place the turbines in a manner that takes aesthetics into account will help the project fit more harmoniously with the community.

Information Assessment:

- There are a number of reasons why proposed wind-energy projects evoke aesthetic concerns. Modern wind turbines are relatively new to the United States. Some of the early projects were built in remote areas, but increasingly they are being built in or proposed for areas that are close to residential and recreational uses, and often in areas never before considered for wind power uses. The turbines are often taller than any local zoning ordinance, and they are impossible to screen from view. The movement of the blades makes it more likely that they will draw attention. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 143.
- One commentator suggests that communities with a rural setting and a history of farming might accept harvesting of wind energy as an acceptable use of their land. Ben Hoen, *Impacts of Windmill Visibility on Property Values in Madison County, NY* (April 2006) (attached as Appendix B to Faulkner, David, *Community Improvement Corporation of Champaign County, “Economic Impact Study of Wind Farm Development in Champaign County, Ohio”*, November 13, 2007).

Recommended Action:

- Local decision-makers should require an aesthetic impact study as part of local jurisdictions’ siting and compliance review process. One option for an aesthetic impact study is to require wind developers to provide a visual simulation that depicts how the project would look from different vantage points throughout the project area. The study should specifically address sensitive areas around the project as defined by the local jurisdiction and taking into account, among other things, the policies and designations of the State Historic Preservation Office (SHPO).
- The National Research Council publication, *Environmental Impacts of Wind-Energy Projects* (2007), contains an extensive discussion of how aesthetic impacts can be evaluated in connection with the implementation of projects. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 173-78, 360-75. This publication may be purchased or accessed online at <http://www.nap.edu>. Follow the “Energy and Energy Conservation” link.
- Aesthetic impacts can be mitigated by ensuring the project has visual order and uniformity, using turbines and towers of consistent height and design, requiring removal of non-operating structures (as appropriately defined), minimizing the visibility of transmission lines and ancillary

structures, minimizing erosion during project construction and operation, requiring turbines to be painted white or grey, and prohibiting turbine use for telecommunication antennas, billboards, and signs. Gipe, Paul, *“Design As If People Matter: Aesthetic Guidelines for a Wind Power Future”* (referenced in J. Johnson presentation materials Jan. 29, 2008.)

- Utilizing the above considerations, in combination with setbacks as warranted, can result in a wind project that is compatible with most existing land uses.
 - Some, but not all, of the members of the WTSG agree with Paul Gipe that most existing land uses include rural residential, row crops, grazing, commercial, schools, religious sites, some parks, outdoor recreation, tourism, cycling, walking and jogging. Paul Gipe Ag Workshop Powerpoint, Community Wind.
- Members of the WTSG believe that the following questions could help evaluate the potential for undue cumulative aesthetic impacts associated with new wind turbine projects or expansions of existing wind turbine projects. (All of the following considerations are from National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 150-51.)
 - Are the turbines at a scale appropriate to the landscape?
 - Are turbine types and sizes uniform within the area?
 - How great is the offsite visibility of infrastructure (for example, substations and transmission lines)?
 - Have areas that are inappropriate for wind projects (due to terrain, important scenic, cultural, or recreational values) been identified and evaluated?
 - If the project is built as proposed, would the area retain any undeveloped scenic vistas?
- Members of the WTSG acknowledge that there may be difficulty in the interpretation and implementation of the above considerations.
- Some, but not all, of the WTSG members recommend that consideration be given to the potential aesthetic impact of wind turbine projects on populated areas such as cities or villages.

2. Blade Throw:

Definition of Issue:

- Wind turbine blades can fail resulting in blades or blade fragments coming free and being thrown from the turbine.

Information Assessment:

- According to Garrad Hassan Canada, Inc.:
 - The main causes of blade failure are human interface with control systems, lightning strike or manufacturing defect;
 - Evidence suggests that the most common cause of control system failure is human error. Many manufacturers have reduced that risk by limiting the human adjustment that can be made in the field;
 - Lightning strike does not often lead to detachment of blade fragments. Lightning protection systems have developed significantly over the past decade, leading to a significant reduction in structural damage attributable to lightning strikes;
 - Improved experience and quality control, as well as enhancement of design practices, has resulted in a significant diminution of structural defects in rotor blades; and
 - Garrad Hassan is not aware of any member of the public having been injured by a blade or blade fragment from a wind turbine.

Garrad Hassan Canada, Inc., *“Recommendations for Risk Assessments of Ice Throw and Blade Failure in Ontario”*, May 31, 2007 at p. 12-13 (included in Champaign County Farm Bureau report 12/11/07).

- Blade failure can occur in high wind-speed conditions. Ubarana, Vinicius & Giguere, Philippe, General Electric Energy, *“Extreme Wind Speed – Risk and Mitigation”*, October 2007.
- According to GE Energy:
 - The mode of failure of a wind turbine due to an extreme wind event cannot be generalized and depends on the turbine type and configuration, as well as the specifics of the extreme wind event and site conditions. Examples of possible failure scenarios include blade failure or a tower buckling or overturning. When winds are above the cut-out speed, the wind turbine should have its blades idling in a position creating minimal torque on the rotor. This is the only safety mechanism other than the yaw control. If a grid failure were to occur in conjunction with an extreme wind event—which is a likely scenario—the yaw control will become inactive. The loss of yaw control could increase the likelihood of damage/failure in the case of an extreme wind event. Also, the grid components/structures could also be part of the potential windborne debris. At this time, GE has no modeling capability in place that can predict the impact made to a wind plant if an extreme wind event occurs. Ubarana,

Vinicius & Giguere, Philippe, General Electric Energy, "Extreme Wind Speed – Risk and Mitigation", October 2007.

- The safety system must have two mutually-independent braking systems capable of bringing the rotor speed under control in the event of grid failure (as required through IEC specifications). Garrad Hassan Canada, Inc., "Recommendations for Risk Assessments of Ice Throw and Blade Failure in Ontario", May 31, 2007 at p. 12-13 (included in Champaign County Farm Bureau report 12/11/07).
- Professor Terry Matilsky of the Department of Physics and Astronomy, Rutgers University, has calculated that it is physically possible for broken blades to be thrown up to 1,680 feet horizontally. Matilsky, Terry, Rutgers University, "Part I – Basic Kinematics" at p. 2.

Recommended Action:

- Members of the Study Group had differing views as to the degree of setback that is warranted to protect against blade throw.
 - Some WTSG members are of the view that the precautions and setbacks employed for protection against ice throw (that is, 1.5 x (hub height + blade diameter) from occupied structures, roads and public use areas) are also adequate to protect against blade failure. This view is based on risk-based calculations done for icing situations which consider the frequency of occurrence and the potential travel distance. Wahl, David & Giguere, Philippe, General Electric Energy, "Ice Shedding and Ice Throw – Risk and Mitigation", April 2006. Using the recommended setback for ice is appropriate because the physics of anything breaking off the blades, including the blades themselves, is similar. Matilsky, Terry, Rutgers University, "Part I – Basic Kinematics" at p. 1.
 - Other WTSG members are of the view that a minimum setback of 1,680 feet is warranted based on the potential for broken blades to be thrown that distance. To protect safety and property on adjacent property, these members also believe that this setback should be measured from the adjacent property line.

3. Decommissioning:

Definition of Issue:

- Once the operational life of the turbines has ended, arrangement must be in place that would ensure the removal of the structures.

Information Assessment:

- Lease Agreements between wind developers and landowners normally include provisions for decommissioning, though these provisions are not necessarily uniform from project to project.
- In practice, decommission generally consists of removal of above-ground and subsurface structures to a depth of at least 36 inches, grading and re-seeding of the surface, unless directed otherwise by the landowner.

Recommended Action :

- Local decision-makers should enact zoning to require that the developer or operator decommission (*i.e.*, dismantle and remove) wind turbines and ancillary structures—
 - At the end of the turbine’s useful life (as appropriately defined), or
 - if the turbine is determined to be unsafe or detrimental to health, or
 - If the turbine is in significant violation of applicable zoning requirements.

Local decision-makers may wish to consider different timelines and remedies for decommissioning under the different circumstances set forth above.

At the landowner’s election, roadways and pads may remain in place.

- Local zoning should require the developer and operator to post a surety bond or other financial assurance that is at least 115% of decommissioning costs (less salvage value) as calculated and certified by a registered professional engineer. Calculation of the decommissioning and salvage should be updated every few years and the fund amount adjusted accordingly.
- Local zoning should specify that wind turbines and ancillary structures that are not decommissioned in accordance with zoning requirements are to be deemed a public nuisance.
- Upon decommissioning, all above-ground and subsurface structures should be removed to a depth of at least thirty-six inches (36”) and the site returned, as closely as possible, to its previous state (unless otherwise directed by the landowner).
- Some, but not all, WTSG members believe that the leasing landowner should be jointly obligated with the developer and operator to ensure decommissioning since the leasing landowner is a participant in the wind turbine development. These members also believe that decommissioning is consistent with townships’ zoning authority for the purpose of preventing nuisance, protecting public safety, and addressing community aesthetics.

- WTSG members requested a legal opinion from the Champaign County Prosecutor regarding township authority to require decommission bonding or funding. That opinion is attached in Appendix B.
- Some WTSG members believe that the Pennsylvania Model Ordinance for Wind Energy Facilities provides a good example of decommissioning language for zoning documents.

4. Economics:

Definition of Issue:

- Wind energy projects have the potential to impact the local economy in the form of capital investment, jobs, patronization of local businesses, lease payments to host landowners, tax revenue, and property values.

Information Assessment:

- David Faulkner of the Champaign County Improvement Corporation conducted a study examining the potential economic benefits to the community. Faulkner, David, Community Improvement Corporation of Champaign County, "Economic Impact Study of Wind Farm Development in Champaign County, Ohio", November 13, 2007. The study utilized an economic model that was developed by the National Renewable Energy Laboratory (NREL) specifically to estimate the economic benefits from a new wind-energy facility. This model, the JEDI-WIND model, calculates the direct, indirect, and induced economic benefits of new wind energy facilities. National Research Council, "Environmental Impacts of Wind-Energy Projects", May 2007 at p. 166-67.
 - The JEDI-Wind model employs economic data developed from numerous operating US wind farms and provides for the use of national statistics or the tailoring of the model to local economic circumstances. The case of the Champaign County Economic Study utilized both national statistics and specific local input data to calculate the economic benefits of the project.
 - Based on input from wind developers active in the area, the Champaign County Economic Study estimates a capital investment of \$190 Million to \$570 Million, based on wind generation of 100-300 megawatts in the county. Faulkner, David, Community Improvement Corporation of Champaign County, "Economic Impact Study of Wind Farm Development in Champaign County, Ohio", November 13, 2007 at p. 3.
 - The Champaign County Economic Study predicts that this investment in the area will result in significant jobs, economic activity, and tax revenue during both construction and operation.
 - Some, but not all, WTSG members question the CIC's findings and conclusions about local economic benefit on the ground that although the report refers "local" economic impacts, the supporting model utilized default data that reflects statewide economic impacts. http://www.eere.energy.gov/windandhydro/windpoweringamerica/docs/jedi_wind_model.xls (FAQ). Although the model provides an option for inputting county or regional data to run a county or region-specific analysis, the utilization of county or regional data in the Economic Study was limited and unsupported. Furthermore, to estimate the secondary effects of a wind-energy project on a region's economy, the region must be geographically defined. National Research Council, "Environmental Impacts of Wind-Energy Projects", May 2007 at p. 166. The Champaign County Economic Study does not adequately define the geographic region over which new jobs, spending, and other

economic impacts are being distributed. For these reasons and other reasons, these members believe that the report's projections of "local" job and spending generation are meaningless.

- Some, but not all, WTSG members feel that the CIC findings are representative of Champaign County and the neighboring counties. The results represent general economic impacts based on the JEDI methodology and Faulkner's knowledge of the local economy. See Faulkner, David, Community Improvement Corporation of Champaign County, "Economic Impact Study of Wind Farm Development in Champaign County, Ohio", November 13, 2007 at p. 3.
- On the subject of the impact of wind turbine development on local property values, the Champaign County Economic Study report concludes, "The only safe conclusion one can draw from the body of work done on this is that there is no definitive understanding or conclusion on the impact wind power development has on property values." Faulkner, David, Community Improvement Corporation of Champaign County, "Economic Impact Study of Wind Farm Development in Champaign County, Ohio", November 13, 2007 at 5.
- In addition, a number of other organizations have made general conclusions about the economic impacts of wind energy:
 - According to Environment Ohio:
 - "In 2001 Ohio spent \$29 billion on energy, \$16 billion of which was exported to other states or nations. A homegrown clean energy strategy would reduce Ohio's exposure to price spikes, supply distribution, and other repercussions of our reliance on fossil fuels." Environment Ohio & Environment Ohio Research and Policy Center, "*Ohio's Wind Energy Future*", November 2006 at p. 10.
 - "Ohio has the infrastructure to be a leading manufacturer of wind energy technologies. With a national investment in renewable energy and energy efficiency, Ohio could potentially gain more than 22,000 manufacturing jobs. Over 13,000 of these manufacturing jobs would result from an investment in wind power, which is more of a job gain than any other state besides California. The installation and maintenance of wind turbines is a homegrown industry, one that can provide more and better jobs than coal-fired power plants. Over 1,000 companies, located throughout the state, would benefit from increased wind energy production." Environment Ohio & Environment Ohio Research and Policy Center, "*Ohio's Wind Energy Future*", November 2006 at p. 11.
 - Figure 7 of the Environment Ohio report estimates that Champaign County has the potential to gain 50-99 jobs as a result of a nationwide investment in renewable energy. The same figure estimates that the six surrounding counties have the potential to gain a total of 800-1,744 jobs as a result of a nationwide investment in renewable energy, most of which are predicted for Miami County.
 - "Farmers with good wind resources could increase the economic yield of their land by 30 to 100 percent. This could make the difference between insolvency and survival for

many Ohio family farmers.” Environment Ohio & Environment Ohio Research and Policy Center, *“Ohio’s Wind Energy Future”*, November 2006 at p. 12.

- “If Ohio were to take advantage of only 20 percent of [areas with wind speeds high enough to support commercial-scale wind farms,] wind energy could provide 20 percent of Ohio’s electricity needs in 2020 (or about 37,000 GWh per year.) The wind turbines would cover only 0.03 percent of Ohio’s total land area, allowing farmers to grow crops right up to the turbine base.” Environment Ohio & Environment Ohio Research and Policy Center, *“Energizing Ohio’s Economy, Creating Jobs and Reducing Pollution with Wind Power”*, August 2007 at p. 21.
- According to the American Farmland Trust, for every dollar of tax generated by residential property, there is a cost to service those residences of \$1.16. By comparison, the cost to service commercial and industrial property is \$0.27 for each dollar of tax revenue generated. Faulkner, David, Community Improvement Corporation of Champaign County, *“Economic Impact Study of Wind Farm Development in Champaign County, Ohio”*, November 13, 2007 at p. 11.
- According to the American Wind Energy Association’s (hereinafter “AWEA”) *“Wind Energy and Economic Development: Building Sustainable Jobs and Communities,”* the European Wind Energy Association has estimated that, in total, every MW of installed wind capability directly and indirectly creates about 60 person-years of employment and 15 to 19 jobs. The rate of job creation will decline as the industry grows and is able to take advantage of economies of scale. AWEA, *“Wind Energy and Economic Development: Building Sustainable Jobs and Communities,”* cited in National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 166.

Recommended Action:

- To fully understand and evaluate the economic impacts of any wind energy project, local decision-makers should require wind developers to provide an economic impact assessment prepared with input from appropriate development agencies such as the Ohio Department of Development and/or the Champaign County Community Improvement Corporation.

