

MINUTES
LANCASTER COUNTY BOARD OF COMMISSIONERS
COUNTY-CITY BUILDING, ROOM 112
TUESDAY, OCTOBER 27, 2015
9:00 A.M.

Advance public notice of the Board of Commissioners meeting was posted on the County-City Building bulletin board and the Lancaster County, Nebraska, web site and emailed to the media on October 23, 2015.

Commissioners present: Roma Amundson, Chair; Larry Hudkins, Vice Chair; Bill Avery, Deb Schorr and Todd Wiltgen

Others present: Gwen Thorpe, Deputy Chief Administrative Officer; David Derbin, Deputy County Attorney; Cori Beattie, Deputy County Clerk; and Kelly Lundgren, County Clerk's Office

The Chair called the meeting to order at 9:00 a.m., the pledge of allegiance was recited and the location of the Nebraska Open Meetings Act was announced.

1) MINUTES:

- A.** Approval of the minutes of the Board of Commissioners meeting held on Tuesday, October 20, 2015.

MOTION: Hudkins moved and Wiltgen seconded approval of the minutes. Avery, Hudkins, Schorr, Wiltgen and Amundson voted aye. Motion carried 5-0.

- B.** Approval of the minutes of the Wind Text Public Hearing held on Tuesday, October 20, 2015.

MOTION: Schorr moved and Hudkins seconded approval of the minutes. Hudkins, Schorr, Wiltgen, Avery and Amundson voted aye. Motion carried 5-0.

2) CLAIMS: Approval of all claims process through October 27, 2015.

MOTION: Hudkins moved and Avery seconded approval of the claims. Schorr, Wiltgen, Avery, Hudkins and Amundson voted aye. Motion carried 5-0.

3) SPECIAL PRESENTATION:

- A. 2014 Lancaster County Department of Corrections Employee of the Year – Amy Cook, Correctional Officer.**

Mike Thurber, Corrections Administrator, presented a plaque to Amy Cook, 2014 Department of Corrections Employee of the Year and recommended the Board approve an exceptional circumstance award of \$500.

The Deputy Clerk read the nomination for the record.

SPECIAL PRESENTATION CONTINUED:

Cook thanked her co-workers for the nomination and their support.

The Board expressed their appreciation to Cook for her dedication and service to the Lancaster County Department of Corrections.

MOTION: Hudkins moved and Wiltgen seconded approval of the exceptional circumstance award. Wiltgen, Avery, Hudkins, Schorr and Amundson voted aye. Motion carried 5-0.

B. Sheriff's Office Good Life 100 Day fitness challenge – Jeff Bliemeister

Jeff Bliemeister, Deputy County Sheriff, introduced Steve Auxier and Caitlynn Gillaspie from Good Life Fitness and Jen Koolen from the Child Advocacy Center. He told the Board thirty-one employees of the Lancaster County Sheriff's Office and the University Police Department recently participated in a 100-Day fitness challenge sponsored by Good Life Fitness Center. Bliemeister said Good Life Fitness pledged one dollar for each pound lost to the Child Advocacy Center.

Auxier said it was a pleasure working with those that serve and protect the community. He noted that the participants lost a total of 131 pounds but Good Life Fitness rounded that up and presented a check to Koolen for \$300.

Koolen thanked the Sheriff's Office for selecting the Child Advocacy Center. She said they see approximately one hundred children a month and the funds will go toward critical services for those children.

4) OLD BUSINESS:

A. Liability insurance coverage with National Legal Aid and Defender Association (NLADA) Service Corporation for the Lancaster County Public Defender's Office, in the amount of \$6,283.00. The policy begins on November 1, 2015 for a period of 12 months

Hudkins told the Board he had received information from Kerry Eagan, Chief Administrative Officer, who indicated that the insurance coverage is a required professional insurance. He added that it is a decrease of \$200 from last year.

MOTION: Hudkins moved and Avery seconded approval of the insurance coverage. Wiltgen, Schorr, Hudkins, Avery and Amundson voted aye. Motion carried 5-0.