5. Environmental Impacts:

Definition of Issue:

- Wind projects, as all human development, can have an impact on local wildlife and wildlife habitat.

Information Assessment:

- There are a number of federal, state, and local agencies that have primary jurisdiction over these issues. The Ohio Department of Natural Resources has jurisdiction over Ohio wildlife species. They are currently developing and adapting measures that will help wind turbine projects avoid or minimize species impacts. U.S. EPA, Ohio EPA, the U.S. Army Corps of Engineers, and other agencies have jurisdiction over wetlands, stormwater and surface water impacts, and other potential environmental impacts from wind turbine developments. Champaign Soil & Water Conservation District oversees drainage and erosion issues.

Recommended Action:

- Local decision-makers should coordinate with the above agencies concerning potential environmental impacts from wind turbine projects.

6. FAA Lighting:

Definition of Issue:

- The FAA requires wind turbines and other tall structures to utilize pulsing lighting for aviation safety.

Information Assessment:

- Wind turbine lighting will be visible in the night sky and will be similar in character to the lighting used for communication towers and other tall structures. This lighting may raise aesthetic concerns. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 143.

Recommended Action:

- Obstruction lighting must follow FAA requirements. Local decision-makers should consider requiring the project to use the minimum lighting required. All lighting should be synchronized within the development and, if possible, with other nearby wind power developments.

7. Fire/Emergency Response:

Definition of Issue:

- As an operating turbine and a workplace, accidents can occur that will result in damage to the facilities and/or worker injury. Accidents involving maintenance and operation staff are unlikely, but possible and would require local response capabilities.

Information Assessment:

- A turbine fire generally represents a risk only to the structure itself. Response units should be able to handle a turbine fire should it occur by alerting neighbors and protecting the area for ground level fires that may result.

Recommended Action:

- Local governments should request the turbine operator and construction crews to work with emergency crews to be prepared to handle a turbine-related incident. In general, if a fire in the structure occurs, the appropriate course of action is to allow the turbine to burn out while the fire brigade prevents ground based fires from developing. Training for tower rescues should also be included in any emergency preparedness plan. The resources and training for emergency and fire response should be facilitated by the owner/operator of the facility.
- Access to the turbine interior should be secured and strictly limited to authorized personnel.
- Each turbine should have a first responder designation to assist emergency personnel in locating the turbine in the event of an emergency.
- Local decision-makers should consult with providers of emergency medical airlift services to determine whether a wind turbine proposal will affect helicopter access to the project site and surrounding area.

8. Ice Shed/Throw:

Definition of Issue:

- Wind turbines can accumulate ice under certain atmospheric conditions. Shedding of this ice from blades and other surfaces presents a safety concern, particularly below the turbine, that should be considered during project development and operation. In the event that icing sensors fail, ice can be thrown from the rotating blades and can travel a distance. Wahl, David & Giguere, Philippe, General Electric Energy, *"Ice Shedding and Ice Throw – Risk and Mitigation"*, April 2006, at p. 2.

Information Assessment:

- Under normal operations, when icing occurs, the turbine will be shut down either automatically or manually. The ice will then shed from the turbine blades before the turbine is re-started. When the turbine is shut down, the risk is confined to an area close to the turbine tower.

Recommended Action:

- Appropriate safety concerns should be addressed by means of a setback. GE Energy, a major manufacturer of wind turbines, suggests implementing a safe distance equal to 1.5 times the sum of the hub height and the rotor diameter. GE notes also that the actual "safe distance" depends on turbine dimensions, rotational speed, and other factors. Some consulting groups have the capability to provide risk assessment based on site-specific conditions. Wahl, David & Giguere, Philippe, General Electric Energy, *"Ice Shedding and Ice Throw – Risk and Mitigation"*, April 2006, at p. 2.
- Wind turbines should be designed with redundant safety mechanisms and procedures to protect themselves by shutting down, either automatically or manually, when icing conditions occur.
- Safety can be further promoted by utilizing appropriately placed signs and other public education efforts warning the public of the dangers associated with wind turbines in winter weather.
- Maintenance staff should also be trained to recognize icing conditions and should confirm that shut down occurs when conditions dictate.
- Some, but not all, WTSG members recommend that because of the potential for injury or property damage on neighboring properties, the above "safe distance" recommendation should also be applied from the boundary of any adjacent nonparticipating property.

9. Noise:

Definition of Issue:

As with any machine involving moving parts, wind turbines generate noise during operation. Noise from wind turbines arises mainly from two sources: (1) mechanical noise caused by the gearbox and generator, and (2) aerodynamic noise caused by interaction of the turbine blades with the wind. Wind turbine noise can be generally classified as being of one of three types: broadband, tonal, and low frequency. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 157.

Information Assessment:

Characteristics of Wind Turbine Noise:

- Sound from wind turbines is generally classified as mechanical sound or aerodynamic sound. Mechanical sounds are generally “tonal” in character, while aerodynamic sound from turbines is generally “broadband.” The tonal sounds are generated by the machinery in the nacelle, including the generator, gearbox, etc. Aerodynamic sounds result from the air flowing over the blades and represent the characteristic “swish” or “whoosh.” Aerodynamic sounds generally compose the most dominant type of wind turbine sound. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 158.
- Under certain conditions, aerodynamic noise from wind turbines has been described as having a swishing, clapping, beating, or thumping character with a modulation that is not well-masked by background noise. Van den Berg, G. P., *Do Wind Turbines Produce Significant Low Frequency Sounds?*, 2004 at p. 4, 8; Pedersen, Eja, *Noise Annoyance from Wind Turbines—A Review*, 2003 at p. 5, 22. In a stable atmosphere, such as at night, this noise is louder than at daytime and (in the case of one cited wind turbine project) can be heard at distances of at least up to 1 kilometer. In the case of multiple wind turbines, the pulses can synchronize, leading to still higher levels of sound. Van den Berg, G. P., *Do Wind Turbines Produce Significant Low Frequency Sounds?*, 2004 at p. 4, 8.
- In addition to the above areas of agreement, different WTSG members felt that the following information was relevant and informative:

- Some, but not all, WTSG members offered the following:
 - Dr. Geoff Leventhall, sound engineer (hereinafter “Leventhall”), states categorically that there is no significant infrasound from current designs of wind turbines. Memorandum of AWS Truewind, *“Wind Energy and Low Frequency Noise”*, March 6, 2006, at p. 2.
 - Rebuttal--Although Leventhall insists that there is no significant infrasound from wind turbines, he does concede that wind turbine noise includes a low-frequency component and that such low frequency noise can be audible under certain circumstances. Leventhall, Geoffrey, *“How the ‘Mythology’ of Infrasound and Low Frequency Noise related to Wind Turbines Might Have Developed”*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005 at p. 14. Thus, denying the presence of “significant infrasound” in wind turbine noise does not excuse the need to model and monitor for low frequency noise from wind turbines.
 - Research done by Hepburn Explorations has shown that low frequency sound pressure levels are often lower when the turbines are on than when off. This is a result of the turbines converting the energy in the wind to electricity. Memorandum of AWS TrueWind, March 6, 2006, at p. 1.
 - Ambient baseline sound levels will be a function of such things as local traffic, industrial sounds, farm machinery, barking dogs, lawnmowers, children playing and the interaction of the wind with ground cover, buildings, trees, powerlines, etc. It will vary with time of day, wind speed and direction and the level of human activity. As one example, background sound levels measured in the neighborhood of the Hull High School in Hull Massachusetts on March 10, 1992 ranged from 42to 48 dB(A) during conditions in which the wind speed varied from 5 to 9 MPH(2-4m/s). Rogers, Anthony, PhD, et al., *“Wind Turbine Acoustic Noise”*, Renewable Energy Research Laboratory, June 2002, Amended January 2006 at p.18.
 - Rebuttal--References to background noise measurements from urban areas are not necessarily representative of rural background noise, which can be at levels in the range of 20-25 dB. James, Richard, E-Coustic Solutions, *“Comments in Response to Everpower Critique of Richard James Presentation”*, March 17, 2008 at p. 2.
 - Recent improvements in mechanical design of large wind turbines have resulted in significantly reduced mechanical sounds from both broadband and pure tones. Today, the sound emission from modern wind turbines is dominated by broadband aerodynamic sounds. Rogers, Anthony, PhD, et al., *“Wind Turbine Acoustic Noise”*, Renewable Energy Research Laboratory, June 2002, Amended January 2006 at p. 13.
 - As reported by the NRC, in 2004 there were 17,000 turbines in operation in the United States. NRC, *Environmental Effects of Wind-Energy Projects* 42 (2007).
 - Everpower Renewables Corp. sponsored a trip to Bowling Green, Ohio so farmers and landowners could get first hand knowledge of the scope and sound of the

turbines. The Champaign County Farm Bureau sponsored a trip to Leroy, Illinois to visit a large wind turbine project. The public was invited to attend the trip.

- As a result, some, but not all, WTSG members believe we have plenty of local and first hand knowledge on whether the turbines make a sound and if that sound would be an issue.
- Other WTSG members offered the following:
 - A good overview of the nature of sound in general and sound from wind turbines can be found in a report by Anthony Rogers, Ph. D. Rogers, Anthony, PhD, et al., *“Wind Turbine Acoustic Noise”*, Renewable Energy Research Laboratory, June 2002, Amended January 2006. This report includes an informative sample noise assessment for a wind turbine project.
 - The misunderstanding on low frequency noise may be associated with the “swish-swish” which is typical for wind turbines. The swish is a modulation of a higher frequency and does not contain low frequencies or infrasound.
 - Dr. Geoff Leventhall has stated, “I can state quite categorically that there is no significant infrasound from current designs of wind turbines. British Wind Energy Association, *“Low Frequency Noise and Wind Turbines, Technical Annex”*, February 2005 at p. 8.
 - Numerous studies have shown that low frequency sound output from wind turbines does not significantly exceed background levels, and measures no more than 50-60 dB. Leventhall, Geoffrey, *“How the ‘Mythology’ of Infrasound and Low Frequency Noise related to Wind Turbines Might Have Developed”*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005, at p. 13-14; Hessler, David, Hessler Associates, Inc., Speerschneider, Michael, Everpower Renewables Corp., *“Comments in Response to Richard James Presentation”*, March 3, 2008, at p. 2.
 - From analysis on existing wind turbines it seems that there is no tendency that the larger wind turbines is creating an excessive amount of low frequency noise compared to the overall noise level. Sondergaard, Bo & Hoffmeyer, Dan, *“Low Frequency Noise from Large Wind Turbines”*, Second International Meeting on Wind Turbine Noise, September 20-21, 2007 at p. 21.
 - Frequencies produced by wind turbines below 40 Hz cannot be distinguished from background noise due to wind. Leventhall, Geoffrey, *“How the ‘Mythology’ of Infrasound and Low Frequency Noise related to Wind Turbines Might Have Developed”*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005 at p. 14.
- Yet other WTSG members offered the following:
 - Wind turbine noise includes a low-frequency component that, although inaudible (per NRC) or barely audible (per Leventhall), is still perceptible by humans. Leventhall, Geoffrey, *“How the ‘Mythology’ of Infrasound and Low Frequency Noise*

related to Wind Turbines Might Have Developed", First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005 at p. 14; National Research Council, *"Environmental Impacts of Wind-Energy Projects"*, May 2007 at p. 158-59. This low-frequency component is less diminished by building walls or other structures, and individuals sense or perceive low frequency noise in different ways. Leventhall, Geoffrey, *"A Review of Published Research on Low Frequency Noise and its Effects, Report for DEFRA"*, May 2003 at Sections 8.2.4, 13.2. Low frequency noise from wind turbines may be audible under certain circumstances. Leventhall, Geoffrey, *"How the 'Mythology' of Infrasound and Low Frequency Noise related to Wind Turbines Might Have Developed"*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005 at p. 14. For these reasons, this low-frequency component is important to assess.

- Rebuttal - Leventhall has conducted extensive research on infrasound and low frequency sound in the community and is a leading expert. There are sources of community noise that have generated substantial low frequency sound and infrasound. Concerns about efficient propagation and diminished attenuation are legitimate concerns when taken in the context of significant emitters of low frequency sounds. The DEFRA report does not focus on wind turbine sound, but Leventhall makes it clear in his other work where he does address wind turbine sound that low frequency sound and infrasound from wind turbines is, in general, not an issue. Leventhall, *"How the 'mythology' of infrasound and low frequency noise related to wind turbines might have developed"*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005 at p. 13-14; British Wind Energy Association, *"Low Frequency Noise and Wind Turbines, Technical Annex"*, February 2005 at p. 2.
- Rebuttal - Leventhall's characterization of wind turbine noise indicates that infrasound and low frequency noise components are not problematic. Aside from saying definitively that infrasound is not a problem (Leventhall, Geoffrey, *"How the 'Mythology' of Infrasound and Low Frequency Noise related to Wind Turbines Might Have Developed"*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005 at p. 14), he states; "The concerns of the WHO on low frequency noise require us to look carefully at low frequency noise from wind turbines. In general, there is not a problem, although the mythology is that wind turbine noise has a substantial low frequency component." Leventhall, Geoffrey, *"How the 'Mythology' of Infrasound and Low Frequency Noise related to Wind Turbines Might Have Developed"*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005 at p. 13. The data presented by Leventhall to make even these diminutive statements regarding wind turbine sound are based on measurements taken just 65 meters (213 feet) from a turbine. Leventhall, Geoffrey, *"How the 'Mythology' of Infrasound and Low Frequency Noise related to Wind Turbines Might Have Developed"*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005 at p. 14.

- Although wind turbines may generate low-frequency noise at levels of 55 dB, rural background noise can be considerably quieter (e.g., in the range of 20-25 dB). James, Richard, E-Coustic Solutions, *“Comments in Response to Everpower Critique of Richard James Presentation”*, March 17, 2008 at p. 2.
 - Rebuttal - There have been a number of studies which have shown that measured low frequency sound from wind turbines are comparable to rural background levels absent of wind turbines. Leventhall, Geoffrey, *“How the ‘Mythology’ of Infrasound and Low Frequency Noise related to Wind Turbines Might Have Developed”*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005 at p. 13-14; in Hessler, David, Hessler Associates, Inc., Speerschneider, Michael, Everpower Renewables Corp., *“Comments in Response to Richard James Presentation”*, March 3, 2008 at p. 2. According to Sondergaard, “It seems that there is no tendency that the larger wind turbines is [sic] creating an excessive amount of low frequency noise compared to the overall noise level.” Sondergaard, Bo & Hoffmeyer, Dan, *“Low Frequency Noise from Large Wind Turbines”*, Second International Meeting on Wind Turbine Noise, September 20-21, 2007 at p. 21. Mr. James’ measurements showing background levels of 20-25 dB should be treated with caution as his methodology is not defined and they are not substantiated and do not agree with any published reports on wind turbine measurements or rural background sound measurements.
- The variability of background noise levels in different environments is why a thorough, unbiased pre-construction study of community sound is needed. James, Richard, E-Coustic Solutions, *“Comments in Response to Everpower Critique of Richard James Presentation”*, March 17, 2008 at p. 2.
- Turbine noise is usually most critical within a half-mile of a project. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 153.
 - Rebuttal--While it has been suggested that potential noise on nearby residents may be less important outside of ½ mile, this does not indicate that noise impacts *will be* important within ½ mile.

Effects of Wind Turbine Noise:

- Different WTSG members felt that the following information was relevant and informative:
 - Some, but not all, WTSG members offered the following:
 - Modern wind turbines that utilize upwind blade orientations have dramatically reduced tower interaction effects, and the generation of high levels of low frequency noise by wind turbines. British Wind Energy Association (hereinafter BWEA), *“Low Frequency Noise and Wind Turbines, Technical Annex”*, February 2005 at p. 1-2.

- There are no direct health effects from noise at the level of noise generated by wind turbines. British Wind Energy Association, *“Low Frequency Noise and Wind Turbines, Technical Annex”*, February 2005.
- There is no scientific evidence that noise at the levels generated by wind turbines could cause health issues other than annoyance. Pedersen, Eja, *Noise Annoyance from Wind Turbines—A Review*, 2003 at p. 5.
 - Rebuttal: While it may be disputed whether low frequency noise from wind turbines causes public annoyance, it has been documented that wind turbine noise can cause public annoyance. Pedersen, Eja, *Noise Annoyance from Wind Turbines—A Review*, 2003 at p. 22.
 - Rebuttal: Although Pedersen concludes that wind turbine noise does not directly cause any physical health problems, his conclusion continues, “There is not enough data to conclude if wind turbine noise could induce sleep disturbance or stress-related symptoms.” Pedersen, Eja, *Noise Annoyance from Wind Turbines—A Review*, 2003 at p. 22.
- Wind turbines produce low frequency sounds, but it has not been shown this is a major factor contributing to annoyance. Van den Berg, G. P., *Do Wind Turbines Produce Significant Low Frequency Sounds?*, 2004 at p. 1
- Non-sound-related factors also influence individual responses to wind turbines. British Wind Energy Association, *“Low Frequency Noise and Wind Turbines, Technical Annex”*, February 2005 at p. 4. This makes it more important that the community is involved in the planning process and is aware of the benefits that will result from the project.
- Research conducted in low frequency noise on modern wind turbines has shown that the levels of low frequency noise have been below thresholds of perception and is therefore not a problem. British Wind Energy Association, *“Low Frequency Noise and Wind Turbines, Technical Annex”*, February 2005 at p. 8.
 - Rebuttal: The above report of the British Wind Energy Association cites no specific “accepted” thresholds with which to compare low frequency noise from wind turbines. According to the National Research Council, “More needs to be understood regarding the effects of low-frequency noise on humans.” National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 158-59.
- The Danish Wind Industry Association and the Danish Environmental Agency confirm that low frequency noise from wind turbines has not been an issue and there have been very few complaints from the general public in the past 20 years. British Wind Energy Association, *“Low Frequency Noise and Wind Turbines, Technical Annex”*, February 2005 at p. 6.
 - Rebuttal: The cited information from the report of the Danish Wind Industry Association gives no indication of the number of turbines installed in populated areas of Denmark or the distance of those turbines from residences.

- The German Wind Energy Association has confirmed that no impacts to human health have been proved from low frequency noise from wind turbines in German Studies. British Wind Energy Association, *“Low Frequency Noise and Wind Turbines, Technical Annex”*, February 2005 at p. 6.
- Other WTSG members offered the following:
 - Low frequency noise can be annoying or distressing to people who are sensitive to its effects. Leventhall, Geoffrey, *“A Review of Published Research on Low Frequency Noise and its Effects, Report for DEFRA”*, May 2003 at p. 8.2.4; Pedersen, Eja, *Noise Annoyance from Wind Turbines—A Review*, 2003.
 - Rebuttal: The Leventhall report cited above does not focus on wind turbine sound and primarily addresses the impacts of low frequency sound at levels much higher than is generated by wind turbines.
 - Public annoyance from wind turbine noise occurs to a higher degree at low levels than noise annoyance from other sources of community noise such as traffic. Pedersen, Eja, *Noise Annoyance from Wind Turbines—A Review*, 2003 at p. 22.
 - A report for the Swedish Environmental Protection Agency cites statistics that at wind turbine noise ranges of 37.5 to 40 dBA, 20% of 356 respondents were very annoyed with the noise. At above 40 dBA, the percentage of highly annoyed respondents increased to 36%. Pedersen, Eja, *Noise Annoyance from Wind Turbines—A Review*, 2003 at p. 13.
 - Rebuttal: It should be recognized that, in addition to the Swedish study reviewed by Pedersen, his report includes review of other research. The Swedish report is the only one that showed a statistical correlation of annoyance to wind turbine sound pressure levels, and leads him to conclude that wind turbine noise is “to a degree correlated to noise exposure.” Pedersen, Eja, *Noise Annoyance from Wind Turbines—A Review*, 2003 at p. 22.
 - Low-frequency vibration and its effects on humans are not well understood. Sensitivity to such vibration resulting from wind-turbine noise is highly variable among humans. It has recently been stated (Pierpont, Nina, MD, PhD, *“Wind Turbine Syndrome: Noise, Shadow Flicker and Health”*, August 1, 2006 / *“Health Effects of Wind Turbine Noise”*, March 2, 2006) that “some people feel disturbing amounts of vibration or pulsation from wind turbines, and can count in their bodies, especially their chests, the beats of the blades passing the towers, even when they can’t hear or see them.” National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 158-59.
 - Several studies and reports suggest that certain adverse health effects may be associated with long-term exposure to wind turbine noise, including the infrasound and low-frequency component. *E.g.*, Harry, Amanda Dr., *“Wind Turbines, Noise and Health”*, February 2007; Pierpont, Nina, MD, PhD, *“Vibro-Acoustic Disease”*, June 9, 2007 (summarizing research conducted in Portugal).
 - Noting the need for further scientific data on this subject, in 2006 the French National Academy of Medicine recommended that wind turbines be sited no closer

than 1.5 kilometers (0.93 miles) from residences “while waiting for precise studies of the risks connected with these installations.” C-H Chouhard, *Le retentissement du fonctionnement des éoliennes sur la sante de l’homme (Repercussions of wind turbine operations on human health)*, Panorama du Medecin (March 20, 2006), quoted in Frey and Hayden, “Noise Radiation from Wind Turbines Installed Near Homes: Effect on Health”, 2007 at p. 5.

- Yet other WTSG members offered the following:
 - Using available internet search engines, Vibro Acoustic Disease or Wind Turbine Syndrome was not listed as an ailment in any of the following associations or organizations that list known diseases:
 - Medicine Net
 - National Institutes of Health (Office of Rare Diseases)
 - Wikipedia (Internet Encyclopedia)
 - National Organization for Rare Disorders
 - Mayo Clinic
 - In an effort to evaluate the health and safety risks associated with other forms of electrical generation, these presenting members offered the following information regarding the coal industry.
 - In Ohio the burning of coal leads to the premature deaths of 1,700 people per year. Environment Ohio, “Clean Up Power Plants”, 2007 at p. 2. In the United States according to the American Lung Association (2004 Study) 24,000 premature deaths are attributed each year due to power plant pollution.
 - The ALA notes that research estimates over 550,000 asthma attacks, 38,000 heart attacks, and 12,000 hospital admissions are caused annually by power plant pollution. In the last century more than 100,000 deaths have been a result of mining coal, with over 200,000 black lung deaths. This is part of the burden of coal. TXU Corporate Presentation included in Champaign County Farm Bureau materials dated 1/15/08.
 - In 1997 the World Health Organization estimated that nearly 700,000 deaths are related to air pollution and that about 8 million avoidable deaths will occur worldwide by 2020. Cifuentes, Luis, et al., “Climate Change: Hidden Health Benefits of Greenhouse Gas Mitigation”, Science Magazine, August 17, 2001, vol. 293: 1257-1259 at p. 1.
 - Rebuttal: It is impossible from the above statistics to determine the extent to which the installation of a local wind power facility will offset those impacts, or how those offsets might compare with other potential local impacts (such as nuisance, safety, and health) discussed throughout this report.

- According to Leventhall, infrasound and its companion low frequency noise now occupy a special position in the national psyche of a number of countries where they lie in wait for an activation trigger to re-generate concerns of effects on health. Earlier triggers have been defense establishments and gas pipelines. A current trigger is wind turbines. Leventhall, Geoffrey, *"How the 'Mythology' of Infrasound and Low Frequency Noise related to Wind Turbines Might Have Developed"*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005.

Measurement of Wind Turbine Noise

- Different WTSG members felt that the following information was relevant and informative:
 - Some, but not all, WTSG members offered the following:
 - Low-frequency noise is not adequately measured using an "A-weighted" sound measurement (dBA). A-weighted measurements underestimate the levels of low-frequency noise. Leventhal, *Review of Published Research on Low-Frequency Noise and Its Effects* at 8.2.4 (2003) (prepared for British Department for Environment, Food, and Rural Affairs (DEFRA)). Since A-weighting underestimates the sound pressure of noise with low-frequency components, a better assessment of health effects would be to use C-weighting. Frey and Hayden, *"Noise Radiation from Wind Turbines Installed Near Homes: Effect on Health"*, 2007 at p. 36, quoting World Health Organization Guidelines for Community Noise S.3.8 (1999). Both A- and C-weighted measurements are necessary to adequately assess noise from wind turbines. James, Richard, E-Coustic Solutions, *"Champaign County Ohio Noise Questions Powerpoint Presentation"*, February 6, 2008.
 - Rebuttal: The Leventhall review cited above is a thorough examination of low frequency noise from a variety of sources. It is recognized that low frequency noise can be an issue in some higher sound level environments, and that using an A-weighted measurements can be inadequate in those environments. This report, however, does not focus on wind turbine noise, and Leventhall has reported repeatedly that low frequency sound at the levels produced by wind turbines is not problematic. Leventhall, *"How the 'mythology' of infrasound and low frequency noise related to wind turbines might have developed"*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005 at p. 13-14; British Wind Energy Association, *"Low Frequency Noise and Wind Turbines, Technical Annex"*, February 2005 at p. 2.
 - Other WTSG members offered the following:
 - Low frequency sound from wind turbines is comparable to natural ambient levels of low frequency sounds. Leventhall, Geoffrey, *"How the 'Mythology' of Infrasound and Low Frequency Noise related to Wind Turbines Might Have Developed"*, First International Meeting on Wind Turbine Noise: Perspectives for Control, October 17-18, 2005, at p. 13-14. According to Sondergaard, "It seems that there is no tendency that the larger wind turbines is [sic] creating an excessive amount of low frequency noise compared to the overall noise level." Sondergaard, Bo & Hoffmeyer, Dan,

"Low Frequency Noise from Large Wind Turbines", Second International Meeting on Wind Turbine Noise, September 20-21, 2007 at p. 21. Measuring the C-weighted component of wind turbine noise will not help mitigate sound impacts in communities. The C-weighted measurement is generally only useful for environmental sound when the absolute magnitude exceeds about 70-75 dBC. Below this threshold low frequency sound is largely imperceptible and inconsequential. Hessler, David, Hessler Associates, Inc., Speerschneider, Michael, Everpower Renewables Corp., "Comments in Response to Richard James Presentation", March 3, 2008.

- Yet other WTSG members offered the following:
 - At the present time there are no common international noise standards or regulations for sound pressure levels. Rogers, Anthony, PhD, et al., *"Wind Turbine Acoustic Noise"*, Renewable Energy Research Laboratory, June 2002, Amended January 2006 at p. 21.
 - Sample Noise Assessment for a Wind Turbine Project, taken from Rogers, Anthony, PhD, et al., *"Wind Turbine Acoustic Noise"*, Renewable Energy Research Laboratory, June 2002, Amended January 2006 at p. 22.
 1. An estimation or survey of existing ambient background noise levels.
 2. Prediction of noise levels from the turbines at and near the site.
 3. Identification of a model for sound propagation (sound modeling software will include a propagation model)
 4. Comparing calculated sound pressure levels from wind turbines with background sound pressure levels at the locations of concern.

Mitigation of Wind Turbine Noise:

Different WTSG members felt that the following information was relevant and informative:

- Some, but not all, WTSG members offered the following:
 - Efforts to reduce potential noise impacts on nearby residents may be most important within one-half mile. National Research Council, *"Environmental Impacts of Wind-Energy Projects"*, May 2007 at p. 153.
 - Rebuttal: While it has been suggested that potential noise on nearby residents may be less important outside of ½ mile, this does not indicate that noise impacts *will be* important within ½ mile.

Recommended Action:

- The Wind Turbine Study Group recommends a noise standard +5dB above pre-construction background (L_{90}) to mitigate potential noise impacts from wind turbines in Champaign County. Wind turbine noise should not cause the sound levels at any receptor site to exceed 5 decibels

above pre-construction background (L_{90}). This standard should be used in siting determinations as well as to assess ongoing operation of wind turbines.

- Some, but not all, WTSG members recommend that a standard include a threshold level of 40-45 dB (based on World Health Organization (WHO) community sound guidelines which recommend sound levels outside a bedroom do not exceed 45 dB to avoid sleep disturbance). If the sound from turbines exceeds this level, the limit should be +5dB above pre-construction background (L_{90}). The sound standards referenced above are designed to minimize possible adverse impact to residents in their homes and are much more stringent than typical outdoor noise standards. It would be appropriate, therefore, to maintain these standards at the residence and not at other parts of the property. The National Research Council study recommends that good practice for dealing with potential impacts of noise includes maintaining a minimum distance between the nearest turbine and a residence. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 176.
 - Some, but not all, WTSG members believe that the proposed noise standard threshold of 40-45 dB is unacceptable because—
 - It would allow wind turbine facilities to significantly increase community noise levels to, or above, the 30 dB threshold for sleep deprivation as recognized by the WHO, see Frey and Hayden, *“Noise Radiation from Wind Turbines Installed Near Homes: Effect on Health”*, 2007 at p. 34;
 - The WHO has recognized that a lower limit is appropriate where there is a significant low-frequency noise component or where a throbbing or pulsating noise is present (all of which are present in wind turbine noise), Frey and Hayden, *“Noise Radiation from Wind Turbines Installed Near Homes: Effect on Health”*, 2007 at p. 35; and James, Richard, E-Coustic Solutions, *“Champaign County Ohio Noise Questions Powerpoint Presentation”*, February 6, 2008 at slide 33, and
 - High levels of public annoyance have been documented at wind turbine noise levels above 40 dB. Pedersen, Eja, *Noise Annoyance from Wind Turbines—A Review*, 2003 at p. 13.
 - Some, but not all, WTSG members state that the WHO guideline for community noise related to sleep disturbance of 30 dB described above applies *inside the bedroom*. The same guideline indicates that sound pressure level of 45 dB at the outside façade, with an open window, is adequate to prevent sleep disturbance. Frey and Hayden, *“Noise Radiation from Wind Turbines Installed Near Homes: Effect on Health”*, 2007 at p. 35.
- Some, but not all, WTSG members recommend that compliance with wind turbine noise standards be determined using both A- and C-weightings.
 - Some, but not all, WTSG members believe that measuring the C-weighted component of wind turbine noise will not help mitigate sound impacts in communities. Below the absolute magnitude of 70 or 75 dBC, low frequency sound is largely imperceptible and inconsequential. Hessler, David, Hessler

Associates, Inc., Speerschneider, Michael, Everpower Renewables Corp.,
"Comments in Response to Richard James Presentation", March 3, 2008, at p. 2.