5) NEW BUSINESS:

A. Agreement between the American Federation of State, County and Municipal Employees (AFSCME – Engineering) Local 2468 and Lancaster County for the contract term August 20, 2015 through August 30, 2017. (C-15-0564)

Doug McDaniel, Human Resources Director, noted the two-year contract provides for a 2.5% salary increase annually.

NEW BUSINESS CONTINUED:

Rick DeBoer, American Federation of State, County and Municipal Employees (AFSCME – Engineering) Local 2468 President, said overall the negotiations were handled with fairness and integrity. He noted there are still some concerns and questions which could not be addressed with the Board until after the negotiations concluded. DeBoer presented each Board member with a letter addressing those concerns (Exhibit A).

Pam Dingman, County Engineer, said she hopes that the open and positive dialogue and mutual respect between management and the union continues.

MOTION: Schorr moved and Hudkins seconded approval of the agreement. Schorr, Hudkins, Avery, Wiltgen and Amundson voted aye. Motion carried 5-0.

B. Commercial Wind Energy Text Amendment No. 15009.

Amundson said the Board would not be accepting any additional testimony regarding this agenda item. She noted the Board had received numerous documents since the public hearing held on Tuesday, October 20, 2015 which would be entered into the record (Exhibit B).

Wiltgen said the estimated \$700,000 collected from the nameplate capacity tax would be a benefit to the County for repairing roads and bridges.

Avery stated that he is in favor of the project moving forward but not without reasonable standards. He said there is the need to protect the public interest by developing alternative energy and becoming less dependent on fossil fuels. He said he supports the recommendations of the Planning Commission and will consider amendments from fellow Board members but will not support any amendment that will shrink the area of allowable turbine construction to the point where no wind project is possible.

Wiltgen said his focus is setting good policy for the entire County and not focusing on one certain area or benefit one particular developer. He distributed copies of a proposed amendment to #2 "B" – Section G (Exhibit C) which addresses the setback section to delete lot size differentiation and measure setback to all non-participating lots at the property line. Wiltgen stated with this proposal, the setback would be dependent on the turbine height from the closest exterior wall of the dwelling as opposed to 1000 feet. It also addresses the concerns of a universal property line standard. Wiltgen felt it increases the protection of non-participating property owners.

Amundson noted that almost all construction setbacks in Lancaster County are from the property line and preferred this text remain consistent.

Hudkins said that he concurs with Amundson as measuring from the property line provides the most clarity and protection for the property owners. He asked Wiltgen to elaborate on the issue of a non-participating property owner becoming a participating property owner.

Wiltgen stated there is the setback standard of two times the turbine height to the property line and an additional three and half times for added protection for a dwelling unit. He explained his proposal allows a non-participating property owner to negotiate with the wind developer and become a participating property owner in the future.

NEW BUSINESS CONTINUED:

Avery asked Wiltgen what affect his amendment would have on the available space for turbines.

Wiltgen said it may shrink the available land size but would provide an opportunity for a reasonable compromise. With regard to the original proposal by the Planning Commission for non-participating property owners with less than 10 acres, the setback was 1000 feet from the property line and three times the turbine height to the dwelling. Wiltgen added for lots greater than 10 acres, the setback is measured from the dwelling which would result in a slight reduction in the available land space.

Amundson suggested that a decision be made on whether the setback is measured from the property line versus the dwelling before considering any other amendments.

Hudkins expressed concerns with the turbine's concrete base and future height changes. He felt it would be best to have a setback with a specific foot limit.

Avery questioned the procedure on forwarding proposed amendments if there is no motion on the floor.

MOTION: Wiltgen moved to amend #2B (Section G) of the Planning Commission's recommendations (as proposed in Exhibit C); seconded by Hudkins.

David Derbin, Deputy County Attorney, said Wiltgen simply made a motion to amend #2B (Section G) of the Planning Commission's proposed recommendations. He added that he would not recommend adopting the Planning Commission's proposal in its entirety at this time as there may be further changes. It was also noted that following today's discussion, the Board would need to direct the County Attorney's Office to prepare a resolution which would incorporate the amendments to the original recommendations.