- The WTSG recommends that wind turbine noise standards be implemented as follows:
 - The L_{90} sound level is a background noise measurement representing that sound level which is exceeded 90 percent (90%) of the time.
 - The background level should be established by a qualified and experienced sound engineer.
 - Some, but not all, WTSG members recommend that background noise samples should be at least 10 minutes in length. Background noise should be measured during late evening or nighttime conditions using pre-construction computer modeling to determine representative receptor sites. James, Richard, E-Cooustic Solutions, "Champaign County Ohio Noise Questions Powerpoint Presentation", February 6, 2008 at slides 37, 47.
 - Compliance with the $L_{90}+5\text{dB}$ standard should be evaluated through computer modeling as a part of pre-construction project review and approval. This modeling should be based in part on an IEC certified sound power level that represents the sound level originating from the turbine. A qualified sound engineer should then use that sound power level, along with the characteristics of the project area to model the sound propagation through the proposed project area. The modeled sound impact at any particular spot should be evaluated against the noise standard recommended above.
 - Modeling sound from wind turbines and predicting its impact in the community is complicated by the varying noise levels from both the wind turbine and the ambient background noise that will mask the turbine noise. A qualified sound engineer experienced in modeling wind turbine sound should be utilized for this study.
 - Some, but not all, WTSG members recommend that compliance should be determined at the property lines of adjacent non-participating landowners. Determining compliance at existing residences and businesses does not take into account the potential for future development of adjacent parcels.
 - Some, but not all, WTSG members state that the sound standards referenced above are designed to minimize possible adverse impact to residents in their homes and are much more stringent than typical outdoor noise standards. It would be appropriate, therefore, to maintain these standards at the residence and not at other parts of the property. The National Research Council study recommends that good practice for dealing with potential impacts of noise includes maintaining a minimum distance between the nearest turbine and a residence. National Research Council, "Environmental Impacts of Wind-Energy Projects", May 2007 at p. 176.
 - If multiple turbines are proposed, their combined noise effects on neighboring properties should be considered as part of the computer modeling. Computer models should reflect conservative assumptions for operating conditions and meteorological conditions. All assumptions should be disclosed in the modeling report.
 - WTSG members had differing views as to the recommended methods to be used to assess compliance with wind turbine noise standards.

- Some, but not all, WTSG members recommend that compliance with the recommended noise standard should be assessed using both dBA and dBC measurements and in accordance with American National Standards Institute (ANSI) Standards S12.9, S12.17, and S12.18.
- These members further state that because low-frequency noise from wind turbines is audible under certain circumstances, it should be measured by use of C-weighted noise measurements.
- Some, but not all, WTSG members recommend using appropriate methods used by the acoustic engineering industry working in the field of community sound impacts of wind energy projects. These members believe that there are a number of acceptable methodologies that are employed to measure compliance, that the ANSI standards listed above are not specific to wind turbine sound measurements, that it is not clear that they would be appropriate for all situations, and that they should not be adopted without further examination of their appropriateness.
- Some, but not all, WTSG members recommend that local decision-makers should assess from the developer a project application fee sufficient to enable the township to engage its own noise consultant for assessing sound modeling and future operational compliance with the sound standard.

10. Road Infrastructure:

Definition of Issue: The road infrastructure must physically support both traffic patterns and loads associated with wind turbine installation projects.

Information Assessment:

- Construction of the project will require heavy traffic and overweight carriers. This traffic will create temporary congestion in some areas and local roads may be damaged. Oversight of road infrastructure is within the purview of the Champaign County Engineer and necessary regulations, permitting and oversight are currently in place to protect local highway infrastructure during construction.
- The Champaign County Engineer requires any activity under special permit for oversized/over-load to submit a transportation plan, engineered road assessments, and completion of adequate roadway improvements before work can begin.
- Some roadway and intersection upgrades will likely be necessary. Again, the Champaign County Engineer would oversee this work to ensure that it is done properly.

Recommended Action:

- Local decision-makers should request a transportation route and work with the developer to make sure the community and school districts are aware of activity on local roads.
- Prior planning with the developer and county engineer or township trustees is imperative. Prior to construction the developer should provide a turbine site plan and transportation route associated with construction of the project.
- The roads after the construction should be as good as or better than they were previously.
- The Natural Resource Conservation Service has “best management practices” that have been written to mitigate negative impacts to the environment, and must be considered.

11. Shadow Flicker:

Definition of Issue:

- Shadow flicker describes the effect caused by wind turbine blades passing between the sun and an observer. Rotation of turbine blades in sunny conditions results in moving shadows on the ground, which results in alternating changes in light intensity. Shadow flicker is different from a related strobe-like phenomenon that is caused by intermittent chopping of the sunlight behind the rotating blades. Shadow flicker is a function of several factors, including the location of people relative to the turbine, the wind speed and direction, the diurnal variation of sunlight, the geographic latitude of the location, the local topography, and the presence of any obstructions. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 160. Shadow flicker is also a function of tower height and rotor diameter.

Information Assessment:

- According to the National Research Council, shadow flicker is not important at distant sites (for example, greater than 1,000 feet from a turbine) except during the morning and evening when shadows are long. However, sunlight intensity is also lower during the morning and evening when shadows are long. This tends to reduce the effects of shadows and shadow flicker. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 160.
- Turbines on elevated ridges may cast very long shadows into the adjacent valleys. For example, for a 700’ high north-south ridgeline and a 262 foot nacelle, the 300’ diameter rotors will cast over a two-mile shadow when the sun is at 5 degrees. Bolton, R.H., *“Evaluation of Environmental Shadow Flicker, Analysis for ‘Dutch Hill Wind Power Project’*, January 30, 2007 at p. 9. Although 700’ ridgelines are not representative of topography in Champaign County, Ohio, this example illustrates how topography can affect the length of shadows cast by wind turbines. The length of the shadow and potential exposure to shadow flicker should be calculated based on local topography.
 - Some, but not all, WTSG members believe that since elevation changes in Champaign County, Ohio, are roughly 200’ with much more gradual slopes than those used in the calculations referenced in the Bolton example above, the above example does not provide an accurate representation of potential impacts in Champaign County, Ohio.
- According to the National Research Council, while shadow flicker can be a nuisance to people living near a wind-energy project, in the United States shadow flicker has not been identified as causing even a mild annoyance. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 160.
 - In Northern Europe because of the higher latitude and the lower angle of the sun, especially in winter, shadow flicker can be a problem. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 160.

- Some, but not all, WTSG members believe that the experience with shadow flicker in the United States may be different from that in Europe because large wind-energy facilities in populated areas are relatively new in the United States.
- According to one publication, people and animals (for example, dairy cattle) directly under the shadow flicker cast by a bright sun will both be highly affected by shadow flicker from wind turbines by the rapid dimming and brightening. This has not been experienced by most people or livestock ever before and will be a completely new phenomenon. Bolton, R.H., *"Evaluation of Environmental Shadow Flicker, Analysis for 'Dutch Hill Wind Power Project'"*, January 30, 2007 at p. 10.
 - Some, but not all, WTSG members feel that the Bolton statement above is opinion and not based on science, expertise, or experience. These members are not aware of any evidence of negative impact to livestock associated with shadow flicker from wind turbines around the world. Other than the report referenced above, according to Mr. Bolton's statement of experience, his experience in wind industry is limited to one analysis of wind turbine noise of unknown content or influence. The report referenced above is an evaluation of shadow flicker assessment made by another firm.
 - Some, but not all, WTSG members note that the author of the Bolton report has at 23 years of professional experience as a project engineer (Eastman Kodak) and physics faculty member (Rochester Institute of Technology). Mr. Bolton has prepared evaluations concerning at least two wind power facilities. Furthermore, these members assert that the determination whether shadow flicker may constitute a nuisance is determined by what a reasonable person would consider an unacceptable impact, and is not solely a scientific matter.
- To the WTSG's knowledge, there are no U.S. or global uniform standards for mitigation of shadow flicker. In Denmark, it is generally recommended that there be no more than 10 hours per year when shadow flicker is experienced. One wind-energy project in Germany is subject to a restriction of 30 hours per year of shadow flicker on a neighbor's property; that restriction pertains to hours when the neighboring residents are present and awake. National Research Council, *"Environmental Impacts of Wind-Energy Projects"*, May 2007 at p. 161. The NRC publication does not specify the underlying assumptions and methodologies used in the Denmark and Germany examples cited above.
- It is sometimes difficult to work in a dwelling if there is shadow flicker on a window. Even in the worst situations, shadow flicker only lasts for a short time each day, rarely more than a half hour. National Research Council, *"Environmental Impacts of Wind-Energy Projects"*, May 2007 at p. 161.
 - Some, but not all, WTSG members also believe that shadow flicker can be a nuisance outside of a residence, for example, in outdoor recreation contexts.
- If a turbine is close to a highway, the movement of the large rotor blades and possible resulting shadow flicker can also distract motorists. National Research Council, *"Environmental Impacts of Wind-Energy Projects"*, May 2007 at p. 161. A recent compilation of wind industry related accidents reports that three fatalities have been attributed to driver distraction on a circular

road in Germany where turbines become visible to drivers. Craig, David, *Wind Turbine Accident Compilation* (enclosed in 12/11/07 materials compiled by Champaign County Farm Bureau). Because of the potential for driver distraction, Irish guidelines recommend that turbines be set back from roadways at least 300 meters. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 161.

- Some, but not all, WTSG members feel that motorists are subject to a number of distractions when driving. There is no evidence that distance of the turbine from the road can increase or decrease the potential for distraction.

Recommended Action:

- Shadow flicker impacts should be mitigated through proper turbine siting. The wind turbine developer should provide an analysis of the potential shadow flicker impacts for the entire project. The analysis should be performed by a qualified professional and should include the use of an accepted software tool specifically designed for shadow flicker calculations. In general, shadow flicker models have the ability to consider local weather conditions, tree cover, and other factors that can determine potential exposure to shadow flicker. These models can also calculate maximum possible exposure given full sunlight without clouds.
- Local decision-makers should establish reasonable exposure limits for shadow flicker. These exposure limits should be clearly defined, and compliance should be determined during the siting process by use of the software tools referenced above.
 - Some, but not all, WTSG members believe that there is minimal potential for shadow flicker impact and it is limited to residences. Therefore, any limits for shadow flicker should be calculated based on real exposure to residences. Any calculation of exposure time should take into account scientific data and base calculations on our specific area and latitude of Champaign County, Ohio.
- Some, but not all, WTSG members recommend that to mitigate potential nuisance to people and animals and adverse property value impacts on adjacent property, any restriction on shadow flicker impacts should be measured from boundaries of adjacent properties. These members recommend that shadow flicker modeling should be based on maximum possible exposure given full sunlight without clouds. These members also recommend that a 10 hour/year exposure standard, similar to the Danish guideline referenced above, is reasonable and appropriate under any scenario.

12. Telecommunications:

Definition of Issue:

- Wind turbines have the potential to interfere with television, radio, microwave/radio fixed links, cellular phones, and radar transmissions. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 160.

Information Assessment:

- The main form of interference to TV transmission caused by wind-energy projects is the scattering and reflection of signals by the turbines, mainly the blades. In relation to the components that make up a wind turbine, the tower and nacelle have very little effect on reception (that is, only a small amount of blocking, reflection, and diffraction occurs.) National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 170.
- Available literature indicates that the effects of wind projects on both AM and FM radio transmission signals are considered to be negligible and only apply at very small distances from the turbines (that is, within tens of meters). National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 171.
- A wind turbine may degrade the performance of fixed link radio receivers (like satellite dishes), not only if the turbine is within the line of site of the link but also if it is within a certain lateral distance of the link, known as the “Fresnel zone.” National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 171.
- The potential for interference of wind turbines with radar is only partially understood. If there is such interference, it would primarily affect military and civilian air-traffic control and National Weather Service weather radar. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 171-72. As of late 2006, the interference of wind turbines with radars is a problem as yet unsolved. National Research Council, *“Environmental Impacts of Wind-Energy Projects”*, May 2007 at p. 173.

Recommended Action:

- Local decision-makers should require sufficient information about the potential for telecommunications and radar interference during siting and compliance review of proposed wind-power developments, and should require prompt mitigation of any such interference post-installation.

13. Turbine Collapse:

Definition of Issue:

- As a built structure, a wind turbine may collapse under extreme conditions, operator error or manufacturing defect.

Information Assessment:

- Published literature suggests that turbine tower failure is rare, but these accidents do occur. Craig, David, *Wind Turbine Accident Compilation*.

Recommended Action:

- In connection with pre-construction review and approval of wind power developments, local decision-makers should address this issue with the use of property line, utility line, and roadway setbacks of at least the height of the hub plus the rotor radius. This would ensure that if the turbine structure does fail, it would not damage occupied structures, roadway rights-of-way, or adjacent nonparticipating properties. Also, it would be appropriate to limit access in the immediate area of the wind turbine during testing and inspection procedures. The design and construction of the wind energy project should conform to all applicable industry standards and developer/operator should provide certification of design compliance.

14. Vandalism:

Definition of Issue:

- There may be a community concern that vandals would seek to damage the turbine, which could result in a safety concern.

Information Assessment:

- The industry standard for wind turbines is a monopole design with operating components located inside the rolled-steel tower and secured behind a locked metal door.

Recommended Action:

- According to the particular landowner's desire, gates can be installed at the access roads to help prevent unauthorized persons from entering a property.

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END



Appendix B

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April 22, 2008

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Re: Township Authority to Require Decommissioning Bonding or Funding for
Wind Turbine Projects; C.C.Op. 08-006

QUESTION PRESENTED

The wind turbine study group has asked whether townships have the statutory authority to require "decommissioning bonding or funding." Decommissioning is the act of dismantling and removing a wind turbine at the end of its useful life or when it is deemed unsafe.

SHORT ANSWER

Since multiple agencies have jurisdiction over the generation and transmission of electrical power, the answer to this question is largely dependent upon who owns or operates the wind turbine or wind farm and its generating capacity.

DETAILED ANSWER

A township is a creature of statute, possessing only the powers it is granted by statute, either expressly or by necessary implication.¹ Thus, a board of township trustees may only exercise the powers expressly conferred by statute and the powers that must necessarily be implied from those express powers to enable the trustees to perform the duties imposed upon them. With that principle in mind, this opinion will briefly discuss several possible scenarios involving the decommissioning of wind turbines and wind farms.

¹ E.g., *Hopple v. Trustees of Brown Township*, 13 Ohio St. 311, 324 (1862).

a. Public Utilities

Revised Code Chapter 519, the statute authorizing townships to enact zoning resolutions, exempts public utilities from its scope. In that regard, R.C. 519.211(A) states:

Except as otherwise provided in division (B) or (C) of this section, sections 519.02 to 519.25 of the Revised Code confer no power on any board of township trustees or board of zoning appeals in respect to the location, erection, construction, reconstruction, change, alteration, maintenance, removal, use, or enlargement of any buildings or structures of any public utility or railroad, whether publicly or privately owned, or the use of land by any public utility or railroad, for the operation of its business.²

As this language makes clear, if a wind turbine or wind farm is erected by a public utility, regardless of its generating capacity, it is exempt from township zoning.³

However, to the extent that a wind turbine or wind farm qualifies as a “major utility facility,”⁴ the Power Siting Board has jurisdiction over its siting. The hearing procedures used by the Power Siting Board allow for public comment, a forum where the decommissioning issue might be raised. With regard to electrical generating facilities that do not qualify as a “major utility facility,” the Public Utilities Commission has jurisdiction and its rules might also allow for public comment. Otherwise, it appears that a township can only address the “decommissioning” of wind turbines and wind farms owned or operated by public utilities via R.C. 505.86, the general nuisance statute governing unsafe buildings and structures.⁵

b. Major Utility Facilities

If a wind turbine or wind farm is erected by an entity that does not qualify as a public utility, it might still be exempt from township zoning. Revised Code Chapter 4906 sets forth a comprehensive scheme governing the process for applying for and granting

² Division (B) allows townships to regulate telecommunication towers in areas zoned for residential use. Division (C) allows limited regulation over public utilities engaged in the business of transporting persons or property over any public street, road, or highway. Neither division has any application to electric generating and distribution facilities.

³ *A & B Refuse Disposers, Inc. v. Ravenna Twp. Bd. of Trustees* (1992), 64 Ohio St.3d 385, defines “public utility” for purposes of township zoning. A discussion of the characteristics of a “public utility” is beyond the scope of this opinion.

⁴ An electric generating facility with a capacity of 50 megawatts or more qualifies as a “major utility facility.” See R.C. 4906.01(B)(1).

⁵ R.C. 505.86 allows boards of township trustees to provide for the removal, repair, or securance of buildings or other structures that have been declared insecure, unsafe, or structurally defective by any fire department, county building department, or board of health.

certificates to construct major utility facilities, including electric generating plants designed for, or capable of, operation at a capacity of 50 megawatts or more.⁶

More specifically, R.C. 4906.13 provides:

No public agency or political subdivision of this state may require any approval, consent, permit, certificate, or other condition for the construction or initial operation of a major utility facility authorized by a certificate issued pursuant to [this chapter]. . . . Nothing herein shall prevent the application of state laws for the protection of employees engaged in the construction of such facility nor of municipal regulations that do not pertain to the location or design of, or pollution control and abatement standards for, a major utility facility for which a certificate has been granted under this chapter.

The first sentence of R.C. 4906.13 wholly exempts the siting of major utility facilities from local regulation.⁷ The second sentence allows for limited regulation by villages and cities. This sentence makes no provision for townships, however. Therefore, a township has no authority to impose any condition, including the posting of a decommissioning bond or plan, on the construction or initial operation of a major utility facility.

It should also be noted that the jurisdiction of the Power Siting Board is not dependent upon whether the “major utility facility” is owned or operated by a public utility. In that regard, R.C. 4906.04 provides in part:

No person shall commence to construct a major utility facility in this state without first having obtained a certificate for the facility [from the Power Siting Board]. . . .

R.C. 4906.01(A), in turn, defines a “person” as “an individual, corporation, business trust, association, estate, trust, or partnership or any officer, board, commission, department, division, or bureau of the state or a political subdivision of the state, or any other entity.” This definition of “person” includes anyone wishing to construct a major utility facility, without regard to whether they are a public utility.

Furthermore, if multiple wind turbines are connected together and enter the grid at a single point, this office believes that their generating capacities should be aggregated, for purposes of determining whether the project qualifies as a “major utility facility.” If the aggregate capacity is 50 megawatts or more, a township would have no authority to condition the operation of a wind turbine or wind farm on the posting of a decommissioning bond or plan.

⁶ E.g., *State ex rel. State Edison Co. v. Parrott* (1995), 73 Ohio St.3d 705, 707.

⁷ *Parrott*, 73 Ohio St.3d at 707, 709; *Chester Township v. Power Siting Comm.* (1977), 49 Ohio St.2d 231, 234

Rather, the siting procedure set forth in Revised Code Chapter 4906 and the accompanying administrative rules make provision for public comment. This forum may allow township officials or residents to address the decommissioning issue. Otherwise, it appears that a township's only authority regarding the decommissioning of wind turbines or wind farms with a generating capacity of 50 megawatts or more is R.C. 505.86.

c. Agricultural Use

Wind turbines used primarily to generate electrical power for agricultural activities might also be exempt from township zoning. In that regard, R.C. 519.21(A) provides in part:

Except as otherwise provided in division (B) of this section, sections 519.02 to 519.25 of the Revised Code confer no power on any township zoning commission, board of township trustees, or board of zoning appeals to prohibit the use of any land for agricultural purposes or **the construction or use of buildings or structures incident to the use for agricultural purposes of the land on which such buildings or structures are located**[.] . . .

(emphasis added).

For purposes of R.C. 519.21(A), a structure is "incident to the use for agricultural purposes of the land" where the structure is directly and immediately related to an agricultural use, or is usually or naturally and inseparably dependent upon an agricultural use.⁸ In light of this test, wind turbines that generate electricity that is used for agricultural purposes would appear to be directly and immediately related to an agricultural use, and therefore, exempt from township zoning. If so, a township would have no authority to require the posting of a decommissioning bond or plan as a condition for the wind turbine's erection. Of course, if the wind turbine is abandoned, and therefore no longer used for agricultural purposes, the township would be able to address its removal via the process set forth in R.C. 505.86.

d. Non-Major Utility Facilities Owned or Operated by Non-Public Utilities

Notwithstanding the broad exemptions provided by Revised Code Chapters 519 and 4906 of the Revised Code, some wind turbines and wind farms might still be subject to township zoning. For example, wind turbines and wind farms owned or operated by non-public utilities with a generating capacity under 50 megawatts cannot avail themselves of either the public utility exemption or the major utility facility exemption. Such facilities may be subject to township zoning resolutions. Similarly, small-scale wind turbines intended for personal use might be subject to township zoning.

In such cases, a township, as part of the authority granted by Revised Code Chapter 519, may require the posting of a decommissioning bond or plan. A number of

⁸ E.g., *State v. Huffman* (1969), 20 Ohio App.2d 263, 269-70.

townships in Champaign County pursuant to their authority to regulate telecommunication towers in areas zoned for residential use have required bonds or decommissioning plans to be posted as part of the permitting process.

Sincerely yours,

NICK A. SELVAGGIO, CHAMPAIGN
COUNTY PROSECUTING ATTORNEY

A handwritten signature in black ink, appearing to read "Scott D. Schockling", written over a horizontal line.

Scott D. Schockling
Assistant Prosecuting Attorney

cc: file

U. Simon

ROAD UPGRADE AND MAINTENANCE

This ROAD UPGRADE AND MAINTENANCE AGREEMENT (this "Agreement") is made and entered into this 20th day of September, 2005 by and among McLean County, an Illinois County (the "County"), and High Trail Wind Farm, LLC ("High Trail") and Old Trail Wind Farm, LLC ("Old Trail", and together with High Trail, collectively, "Developers"). Each of the Developers and the County are sometimes referred to herein individually as a "Party" and collectively as the "Parties". The term "Developers' Representative(s)" shall include the Developers' contractors, sub-contractors, agents, employees, suppliers and designees.

RECITALS

WHEREAS, Developers are in the process of developing a wind-powered electric energy generating facility (the "Project") in McLean County, Illinois and have submitted an application for a Special Use Permit for the Project with the Department of Building and Zoning in accordance with the Zoning Ordinance of McLean County, and

WHEREAS, Developers propose to construct the Project in two or more phases. Each phase will be constructed and owned either by High Trail or Old Trail, and

WHEREAS, in connection with the construction, operation and maintenance of the Project, the Parties desire to address certain issues relating to the roads owned, operated and maintained by the County (collectively, the "County Roads") over which it will be necessary for the Developers and the Developers' Representative(s) to, among other things, (i) transport heavy equipment and materials over certain County Roads, which may in certain cases be in excess of the design limits of the County Roads; (ii) transport certain locally sourced materials, such as concrete and gravel, on such County Roads; (iii) widen certain County Roads and make certain modifications and improvements (both temporary and permanent) to such County Roads (including to certain culverts, bridges, road shoulders and other related fixtures) to permit such equipment and materials to pass; and (iv) place certain electrical and communications cables (collectively "Cables") for the Project adjacent to, under or across certain County Roads, and

WHEREAS, 605 ILCS 5/9-113 grants to the County, authority to impose reasonable rules, regulations and specifications for the use of County roads by public and private utilities, and

WHEREAS, 605 ILCS 5/9 113.01 imposes a liability on public or private utilities for any damage to County highways, and

WHEREAS, under 605 ILCS 5/5 et seq the County has broad power regarding the opening, construction, maintenance, relocation, access to or repair of highways in the County Highway system, and

WHEREAS, it is in the best interest of the public health, safety and welfare that Developers and the County reach an agreement to address the majority of issues that will arise in a project of this size, and

WHEREAS, Developers have provided to the County Engineer of McLean County a site layout plan for the Project that shows the tower sites, the access road entrances, the underground collection system and the power transformer site, a copy of which is attached as Exhibit A (the "Plan"), and

WHEREAS, Developers and the County of McLean wish to set forth their understanding and agreement as to the road issues relating to the construction and operation of the Project, and

WHEREAS, this Agreement shall apply to those County Roads listed on the Principal Road Upgrade Schedule attached as Exhibit B and, subject to Section 3D herein, any other County Highway used by Developers, Developers' Representative(s) in direct support of the construction and operation of the Project.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual promise and covenants herein set forth, the parties, intending to be legally bound, agree as follows:

Section 1. Each of High Trail, in respect of the phases of the project owned, developed and constructed by it, and Old Trail, in respect of the phases of the project owned, developed and constructed by it, agree to undertake the following activities in accordance with the terms of this Agreement:

- A. Within five business days following the award of any contract by the County for the improvements to the County Highways in accordance with Section 5 and Exhibit B for which a Notice to Proceed has been given pursuant to Section 1. T. and not withdrawn, Developers shall pay McLean County Highway Department for the costs of the improvements contained in the bid accepted by the County ("Bid Cost"). For purposes of this Agreement, "commencement of construction" shall mean construction by Developers or Developers' Representative(s) of access roads and wind turbines on the Project site has begun and

does not include testing or surveying (including geotechnical drilling and meteorological testing) to determine the adequacy of the site for construction.

The Parties acknowledge the costs set forth in Exhibit B are estimates. Upon final payment by the County to its contractor for each improvement for which a contract was awarded, the County shall compare the actual cost with the Bid Cost. The County shall provide the Developers with a statement of the final actual costs. In the event the actual costs for the improvements were greater than the Bid Cost payment made by the Developers, the Developers shall reimburse the County for those additional costs. In the event the actual costs for the improvements were less than the Bid Cost payment made by the Developers, the County shall reimburse the Developers for those overpaid costs.

- B. If Developer obtains all required governmental approvals, finds an acceptable market for the power from the respective phases of the project and enters into a power purchase agreement, and elects to proceed with any phase of the Project, Developer shall build the Project substantially as depicted on the Plan and obtain County Highway Department approval of any material alteration of the Plan insofar as it involves the use of County Highways;
- C. Present Access Permit applications and required plans for all access points to the County Highway system;
- D. Erect permanent markers indicating the presence of the Cables;
- E. Install marker tape in any trench in which Developers or Developers' Representative(s) have placed Cables located on County right-of-way;
- F. Become a member of the Illinois State-Wide One-Call Notice System (otherwise known as the Joint Utility Locating Information for Excavators or "J.U.L.I.E.") and provide J.U.L.I.E. with all of the information necessary to update its records;
- G. Use directional boring equipment to make all crossings of County Highways for the cable collection system;

- H. Provide plans for the widening of any corner radius necessary to facilitate the turning movements of the transport trucks used by the Developers or Developers' Representative(s);
- I. Make the necessary improvements for these widened radii and once these widened radii are no longer needed to return the corners substantially to their original lines and grades unless the County Engineer requests that the widened radii remain as improved;
- J. Notify the County Engineer in advance of all oversize moves and crane crossings;
- K. Transport the tower segments and other oversize loads so as to minimize adverse impact on the local traffic;
- L. Provide as much advance notice as is commercially reasonable to obtain approval of the McLean County Highway Department when it is necessary for a road to be closed due to a crane crossing or for any other reason. Notwithstanding the generality of the aforementioned, Developers will provide 48 hours notice to the extent reasonably practicable;
- M. Sign all highway closures and work zones in accordance with the Illinois Department of Transportation Manual On Uniform Traffic Control Devices;
- N. Pay for the cost of all repairs to all County Highways that are damaged by Developers or the Developers' Representative(s) during the construction of the Project and restore such roads to the condition they were in at the time of the pre-construction inventory;
- O. Establish a single escrow account and a single Letter of Credit in accordance with Section 6 for all phases of the Project;
- P. Notify all relevant parties identified under Section 4 of any temporary road closures.
- Q. At the commencement of construction of each phase of the Project and on the first, second, third and fourth anniversaries thereafter, pay to the McLean County Highway Department, the amount of \$50,000.00. Thereafter, the annual fee shall be 100% of what the prior year's fees would have been based on the County standard

charges for agreements of this type. The fee shall not be cumulative, so if two or more phases are under way in any one year, only one \$50,000 payment per year shall be made.

- R. Obtain easements and other land rights needed to fulfill Developers' obligations under this Agreement.
- S. Agree that the County shall design all road upgrades in accordance with the IDOT Bureau of Local Roads and Streets Manual - 2005 edition.
- T. Provide written Notice to Proceed to the County by December 31 of each year, which notice shall identify the roads to be upgraded during the following year. The Notice to Proceed may be withdrawn at any time by Developers prior to the County's advertisement of the notice of bids. In the event Developers elect to withdraw the Notice to Proceed, Developers agree to pay the County for its actual reasonable costs incurred related to the subject improvements following the receipt of the Notice to Proceed through receipt of the notice of withdrawal.
- U. Acknowledge that the estimates provided in Exhibit B are good faith estimates, but actual costs may vary.
- V. Provide dust control and grading work to the reasonable satisfaction of the County Engineer on County roads covered by this Agreement that become aggregate surface roads.
- W. Anywhere this Agreement obligates Developers to make a payment, said payment shall be made directly to the McLean County Highway Department. Except as called for in section 1A payments shall be made within 21 days of receipt of an invoice, containing such detail as Developers may reasonably request, from McLean County Highway Department. Such payments shall be made, at the Developers' discretion, by check or wire transfer of immediately available funds.

Section 2. The County, in accordance with the terms of this Agreement, agrees to:

- A. Review for approval all access points to the County Highway system by giving consideration to sight distances, drainage and proximity to other entrances, in a reasonable manner and in accordance with accepted engineering practices;

- B. Review for approval plans for all utility encroachments on County rights-of-way; in a reasonable manner in accordance with accepted engineering practices;
- C. Review for approval all crane crossings across the County Highway system by giving consideration of road damage and traffic safety in a reasonable manner based on accepted engineering practices;
- D. Issue master overweight and oversize permits in a timely manner for the roads scheduled on Exhibit B upon the filing of such applications on behalf of Developers and waive overweight permit fees for loads with axle weights of 18,000 pounds or less. Issue permits during the spring posting period, between January 15th and April 15th when conditions warrant;
- E. Coordinate with Developers and Developers' Representative(s) so as to minimize the impact of their use of the County Highway system;
- F. Waive all individual work permit fees.
- G. Perform all routine maintenance on the County Highways used for the construction of the towers in accordance with Section 5 of this Agreement.
- H. Consent to the use of the County Highway's rights-of-way for utility encroachments, including Cables for the Project. Consent granted herein shall be effective only to the extent of the property interest of the County of McLean. Such consent shall not be binding on any owner of a fee over or under which the highway is located and shall not relieve Developers from obtaining by purchase, condemnation or otherwise the necessary approval of any owner of the fee over or under which the highway is located if such approval is legally required.
- I. Design all road upgrades in accordance with IDOT Bureau of Local Roads and Streets Manual – 2005 edition.
- J. Implement road upgrades as agreed to in Exhibit B upon receipt of the Notice to Proceed.

- K. Authorize County Engineer to agree on behalf of County to revisions to Exhibits A and B and to determine appropriate improvements.
- L. One week prior to advertisement of bids, notify Developers of its intent to advertise notice of bids.

Section 3 Planning Inventory

A. Road Inventory

I. Pre-Construction Inventory

The Parties, prior to the commencement of construction of any phase, shall jointly perform a survey to record the condition of the pavement surface of the County Highways listed in Exhibit 'B'. For County Highways 15, 17 & 21 this survey shall be performed no later than ten (10) days prior to the start of any pre-construction upgrade. For County Highways 28 and 36, the survey shall be done no later than 10 days prior to the start of use by the Developers and Developers' Representative(s). During this survey the entire length of the road as listed in Exhibit B shall be video taped and if necessary photographs may be taken. In addition the County will provide the Developer or his agent copies of any plans, cross-sections and specifications relevant to the existing road structure.