In response to Amundson's inquiry regarding how the setback distance of 1000 feet was determined, Steve Henrichsen, Development Review Manager, Lincoln-Lancaster County Planning Department, said 1000 feet was the most common community standard in the United States and in Nebraska. He added that "ice throw" was also taken into consideration as a safety component even though it was felt to be a minor item. Henrichsen stated for non-participating landowners it was important to have something in place that goes beyond 1000 feet since the turbines can vary in height so the "1000 feet or three times the turbine height, whichever is greater" wording was included.

Schorr questioned the process if there was a significant change to the turbine height or structure. Henrichsen explained the developer would need to state the maximum height of the turbines in the original application. If they then decide to increase that height, a new application would be required. Henrichsen noted the developer was aware of those regulations.

Wiltgen said his intent with the amendment was to make one uniform standard for the entire County and not differentiate between larger and smaller acreages.

Avery asked Henrichsen for his thoughts on Wiltgen's proposal. Henrichsen said the wording would be challenging. He provided the Board with a scenario of how the language could affect the placement of a turbine in relationship to a dwelling versus a property line and the confusion it could cause.

NEW BUSINESS CONTINUED:

Following that explanation, Wiltgen said he would be willing to change the wording of #2 - Section G(1) (see Exhibit C) to reflect a setback of 1000 feet from the property line for non-participating lots or three and a half times the turbine height from the dwelling whichever is greater.

Amundson asked for clarification of the wording. Henrichsen read the proposed change as follows:

"For a non-participating lot, the setback shall be two times the turbine height (hub height plus the rotor radius) measured at the property line, or three and half times the turbine height, measured to the closest exterior wall of the dwelling unit, whichever is greater, but at a minimum 1000 feet."

AMENDMENT: Wiltgen amended his original motion to include the wording as stated above; the seconder agreed.

ROLL CALL ON MOTION AS AMENDED: Hudkins, Avery, Wiltgen, Schorr and Amundson voted aye. Motion carried 5-0.

MOTION: Hudkins moved to increase the depth of the soil to five feet upon decommissioning and to add the words "average surrounding" to Section (c). (Exhibit D); seconded by Avery.

Avery asked Hudkins to explain the rationale behind the amendment. Hudkins said uniform standards need to be in place so that in the future, there is a reasonable expectation that the ground will be free down to five feet. He noted the original text also stated that dirt would be placed over the concrete which he felt was not acceptable.

ROLL CALL: Schorr, Wiltgen, Avery, Hudkins and Amundson voted aye. Motion carried 5-0.

MOTION: Schorr moved to support the noise recommendations of the Lincoln-Lancaster County Health Department of 40 dBA (daytime) and 37 dBA (nighttime); seconded by Hudkins.

Wiltgen requested clarification. Henrichsen said two different versions, #3A and #3B, were prepared. Amendment #3A (Exhibit E) is the version proposed by the LLCHD and originally presented to the Planning Commission which includes noise standards of 40 dBA (daytime) and 37 dBA (nighttime) measured at the dwelling unit. Henrichsen said after last week's public hearing, #3B (Exhibit F) was drafted reflecting the same noise standards as measured from the property line.

In response to Avery's inquiry, Henrichsen said #3B would be more restrictive.

Hudkins inquired what happens if in the future someone builds a house closer to a property line. Scott Holmes, Environmental Public Health Division Manager, Lincoln-Lancaster County Health Department (LLCHD), stated that would be their right as property owner and the turbine could remain as it would then be considered a non-conforming use. It was also noted that the turbine would not have to be decommissioned under this circumstance.

Henrichsen referred to a letter and maps from Volkswind (see Exhibit B) which attempted to describe what land restrictions would occur at each noise level.