For any structures on the proposed routes that the County feels may not carry the loads proposed by the Developer, the County shall have the right to hire a consultant to make a study of the structure to determine the load carrying capacity. The Developer shall furnish the consultant with drawings depicting the axle numbers, spacing and loading for the trucks moving the oversized loads. If it is determined that a structure will not carry the loads that are proposed the Developer may propose a plan to strengthen the structure. The County will then furnish the Developer with all available plans. Should the Developer present a plan to strengthen a structure the County will then have their consultant review those plans to determine if the improvements will carry the proposed loads. All costs incurred by the County for these services shall be paid by the Developers or from the escrow account.

Copies of all pre-construction documentation shall be provided to each of the Parties.

2. Post-Construction Inventory

Upon completion of construction of each phase of the Project, representatives of the County and Developer will perform a post-construction inventory, the methods of which shall be similar to those of the pre-construction survey. The two sets of data will be compared and if there is any wheel lane rutting, cracking or other damage in excess of the original survey McLean County will determine the extent of the repairs or improvements needed to return the roads to a pre-construction condition. The design of these repairs or improvements shall conform to standards provided in the IDOT Bureau of Local Roads and Streets Manual - 2005 edition the cost of these repairs or improvements to be paid by the Developers or from the escrow account.

B. Routing and Access Approval

As soon as practical and as necessary throughout the construction of any phase of the Project, Developers and County shall meet and by mutual agreement revise the Plan (Exhibit A) in so far as it affects the County Highways and make it more definitive. By mutual agreement, County Highways may be added to or deleted from the Principal Road Upgrade Schedule attached as Exhibit B, specific timing for upgrades shall be established, access points to public roads may be approved, preferred traffic routes shall be established and utility encroachments, including Cable, finalized. The Principal Road Upgrade Schedule (Exhibit B) has two parts. The first part is an estimate of the cost of improvements that are to be made before construction commences to give the road sufficient structural strength to handle the traffic anticipated during the construction of the Project. The second part is an estimate of the improvement that may need to be completed at the completion of the construction of the Project to return the roads identified in Exhibit B as amended from time to time to the same or better condition than those roads were in during the pre-construction inspection.

C. Revisions

As the Principal Road Upgrade Schedule (Exhibit B) is revised and roads are added or removed, pre-construction and post-construction

improvement details shall be prepared and added to the Exhibit B using the same methodology as was used to establish the improvement descriptions and cost estimates included in Exhibit B.

D. Incidental Use

The Parties recognize that the Project traffic may, either through mistake or with the consent of the County, use roads other than those listed on the Principal Road Upgrade Schedule (Exhibit B). Repairs for damage caused by Developers or the Developers' Representative(s) during such mistaken or permitted use shall be paid by Developers directly to McLean County Highway Department, or as provided in Section 6 C of this Agreement.

Section 4. Construction Cooperation:

A. With Others:

Prior to the commencement of construction of any phase, Developers shall hold a meeting and shall invite all public or semi-public entities that may be affected by the Project including, but not limited to, schools and fire protection districts. At said meeting, Developers will discuss their plans for the construction of the Project and compile a list of contact persons that will need to be notified of any temporary road closures that may have an effect on the daily routine or routing of those agencies. Should all of the parties contacted not be represented, Developers shall attempt to make contact with these entities in an effort to obtain the contact information. A copy of this list shall be furnished to the Highway Department.

B. With the County:

During construction of any phase, the County and Developers shall meet regularly to disclose and discuss Project activities, including anticipated material and equipment deliveries and traffic movement - which may be reflected as changes in the Plan (Exhibit A) and/or the Principal Road Upgrade Schedule (Exhibit B).

Section 5. Upgrades and Maintenance of the County Highways

- A. In order to minimize the adverse effect of the construction traffic on the County Highways, certain upgrades will be required on certain roads as described below the cost of which shall be paid by Developers.

See the Principal Road Upgrade Schedule attached as Exhibit B, as amended from time to time.

- B. The daily routine maintenance of the County Highways affected by the Project including snow removal, striping, and routine signage and regularly scheduled maintenance or repair shall be the responsibility of the McLean County Highway Department. If repairs or maintenance, other than daily routine maintenance, are deemed necessary because of activity of Developers or Developers' Representative(s), the County will invoice the Developers for such cost and Developers shall make payment to the County therefore.

Section 6. Escrow Account and Letter of Credit

- A. Once the Developers have elected to proceed with the Project in accordance with Section 1 B, then not more than two days following receipt of the notice of intent by the County to advertise the first bid for road upgrades identified on Exhibit B that are subject to this Agreement, the Developers shall establish an escrow account in the amount of \$500,000.00 (the "Escrow Account"). The Escrow Account shall be used to pay for expenses incurred for the upgrade and/or repair of the County Highways in accordance with the terms of this Agreement in the event Developers do not otherwise pay the costs thereof. The Escrow Account shall be established at a bank doing business within McLean County selected by Developers. Within forty-five days of the execution of this Agreement by the Parties, or such later date as the Parties may agree, the Parties shall execute a mutually agreeable form of escrow agreement (the "Escrow Agreement"), which agreement shall, among other things, appoint the escrow agent and set forth the disbursement provisions in detail. Developers shall be responsible for making additional deposits in the Escrow Account in order to maintain the original minimum balance provided however, that the aggregate amount (including the initial balance) Developers shall be required to deposit shall not in any event exceed \$11,000,000. At the same time the Escrow Account is established, Developers shall also provide to McLean County an "Irrevocable Letter of Credit" in the face amount of \$500,000.00 (the "Letter of Credit") which the County may draw against in the event and only to the extent that sufficient funds are not available in the Escrow Account to pay for Developers' failure to pay for the upgrade and repair expense of the County Highways in accordance with the terms of this Agreement. The Letter of Credit shall

be issued by a bank and in such form as is reasonably acceptable to the County.

- B. The Escrow Account and Letter of Credit shall remain in place from the date the initial deposit is made until a date two years after the commencement of commercial operations of the final phase of the Project. For avoidance of doubt the commencement of commercial operation date shall be the date that the entire Project is placed into service. The County agrees to deliver any certification required for any permitted withdrawal from the Escrow Account or surrender of the Letter of Credit, including any final withdrawal and/or surrender when Developers are no longer required to fund the Escrow Account or provide the Letter of Credit pursuant to the terms hereof, or the terms of the Escrow Agreement or Letter of Credit. For so long as Developers are required to maintain the Letter of Credit pursuant to the terms hereof, in the event that, pursuant to the terms of such Letter of Credit, the County shall be entitled to draw down the full outstanding amount of such Letter of Credit as a result of a failure to extend, amend or replace such Letter of Credit prior to its expiration, the County agrees that it shall immediately deposit any amounts so drawn into the Escrow Account. Developers shall be entitled to withdraw from the Escrow Account any and all amounts in the Escrow Account (including any interest accrued thereon) two years after the commencement of commercial operations of the last phase of the Project.

C. The Escrow Agreement shall set forth, among other things, the disbursement procedures for the Escrow Account and shall include:

1. For the pre and post construction improvements listed on the Principal Road Improvement Schedule attached as Exhibit B, as such Exhibit may be amended by the Parties from time to time:
 - a. The County shall notify Developers in writing of the work to be done.
 - b. The contract shall be let by the County. Payment shall be made by the Developers or from the Escrow Account for pre and post construction road improvements.
2. For Damage during Construction to the roads listed on the Principal Road Upgrade Summary, as amended from time to time:

- a. The County shall notify Developers of the work to be done.
 - b. The work shall be performed or contract shall be let by the County. Payment for such work shall be made by the Developers or from the Escrow Account.
3. For damages on roads other than those listed on the Principal Road Upgrade Summary attached as Exhibit B, as amended from time to time:
- a. The County notifies Developer of the location and nature of the repair or maintenance required and a suggested time framework for completion.
 - b. If Developers agrees, the County or County's contractor shall perform the repair in the time framework specified and recover its costs from the Developers or the Escrow Account.
 - c. If Developers disagree, the County and Developers will in good faith attempt to resolve the dispute and shall involve Lewis, Yockey and Brown as a neutral intermediary to help resolve the dispute within a 5-day period. The costs of the intermediary will be paid equally by the Parties if a mutually agreeable solution is proposed, or if not, by the Party rejecting the intermediary proposed solution. Either Party may reject the intermediary solution by written notice to the other party within 2 days from the date it is rendered.
 - d. If the Parties cannot agree and the County rejects the intermediary's proposed solution, the County may take unilateral action to prevent harm or protect public safety, the cost of which shall be paid from the Escrow Account. If the appropriateness of the County action is ultimately determined not to be justified either by agreement or adjudication, County shall promptly refund applicable cost of repairs to the Developer.
 - e. If the Parties agree and/or don't reject the intermediary's proposed solution, then the County or County's contractor may make the repair and shall recover its costs from Developer or the Escrow Account.

f. The County charges shall be based on County maintained time and material cost records, which shall be made available to Developers for review. County billing rates shall be those established by the County and shall be uniformly applied to all consumers.

D. Emergency Repairs.

Notwithstanding the foregoing, in the event Developers or the Developers' Representative(s) are reasonably believed by the County to have caused damage to County roads of a magnitude sufficiently great to create a hazard to the motoring public, which in the County's opinion warrants an immediate repair or road closing, the County may unilaterally make or authorize repair, with the reasonable, documented costs thereof paid by the Developer or from the Escrow Account. The County shall photograph, videotape and otherwise document the conditions and make all such documentation available to Developers. Any such emergency repair shall be subject to post-repair negotiations by the Parties, involvement of the intermediary and, if necessary, adjudication. If such post-repair proceedings favor Developers, the County will reimburse the Escrow Account for amounts withdrawn to fund the repair if any.

Section 7. Mutual Indemnification/Hold Harmless and Liability Insurance Provisions.

A. Indemnification by Developers. The Developers hereby release and agree to indemnify and hold harmless the County and their respective officers, employees, elected or appointed officials, and agents, and their respective heirs, executors, administrators, successors and assigns (hereinafter collectively "County Releasees") from any and all actions, causes of action, suits, claims, expenses (including reasonable attorney's fees) and demands against the County Releasees arising out of or relating to the performance by Developers of their obligations under this Agreement. More particularly, but without in any way limiting the foregoing, the Developers hereby release the County Releasees and agree to indemnify and hold harmless the County Releasees from any and all actions, causes of action, suits, claims, expenses (including reasonable attorney's fees) and demands arising directly or indirectly from any personal injury, death or property damage arising out of the use, construction, modifications, repair or improvement of any road subject to this Agreement by the

Developers, its employees, agents, representatives, suppliers or contractors, or their respective employees, agents or representatives.

- B. Indemnification by the County. The County hereby releases and agrees to indemnify and hold harmless the Developers and their members, officers, directors, contractors, subcontractors, employees and agents, and their respective employees, heirs, executors, administrators, successors and assigns (hereinafter collectively "Developers Releasees") from any and all actions, causes of action, suits, claims, expenses (including reasonable attorney's fees) and demands against the Developers Releasees arising out of or relating to the performance by the County of its obligations under this Agreement. More particularly, but without in any way limiting the foregoing, the County hereby releases the Developers Releasees and agrees to indemnify and hold harmless the Developers Releasees from any and all actions, causes of action, suits, claims, expenses (including reasonable attorney's fees) and demands arising directly or indirectly from any personal injury, death or property damage arising out of the use, construction, modifications, repair or improvement of any road subject to this Agreement by the County, their respective employees, agents, representatives, suppliers or contractors, or their respective employees, agents or representatives.
- C. Limitations of Liability. In no event shall the Developers or any of their members, officers, directors or employees or the County or any of its Board, officers or employees be liable (in contract or in tort, involving negligence, strict liability, or otherwise) to any other party or their contractors, suppliers, employees, members and shareholders for indirect, incidental, consequential or punitive damages resulting from the performance, non-performance or delay in performance under this Agreement.
- D. Required Insurance. The Developers shall at all times throughout the term of this Agreement maintain in full force and effect commercial general liability insurance, naming McLean County, its Board, officers and employees as an additional insured, in the aggregate amount equal to Ten Million Dollars (\$10,000,000). The Developers may utilize any combination of primary and/or excess insurance to satisfy this requirement.

Section 8. Miscellaneous

- A. Remedies and Enforcement. Each of the parties hereto covenant and agree that in the event of default of any of the terms, provisions or conditions of this Agreement by any party (the "Defaulting Party"), which default is not caused by the party seeking to enforce said provisions (the "Non-Defaulting Party") and after notice and reasonable opportunity to cure has been provided to the Defaulting Party, then in such an event, the Non-Defaulting Party shall have the right of specific performance. The remedy of specific performance and injunctive relief shall not be exclusive of any other remedy available at law or in equity.
- B. Due Authorization. Each of High Trail and Old Trail hereby represents and warrants that this Agreement has been duly authorized, executed and delivered on behalf of High Trail and Old Trail. The County hereby represents and warrants that this Agreement has been duly authorized, executed and delivered on behalf of the County.
- C. Severability. If any provision of this Agreement is held invalid under any applicable law, such invalidity shall not affect any other provision of this Agreement that can be given effect without the invalid provision and, to this end, the provisions hereof are severable.
- D. Amendments. No amendment or modification to this Agreement or waiver of a Party's rights hereunder shall be binding unless it shall be in writing and signed by the Party against whom enforcement is sought.
- E. Notices. All notices shall be in writing and sent (including via facsimile transmission) to the parties hereto at their respective addresses or fax numbers (or to such other address or fax number as any such party shall designate in writing to the other parties from time to time).

Developers:

High Trail Wind Farm, LLC and Old Trail Wind Farm, LLC
1001 McKinney Street
Suite 1740
Houston, TX 77002
Phone: 713/571-6640;
Fax: 713/571-6659

with a copy to:

High Trail Wind Farm, LLC and Old Trail Wind Farm, LLC
Project Manager
716 E. Empire, Suite C
Bloomington, IL 61701
Phone: 309/829-8211;
Fax: 309/829-8611

McLean County

McLean County Engineer
102 S. Towanda-Barnes Road
Bloomington, IL 61704
Phone: (309) 663-9445
Fax: (309) 662-8038

- F. This Agreement may not be assigned without the written consent of the other Party.
- G. Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, with the same effect as if the signatures thereto and hereto were upon the instrument. Delivery of an executed counterpart of a signature page to this Agreement by telecopy shall be as effective as delivery of a manually signed counterpart to this Agreement.
- H. Governing Law. This Agreement shall be governed by and interpreted in accordance with the laws of the state of Illinois, irrespective of any conflict of laws provisions.

- I. Successors and Assigns. This Agreement shall inure to the benefit of and shall be binding upon the Parties hereto, their respective successors, assignees and legal representatives.
- J. Termination. The Developers shall have the right to terminate this Agreement at any time for convenience by providing fifteen (15) days prior written notice to the County of its intent to terminate this Agreement. In the event such termination occurs, the Escrow Account and Letter of Credit shall remain in place as follows, rather than the date specified in Section 6. B. of this Agreement.

In the event such termination occurs prior to the date that the Developers have issued the first Notice to Proceed pursuant to Section 1.T. of this Agreement, then notwithstanding anything herein to the contrary the Letter of Credit and the escrowed funds held in the Escrow Account (together with accrued interest, if any) shall be returned to the Developers and the Developers shall have no further liability to the County under this Agreement.