NEW BUSINESS CONTINUED:

Amundson asked why the amendment references the dwelling unit rather than the property line. Holmes said the LLCHD's effort is to establish health-based standards. He noted the primary exposure would be in the home at night and noted the World Health Organization (WHO) established a level of 40 dBA at the wall of a home and 30 dBA inside at night as not to create sleep disturbance. Holmes indicated they attempted to come close to that standard.

Wiltgen expressed concern that if the Board adopts the standards set by the LLCHD, it reflects a zero tolerance for wind energy, thus, he would not support Schorr's motion.

Avery agreed that a balance is needed and felt the Planning Commission's recommendation of 50 dBA (daytime) and 42 dBA (nighttime) should be accepted.

Hudkins proposed setting the daytime and nighttime levels at 45 dBA.

Holmes said 45 dBA is significantly louder than 40 dBA, noting 50 dBA would be roughly twice as loud as 40 dBA. He added it is standard to set nighttime levels lower.

Schorr and Amundson stated they would not support equal decibel levels for day and night.

Wiltgen asked for clarification on the motion. Schorr clarified that her motion was to support noise levels of 40 dBA (daytime) and 37 dBA (nighttime) measured at the dwelling unit (see Amendment #3A).

Avery said if the Board approves the motion, there would not be any wind turbines built in Lancaster County.

Wiltgen asked if the original motion was seconded and, if so, whether the seconder concurred with the clarification on the motion. Hudkins said he did second the motion for discussion and accepted the clarification on the wording as provided by Commissioner Schorr. He added he would also consider setting decibel levels the same for day and night, noting that some people felt 45 dBA would be acceptable. He said he would not support measurement from the dwelling unit. Wiltgen emphasized the reason for the noise standard is to protect public health and safety.

Hudkins asked if the maker of the motion would agree to 42 dBA day and night from the dwelling unit. Schorr said no, as she felt it is important to have a lower noise level at night.

AMENDMENT: Hudkins moved to amend the motion to allow for a noise level of 42 dBA day and night.

Motion failed for lack of a second.

AMENDMENT: Hudkins moved to amend the motion to allow for a noise level of 43 dBA day and night.

Wiltgen pointed out that many counties have noise thresholds of 50 dBA day and night.

Motion failed for lack of a second.

NEW BUSINESS CONTINUED:

ROLL CALL ON THE ORIGINAL MOTION: Hudkins, Schorr and Amundson voted aye. Avery and Wiltgen voted nay. Motion carried 3-2.

MOTION: Hudkins moved to direct the County Attorney's Office to draft a resolution regarding the wind energy text amendment and to bring it before the Board when all members are present; seconded by Schorr.

Avery said, for the record, he would not be signing the resolution.

ROLL CALL: Hudkins, Schorr and Amundson voted aye. Wiltgen and Avery voted no. Motion carried 3-2.

NOTE: Following the Board of Commissioners meeting, the Planning Department provided clarification of the amendment wording related to setbacks. (Exhibit G)

C. Magellan re-credentialing application for the Mental Health Crisis Center.

Gwen Thorpe, Deputy Chief Administrative Officer, said the re-credentialing is a Medicare and Medicaid billing requirement with the Department of Health and Human Services.

MOTION: Wiltgen moved and Hudkins seconded approval of the application. Avery, Wiltgen, Schorr, Hudkins and Amundson voted aye. Motion carried 5-0.

Sara Hoyle, Human Services Director, gave an overview of items D – H.

D. Grant contract in the amount of \$20,000 with HUB Central Access Point for Young Adults, Inc., for their Graduate Links Project. Term of the contract is July 1, 2015 to June 30, 2016. (C-15-0565)

MOTION: Wiltgen moved and Hudkins seconded approval of the contract. Wiltgen, Hudkins, Avery, Schorr and Amundson voted aye. Motion carried 5-0.

E. Grant contract in the amount of \$12, 675 with Berniklau Educational Solutions Team (BEST) for management of a juvenile day reporting center. Term of the contract is July 1, 2015 to June 30, 2016. (C-15-0566)

MOTION: Schorr moved and Hudkins seconded approval of the contract. Avery, Schorr, Hudkins, Wiltgen and Amundson voted aye. Motion carried 5-0.