In the event such termination occurs prior to the commencement of construction of the first phase of the Project but after the Developers have issued the first Notice to Proceed and prior to the County awarding any bids for road work hereunder, Developers agree to pay the County for its actual reasonable costs incurred related to the subject improvements following the receipt of the Notice to Proceed through the date of termination. Upon payment by Developers to the County for such costs, the Letter of Credit and the escrowed funds held in the Escrow Account (together with accrued interest, if any) shall be returned to the Developers and the Developers shall have no further liability to the County under this Agreement.

In the event such termination occurs prior to the commencement of construction of the first phase of the Project, but after the County has commenced road work hereunder pursuant to a bid accepted by the County (the Bid Costs of which were paid by Developers), then the County shall complete such road work. Upon final payment for such road work by the County to its contractor, if the Bid Costs paid by Developer (i) are less than the actual final costs paid by the County then the Developer shall reimburse the County for such difference (the "Final Developer Payment") or (ii) are greater than the actual costs to be paid by the County for such work, then the County shall reimburse the Developers for such difference. Upon

payment by Developers of the Final Payment to the County, the Letter of Credit and the escrowed funds held in the Escrow Account (together with accrued interest, if any) shall be returned to the Developers and the Developers shall have no further liability to the County under this Agreement.

In the event such termination occurs prior to "commencement of commercial operations of the final phase of the Project", the Escrow Account and Letter of Credit shall remain in place until a date two years after the date on which the Developers' construction activities have ceased.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first written above.

HIGH TRAIL WIND FARM, LLC

By 

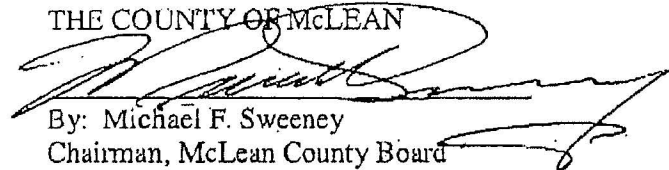
Its Authorized Representative

OLD TRAIL WIND FARM, LLC

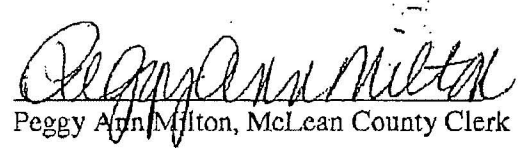
By 

Its Authorized Representative

THE COUNTY OF McLEAN


By: Michael F. Sweeney
Chairman, McLean County Board

ATTEST:


Peggy Ann Milton, McLean County Clerk

Principal Road Upgrade Schedule Exhibit 'B' to High Trail and Old Trail Road Agreement

Exhibit 'B' (Page 1)

Highway Number	Highway Name	From	To	Milage	Pre-Construction Improvements	Post-Construction Improvements
C.H. 15	Arrowsmith-Sabina Rd.	1100N	CH 36	1.00	3/4" Level Binder 1.5" Surface	Level Binder & Surface as Needed
C.H. 15	Arrowsmith-Sabina Rd.	875N			Install Crossing	Remove Crossing
✓ C.H. 17	Ellsworth Rd.	RT 9	Ellsworth	2.25	1.5" Surface	Level Binder & Surface as Needed
✓ C.H. 17	Ellsworth Rd.	In Ellsworth		0.50	None	Mill 2" 2" Surface Course
✓ C.H. 17	Ellsworth Rd.	Ellsworth	CH 36	1.50	2.5" Binder	Level Binder & Surface Required
✓ ^{1/4 mi x 9 south} C.H. 21	Leroy-Lexington Rd.	RT 9	CH 36	5.25	1.5" Surface	Level Binder & Surface as Needed
✓ C.H. 28	Ellsworth-Arrowsmith Rd.	2850E	3200E	3.50	None	4" Aggregate A-3 Surface
✓ C.H. 36	Dawson Lake Rd.	2800E	3100E	3.00	None	4" Aggregate A-3 Surface
✓ C.H. 36	Dawson Lake Rd.	3150E	3200E	0.50	None	4" Aggregate A-3 Surface

11/28/2005

X:\data02\Cad\Wind Farm\Exhibit 'B'\Road Improvement Index

ROAD UPGRADE AND MAINTENANCE AGREEMENT

This ROAD UPGRADE AND MAINTENANCE AGREEMENT (this "Agreement") is made and entered into this 1st day of September, 2005 by and among Tim Bane, Highway Commissioner of Dawson Township, Tim Morefield, Highway Commissioner of Arrowsmith Township, Paul Bottles, Highway Commissioner of Cheneys Grove Township, ("the Commissioners"), High Trail Wind Farm, LLC ("High Trail") and Old Trail Wind Farm, LLC ("Old Trail", and together with High Trail, collectively, the "Developers"). Each of the Developers and the Commissioners are sometimes referred to herein individually as a "Party" and collectively as the "Parties".

RECITALS

A. Developers are in the process of developing a wind-powered electric generating facility (the "Project") in McLean County, Illinois and have submitted an application for a Special Use Permit for the Project with the Department of Building and Zoning in accordance with the Zoning Ordinance of McLean County.

B. Developers propose to construct the Project in two or more phases. Each phase will be constructed and owned either by High Trail or Old Trail.

C. In connection with the construction, operation and maintenance of the Project, the Parties desire to address certain issues relating to the roads owned, operated and maintained by the Township Road Districts (collectively, the "Township Roads") over which it will be necessary for the Developers and their respective agents, contractors, suppliers, vendors, employees, subcontractors and designees (collectively the "Developers' Parties") to, among other things, (i) transport heavy equipment and materials over certain Townships Roads, which may in certain cases be in excess of the design limits of the Township Roads; (ii) transport certain locally sourced materials, such as

9/1/2005

concrete and gravel, on such Township Roads; (iii) widen certain Township Roads and make certain modifications and improvements (both temporary and permanent) to such Township Roads (including to certain culverts, bridges, road shoulders and other related fixtures) to permit such equipment and materials to pass; and (iv) place certain electrical and communications cables (collectively "Cables") for the Project adjacent to, under or across certain Township Roads.

D. The Commissioners have broad statutory authority to regulate the use of Township Roads (605 ILCS 5/6-101, et seq.).

E. It is in the best interest of the public health, safety and welfare that Developers and the Commissioners reach an agreement to address the majority of issues that will arise in a project of this size.

F. Developers have provided to the Commissioners a site layout plan for the Project that shows the proposed tower sites, the access road entrances, the underground collection system and the power transformer site, a copy of which is attached as Exhibit A (the "Plan").

G. This Agreement shall apply to those Township Roads listed on the Principal Road Upgrade Schedule attached as Exhibit B and, subject to Section 3C herein, any other Township Roads used by Developers and Developers' Parties in direct support of the construction and operation of the Project.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual promise and covenants herein set forth, the Parties, intending to be legally bound, agrees as follows:

Section 1. Each of High Trail, in respect of the phases of the project owned, developed and constructed by it, and Old Trail, in respect of the phases of the Project owned, developed and constructed by it, agree

to undertake the following activities in accordance with the terms of this Agreement:

- A. Ten (10) days prior to the expected commencement of construction of any phase of the Project, make the payment provided for in item P. of this Section and commence the improvements to the Township Roads in accordance with Section 5 and Exhibit B for such phase. For purposes of this Agreement, "commencement of construction" shall mean that unlimited and continuous construction of access roads and wind turbines on the Project site has begun and does not include testing or surveying (including geotechnical drilling and meteorological testing) to determine the adequacy of the site for construction.
- B. If the Project is built, build the Project substantially as depicted on the Plan and obtain the Commissioners' approval of any material alteration of the Plan insofar as it involves the use of Township Roads;
- C. Present Access Permits to permit Developers and Developers' Parties to use the Township Roads and required plans to the Commissioners for all access points to the Township Roads;
- D. Erect permanent markers indicating the presence of the Cables;
- E. Install marker tape in any trench located on or adjacent to Township Roads in which Developers or Developers' Parties have placed Cables;
- F. Become a member of the Illinois State-Wide One-Call Notice System (otherwise known as the Joint Utility Locating Information for Excavators or "J.U.L.I.E.") and provide,

from time to time, J.U.L.I.E. with all information necessary to permit J.U.L.I.E. to have current information for its records;

- G. Provide plans for the widening of any corner radius necessary to facilitate the turning movements of the transport trucks used by the Developers or the Developers' Parties;
- H. Make the necessary improvements for the widened corner radii described in paragraph G above and once these widened corner radii are no longer needed, to return the corners to their original lines and grades as near as is reasonably practicable unless the Commissioners request that the widened radii remain;
- I. Notify the Commissioners in advance of all oversize moves and crane crossings on the Township Roads;
- J. Transport the tower segments and other oversize loads so as to minimize the adverse impact on the local traffic resulting from such transport and in the exercise of commercial reasonableness;
- K. Provide as much advance notice as is commercially reasonable to obtain approval of the Commissioners when it is necessary for a Township Road to be closed due to a crane crossing or for any other reason. Notwithstanding the generality of the aforementioned, Developers will provide 48 hours notice to the extent reasonably practicable;
- L. Sign all closures and work zones on the Township Roads used by the Developers and Developers' Parties in accordance with the Illinois Department of Transportation Manual On Uniform Traffic Control Devices;

- M. Pay for the cost of all repairs to all Township Roads that are damaged as a result of the use by Developers and the Developer Parties during the construction of any phase of the Project and restore such roads to the condition they were in prior to the use causing the damage (as near as is reasonably practicable);
- N. Establish a single escrow account in accordance with Section 6 for all phases of the Project that will be used for the repair and improvements of the Township Roads;
- O. Notify all relevant parties identified under Section 4 of any temporary road closures;
- P. At the start of construction of each phase of the Project and on the first, second, third and fourth anniversaries of such date thereafter, pay Twenty Five Thousand Dollars (\$25,000) to each of Dawson Road District and Cheneys Grove Road District, and Fifty Thousand Dollars (\$50,000) to Arrowsmith Road District. The payments shall not be cumulative, so if two or more phases are underway in any one year, only one payment per year shall be made to each of the Township Road Districts. Thereafter, the annual fee shall be \$7,500 for each Township Road District through the thirtieth anniversary of the commencement of commercial operations of the last phase of the project constructed subject to this Agreement. Such \$7,500 per year payment shall be adjusted annually by the U.S. Department of Labor St. Louis Consumer Price Index (CPI) with a Base of January 1, 2006. For purposes of clarification, the following example illustrates how the annual payments will work for Arrowsmith Road District, assuming that the first phase of the Project

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is constructed in 2006 and the second phase of the Project is constructed in 2007:

Year	Project Phase I Annual Fee	Project Phase II Annual Fee	Total Annual Fee Payment
2006	\$50,000	\$0	\$50,000
2007	\$50,000	\$50,000	\$50,000
2008	\$50,000	\$50,000	\$50,000
2009	\$50,000	\$50,000	\$50,000
2010	\$50,000	\$50,000	\$50,000
2011	\$7,500*	\$50,000	\$50,000
2012 through 2036	\$7,500*	\$7,500*	\$7,500*
2037	\$0	\$7,500*	\$7,500*

*Note \$7,500 payment would be adjusted annually by the CPI.

- Q. Use commercially reasonable efforts to obtain easements and other land rights needed to fulfill Developers' obligations under this Agreement;
- R. Agree that all Township Road upgrades hereunder shall be in accordance with IDOT Bureau of Local Roads and Streets Manual 2005 edition;
- S. Provide dust control and grading work on Township Roads that become aggregate surface roads and which are listed on the Principal Road Upgrade Schedule attached as Exhibit B and, subject to Section 3C herein, any other Township Roads used by Developers and Developers' Parties in direct support of the construction and operation of any phase of the Project.
- T. For clarity, when the phrase "Township Roads" is used in this Agreement, such phrase shall mean those Township Road District Roads listed on the Principal Road Upgrade Schedule attached as Exhibit B and, subject to Section

3C herein, any other Township Roads used by Developers and Developers' Parties in direct support of the construction and operation of the Project.

Section 2. The Commissioners, for and on behalf of the Township Road Districts, in accordance with the terms of this Agreement, agree to:

- A. Review for approval all access points to the Township Roads by giving consideration to sight distances, drainage and proximity to other entrances, in a reasonable manner and in accordance with accepted engineering practices;
- B. Review for approval plans for all utility encroachments on Township Roads, in a reasonable manner in accordance with accepted engineering practices;
- C. Review for approval all crane crossings across the Township Roads by giving consideration of road damage and traffic safety in a reasonable manner based on accepted engineering practices;
- D. Issue master overweight and oversize permits in a timely manner for the roads scheduled on Exhibit B upon the filing of such applications on behalf of Developers and waive overweight permit fees for loads with axle weights of 18,000 pounds or less and issue permits during the spring posting period, between January 15th and April 15th when conditions warrant;
- E. Coordinate with Developers and Developers' Parties so as to minimize the impact of their use of the Township Roads;
- F. Waive all individual work permit fees;

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- G. Perform routine maintenance on the Township Roads used for the construction of the towers in accordance with Section 5B of this Agreement;
- H. Consent to the use of the Township Roads' rights-of-way for utility encroachments, including Cables for the Project. The consent granted herein shall be effective only to the extent of the property interest of the Commissioners and the Township Road Districts in the Township Roads. Such consent shall not be binding on any owner of a fee over or under which a Township Road is located and shall not relieve Developers from obtaining by purchase, condemnation or otherwise the necessary approval of any owner of the fee over or under which the Township Road is located if such approval is required by applicable law.
- I. Design all Township Road upgrades in accordance with IDOT Local Road Administrative Policy Manual;
- J. When the Commissioners are not readily available, they agree to delegate the day to day authority to implement the Agreement on behalf of the Commissioners and to so advise the Developers each Commissioner's designee.

Section 3. Planning Cooperation:

A. Roadway Condition Survey

The Parties, prior to the commencement of construction of any phase of the Project, shall jointly perform a survey to record the condition of the Township Roads to be used during the construction of such phase as set forth on Exhibit B. This survey shall be conducted no later than ten (10) days prior

to the commencement of construction for such phase. Documentation shall include video taping, photography, information on original construction specifications and structural strength, boring records and reports of consultants retained by Developers and/or the Commissioners to ascertain the carrying capacities of relevant roads and structures, with consultant fees to be paid by the Developer or from the Escrow Account. In the event the Commissioners desire to retain a consultant, they shall first obtain the consent of the Developers (such consent not to be unreasonably withheld). Copies of all pre-construction documentation shall be provided to each of the Parties.

B. Routing and Access Approval

As soon as practical and as necessary throughout the construction of any phase of the Project, Developers and the Commissioners shall meet and by mutual agreement revise the Plan (Exhibit A) in so far as it affects the Township Roads and make it more definitive. By mutual agreement and prior to the commencement of construction of each phase of the Project, Township Roads may be added to or deleted from the Principal Road Upgrade Schedule attached as Exhibit B, specific timing for upgrades may be established, access points to Township Roads may be approved, preferred traffic routes may be negotiated and utility encroachments, including Cable installation, finalized. The Principal Road Upgrade Schedule contains a list of the principal Township Roads that are currently anticipated to be used during construction of the Project and contains two specifications, the first describing the minimum specifications which the Township Roads must have prior to and during the construction of any phase of the Project;

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the second part describes the repairs or improvements that may be necessary following completion of material use. Such restoration to be within six (6) months following completion of material use by the Developers, or such longer period as mutually agreed by the appropriate Commissioner and the Developers.

As the Principal Road Upgrade Schedule (Exhibit B) is revised and roads are added or removed, pre-construction and post-construction improvement details shall be prepared and added to Exhibit B using the same methodology as was used to establish the improvement descriptions and cost estimates included in Exhibit B on the date of signing this Agreement.

C. Incidental Use

The Parties recognize that the Project traffic may, either through mistake or with the consent of the Commissioners, use Township Roads other than those listed on the Principal Road Upgrade Schedule. Repairs for damage caused by the Developers or any of the Developer Parties during such mistaken or permitted use may be paid as provided in Section 6 C of this Agreement.

Section 4. Construction Cooperation:

A. With Others:

Prior to the commencement of construction of any phase, Developers shall hold a meeting and shall invite all public or semi-public entities that may be affected by the Project including, but not limited to, schools and fire protection districts. At said meeting, Developers will

discuss their plans for the construction of the Project and compile a list of contact persons that will need to be notified of any temporary road closures that may have an effect on the daily routine or routing of those agencies. Should all of the parties contacted not be represented, Developers shall attempt to make contact with these entities in an effort to obtain the contact information. A copy of this list shall be furnished to the Commissioners.

B. With the Commissioners:

During construction of any phase, the Commissioners and Developers shall meet regularly to disclose and discuss Project activities, including anticipated material and equipment deliveries and traffic movement which may be reflected as changes in the Plan (Exhibit A) and/or the Principal Road Upgrade Schedule (Exhibit B).

Section 5. Upgrades and Maintenance of the Township Roads

- A. In order to minimize the adverse effect of the construction traffic on the Township Roads, certain upgrades will be required to be completed by Developers on certain roads as determined by and paid for by Developers in accordance with Exhibit B. All material incorporated into Township Roads and all related tools, fuel, lumber for forms and other end use or consumption items, whether or not incorporated into Township Roads, which are sold directly or indirectly to Developers and are used in connection with the road work described in Exhibit B, shall be exempt from Illinois Retailer Occupation Tax and Use Tax (Title 86 Part 130, § 130, 2075 (d) Ill. Dept. of Revenue Regulation). To the extent any such work is done or materials incorporated into roadways not currently under the jurisdiction of the Commissioners, such roadway shall be transferred to the Commissioners and shall, therefore, be

exempt from Retailer Occupation and Use Tax (Title 86 Part 130, 2075 (e)(2) Ill. Department of Revenue Regulations).

- B. The daily routine maintenance of the Township Roads affected by the Project, including snow removal, striping, and routine signage and regularly scheduled maintenance or repair shall be the responsibility of the Commissioners.
- C. If repairs or maintenance (other than daily routine maintenance which shall be the responsibility of the Commissioners), including dust control and grading, is not performed by the applicable Developer following notice from the Commissioners and an opportunity to cure such failure of no less than 10 days, and such repairs and maintenance are deemed necessary because of activity of Developers and the Developer Parties, the Commissioners may perform (or cause to be performed) such work, with payment pursuant to the Escrow Disbursement Procedure set forth in Section 6-C.

Section 6. Escrow Account and Letter of Credit

- A. Thirty days prior to the start of the initial upgrades of the Township Roads in accordance with this Agreement, the Developers shall establish an escrow account in the amount of Five Hundred Thousand Dollars (\$500,000) (the "Escrow Account"). The Escrow Account shall be used to pay for expenses incurred for the upgrade and/or repair of the Township Roads in accordance with the terms of this Agreement in the event Developers do not otherwise pay the costs thereof. The Escrow Account shall be established at a bank doing business within McLean County selected by Developers. Within forty-five days of the execution of this Agreement, the Parties shall execute a

mutually agreeable form of escrow agreement (the "Escrow Agreement"), which agreement shall, among other things, appoint the escrow agent and set forth the disbursement provisions in detail. Developers shall be responsible for making additional deposits in this escrow account in order to maintain the original minimum balance; provided however, that the aggregate amount (including the initial balance) Developers shall be required to deposit shall not in any event exceed \$7,000,000. Developers shall also provide, thirty days prior to the start of the initial upgrades of the Township Roads in accordance with this Agreement, to the Commissioners an Irrevocable Letter of Credit in the face amount of Five Hundred Thousand Dollars (\$500,000) (the "Letter of Credit") which the Commissioners may draw against in the event and only to the extent that sufficient funds are not available in the Escrow Account to pay for Developers' failure to upgrade and/or repair of the Township Roads in accordance with the terms of this Agreement. The Letter of Credit shall be issued by a bank and in such form as is reasonably acceptable to the Commissioners.

- B. The Escrow Account and Letter of Credit shall remain in place from the date the initial deposit is made until a date two years after the completion of the road upgrades in Exhibit B. Claims by the Commissioners for damage caused by Developers or the Developers' Parties after the expiration of the Letter of Credit shall be resolved as provided in Section 6 C 2 a-f, recognizing that the Escrow Account may be depleted by this point in time. The Commissioners agree to deliver any certification required for any permitted

withdrawal from the Escrow Account or surrender of the Letter of Credit, including any final withdrawal and/or surrender when Developers are no longer required to fund the Escrow Account or provide the Letter of Credit pursuant to the terms hereof, the Escrow Agreement or Letter of Credit. For so long as Developers are required to maintain the Letter of Credit pursuant to the terms hereof, in the event that, pursuant to the terms of such Letter of Credit, the Commissioners shall be entitled to draw down the full outstanding amount of such Letter of Credit as a result of a failure to extend, amend or replace such Letter of Credit prior to its expiration, the Commissioners agree that they shall immediately deposit any amounts so drawn into the Escrow Account. Developers shall be entitled to withdraw from the Escrow Account any and all amounts in the Escrow Account (including any interest accrued thereon) two years after completion of the road upgrades in Exhibit B.

C. The Escrow Agreement shall set forth, among other things, the disbursement procedures for the Escrow Account and shall include:

1. On the roads listed on the Principal Road Upgrade Summary attached as Exhibit B, as such Exhibit may be amended by the Parties from time to time:

a. The Commissioners shall notify Developers in writing of damage shown to be caused by Developers or the Developers' Parties and request that Developers repair the damage to such roads and return such roads to the condition they were in prior to such damage (as near as is reasonably

practicable).

b. Prior to commencement of such repair, the Parties shall meet to review the damage in relation to the most recent survey. Developers shall repair (or cause to be repaired) such damage in accordance with subsection c, unless the Developers demonstrate to the reasonable satisfaction of the Commissioners that the damage was not caused by Developers or the Developer Parties. Any repair and restoration shall be promptly performed at such times as the Parties determine, having due regard for safety, the presence of emergency conditions and the costs of such repairs.

c. The work shall be performed by Developers in accordance with the applicable Illinois Department of Transportation Local Roads and Streets Manual, 2005 edition. Payment for such work shall be made by Developers or from the Escrow Account.

2. For damages on roads other than those listed on the Principal Road Summary attached as Exhibit B, as amended from time to time:

a. The Commissioners notify Developer of the location and nature of the repair or maintenance required and a suggested time framework for completion.

b. If Developers agree, the Developers (or its contractor) or Commissioners (or Commissioner's contractor) shall perform the repair in

the time frame agreed by the Parties and recover its reasonable, documented costs from the Escrow Account.

c. If Developers disagree, the Commissioners and Developers will in good faith attempt to resolve the dispute and shall involve Lewis, Yockey and Brown as a neutral intermediary to help resolve the dispute within a 5-day period. The costs of the intermediary will be paid equally by the Parties if a mutually agreeable solution is proposed, or if not, by the Party rejecting the intermediary proposed solution. Either Party may reject the intermediary solution by written notice to the other Party within 2 days from the date it is rendered.

d. If the Parties cannot agree and the Commissioners reject the intermediary's proposed solution, the Commissioners may take unilateral action to prevent harm or protect public safety, the cost of which shall be paid from the Escrow Account. If the appropriateness of the Commissioners' action is ultimately determined not to be justified either by agreement or adjudication, Commissioners shall promptly refund applicable cost of repairs to the Developer.

e. If the Parties agree and/or don't reject the intermediary's proposed solution, then the Commissioners (or Commissioners' contractor) may make the repair and shall recover its reasonable documented

costs from the Escrow Account.

f. The Commissioners' charges shall be based on County maintained time and material cost records, which shall be made available to Developers for review. County billing rates shall be those established by the County and shall be uniformly applied to all consumers.

3. Emergency Repairs.

Notwithstanding the foregoing, in the event Developers or the Developers' Parties are reasonably believed by the Commissioners to have caused damage to Township Roads of a magnitude sufficiently great to create a hazard to the motoring public, which in the Commissioners' opinion warrants an immediate repair or road closing, the Commissioners may unilaterally make or authorize repair, with the reasonable, documented costs thereof paid from the Escrow Account. The Commissioners shall photograph, videotape and otherwise document the conditions and make all such documentation available to Developers. Any such emergency repair shall be subject to post-repair negotiations by the Parties, involvement of the intermediary and, if necessary, adjudication. If such post-repair proceedings favor Developers, the Commissioners will reimburse the Escrow Account for amounts withdrawn to fund the repair.

Section 7. Mutual Indemnification/Hold Harmless and Liability Insurance Provisions.

A. Indemnification by Developers. The Developers hereby release and agree to indemnify and hold harmless the Commissioners and their respective officers, employees, elected or appointed

officials, and agents, and their respective heirs, executors, administrators, successors and assigns (hereinafter collectively "Commissioners Releasees") from any and all actions, causes of action, suits, claims, expenses (including reasonable attorney's fees) and demands against the Commissioners Releasees arising out of or relating to the performance by Developers of their obligations under this Agreement. More particularly, but without in any way limiting the foregoing, the Developers hereby release the Commissioner Releasees and agree to indemnify and hold harmless the Commissioner Releasees from any and all actions, causes of action, suits, claims, expenses (including reasonable attorney's fees) and demands arising directly or indirectly from any personal injury, death or property damage arising out of the use, construction, modifications, repair or improvement of any Principal Road identified in Exhibit B by the Developers, its employees, agents, representatives, suppliers or contractors, or their respective employees, agents or representatives.

B. Indemnification by the Commissioners. The Commissioners hereby releases and agrees to indemnify and hold harmless the Developers and their respective members, officers, directors, contractors, subcontractors, employees and agents, and their respective employees, heirs, executors, administrators, successors and assigns (hereinafter collectively "Developers Releasees") from any and all actions, causes of action, suits, claims, expenses (including reasonable attorney's fees) and demands against the Developers Releasees arising out of or relating to the performance by the Commissioners of their obligations under this Agreement. More particularly, but without in any way limiting the foregoing, the

Commissioners hereby release the Developers Releasees and agrees to indemnify and hold harmless the Developers Releasees from any and all actions, causes of action, suits, claims, expenses (including reasonable attorney's fees) and demands arising directly or indirectly from any personal injury, death or property damage arising out of the use, construction, modifications, repair or improvement of any Principal Road identified in Exhibit B by the Commissioners, their respective employees, agents, representatives, suppliers or contractors, or their respective employees, agents or representatives.

C. Limitations of Liability. In no event shall any Party be liable (in contract or in tort, involving negligence, strict liability, or otherwise) to any other Party or its contractors, suppliers, employees, members and shareholders for indirect, incidental, consequential or punitive damages resulting from a Party's performance, non-performance or delay in performance under this Agreement.

D. Required Insurance. The Developers shall at all times throughout the term of this Agreement maintain in full force and effect workers' compensation insurance as required by the State of Illinois and commercial general liability insurance, naming each of the Commissioners and Township Road Districts as an additional insured, in an aggregate amount equal to Ten Million Dollars (\$10,000,000). The Developers may utilize any combination of primary and/or excess insurance to satisfy this requirement. Developers shall provide proof of insurance upon written request by a Commissioner.

Section 8. Miscellaneous

- A. Remedies and Enforcement. Each of the Parties hereto covenant and agree that in the event of default of any of the terms, provisions or conditions of this Agreement by any party (the "Defaulting Party"), which default is not caused by the party seeking to enforce said provisions (the "Non-Defaulting Party") and after notice and reasonable opportunity to cure has been provided to the Defaulting Party, then in such an event, the Non-Defaulting Party shall have the right of specific performance. The remedy of specific performance and injunctive relief shall not be exclusive of any other remedy available at law or in equity.
- B. Due Authorization. Each of High Trail and Old Trail hereby represents and warrants that this Agreement has been duly authorized, executed and delivered on behalf of High Trail and Old Trail. The Commissioners hereby represent and warrant that this Agreement has been duly authorized, executed and delivered on behalf of the Township Road Districts.
- C. Severability. If any provision of this Agreement is held invalid under any applicable law, such invalidity shall not affect any other provision of this Agreement that can be given effect without the invalid provision and, to this end, the provisions hereof are severable.
- D. Amendments. No amendment or modification to this Agreement or waiver of a Party's rights hereunder shall be binding unless it shall be in writing and signed by the Party against whom enforcement is sought.
- E. Notices. All notices shall be in writing and sent (including via facsimile transmission) to the Parties hereto at their respective addresses or fax numbers (or to such other address or fax number as any such Party shall designate in

writing to the other Parties from time to time).

High Trail Wind Farm, LLC and Old Trail Wind
Farm, LLC
1001 McKinney Street
Suite 1740
Houston, TX 77002
Office: 713/571-6640; fax: 713/571-6659

With a copy to:

High Trail Wind Farm, LLC and Old Trail Wind
Farm, LLC
Project Manager
716 E. Empire, Suite F
Bloomington, IL 61701
Office: 309/829-8211; fax: 309/829-8611

The Commissioners

Tim Bane
Dawson Township Road Commissioner
28986 E 800 North Rd.
Ellsworth, IL 61737
Phone: 309/724-8071

Tim Morefield
Arrowsmith Township Road Commissioner
10569 North 3300 East Road
Arrowsmith, IL 61722
Phone: 309/275-6146

Paul Bottles
Cheneys Grove Township Road Commissioner
40096 E 950 North Rd.
Saybrook, IL 61770
Phone: 309/475-8461

With a copy to:

McLean County Engineer
102 S. Towanda-Barnes Road
Bloomington, IL 61704
Ph. (309) 663-9445
Fax (309) 662-8038

- F. Assignment. This Agreement may not be assigned without the written consent of the other Party.
- G. Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, with the same effect as if the signatures thereto and hereto were upon the instrument. Delivery of an executed counterpart of a signature page to this Agreement by telecopy shall be as effective as delivery of a manually signed counterpart to this Agreement.
- H. Governing Law. This Agreement shall be governed by and interpreted in accordance with the laws of the state of Illinois, irrespective of any conflict of laws provisions.
- I. Successors and Assigns. This Agreement shall inure to the benefit of and shall be binding upon the Parties hereto, their respective successors, assignees and legal representatives.
- J. Fees and Costs. Developer agrees to reimburse Commissioners their reasonable attorney and other professional fees incurred in negotiating this Agreement and the Escrow Agreement, not to exceed \$ 10,000.00.
- K. Prior to the commencement of construction as defined in Section 1 A, Developer has the unilateral right to terminate this Agreement without further liability to the Commissioners other than to reimburse attorney fees under

Section 8 J. If thereafter, Developer elects to discontinue the Project, Developer shall notify Commissioners in writing of that decision. Such notification shall constitute "completion of the project". Since such termination notification may precede "completion of the road upgrades in Exhibit B", then, if such notification is given, the Escrow Account and Letter of Credit shall remain in place until a date two years after the date on which the Developers' construction activities have ceased and the road upgrades are completed on those Township Roads whereupon the road upgrades had commenced prior to such termination notification but had not yet been completed, rather than the date specified in Paragraph 6 B of this Agreement.

[SIGNATURES FOLLOW ON NEXT PAGE]