F. Grant contract in the amount of \$5,000 with Creating Family Choices, Inc., for the Youth Gambling Prevention program. Term of the contract is July 1, 2015 to June 30, 2016. (C-15-0567)

MOTION: Hudkins moved and Schorr seconded approval of the contract. Hudkins, Wiltgen, Schorr, Avery and Amundson voted aye. Motion carried 5-0.

NEW BUSINESS CONTINUED:

- G. Grant contract in the amount of \$10,000 with El Centro de las Americas, for the Latina Leaders program. Term of the contract is July 1, 2015 to June 30, 2016. (C-15-0568)**

MOTION: Schorr moved and Wiltgen seconded approval of the contract. Schorr, Avery, Wiltgen, Hudkins and Amundson voted aye. Motion carried 5-0.

- H. Grant contract in the amount of \$8,500 with Families Inspiring Families, to provide Parent Support Groups at the Youth Services Center. Term of the contract is July 1, 2015 to June 30, 2016. (C-15-0569)**

MOTION: Schorr moved and Wiltgen seconded approval of the contract. Avery, Hudkins, Schorr, Wiltgen and Amundson voted aye. Motion carried 5-0.

- I. Contract with Kapish North America Services, Inc. for consulting services to facilitate the deployment of the HPRM records management product suite. The County will pay up to \$19,380 for the services provided. Term of the contract is one year from the date of execution. (C-15-0570)**

MOTION: Avery moved and Wiltgen seconded approval of the contract. Hudkins, Schorr, Wiltgen, Avery and Amundson voted aye. Motion carried 5-0.

- J. Amendment to County Contract C-15-0111 between W.W. Grainger, Inc., Lancaster County, the City of Lincoln and the Lincoln-Lancaster County Public Building Commission for facilities maintenance, repair and operating supplies. The amended contract is effective from October 22, 2015 through October 21, 2016. (C-15-0571)**

MOTION: Wiltgen moved and Hudkins seconded approval of the amendment. Schorr, Wiltgen, Avery, Hudkins and Amundson voted aye. Motion carried 5-0.

- K. Amendment to County Contract C-14-0402 with Snap-On Industrial for small hand and power tool accessories. The amended term is from September 20, 2015 through September 19, 2017. Costs to the County is not to exceed \$20,000. (C-15-0572)**

MOTION: Hudkins moved and Schorr seconded approval of the amendment. Wiltgen, Avery, Hudkins, Schorr and Amundson voted aye. Motion carried 5-0.

- L. Amendment to County Contract C-14-0579 with Navia Benefit Solutions to reflect three additional one-year renewal periods after the initial term, and a renewal of the contract from November 1, 2015 through October 31, 2016. Cost to the County is not to exceed \$12,000 during this renewed term. (C-15-0573)**

MOTION: Wiltgen moved and Hudkins seconded approval of the amendment. Avery, Hudkins, Schorr, Wiltgen and Amundson voted aye. Motion carried 5-0.

NEW BUSINESS CONTINUED:

- M. Agreement between Judy Manhas and Lancaster County, on behalf of the Lancaster County Department of Corrections, to provide Safety Training Option Program (STOP) instruction to participants eligible to participate in the Lancaster County Traffic Diversion program. The County shall pay \$100 per STOP class instructed. Term of the Contract is November 1, 2015 to June 30, 2016. (C-15-0574)**

Kim Etherton, Community Corrections Director, clarified that Items M and N relate to the Department of Community Corrections, not the Department of Corrections.

MOTION: Avery moved and Hudkins seconded approval of the agreement. Hudkins, Schorr, Wiltgen, Avery and Amundson voted aye. Motion carried 5-0.

- N. Agreement between Patricia Swanson and Lancaster County, on behalf of the Lancaster County Department of Corrections, to provide Safety Training Option Program (STOP) instruction to participants eligible to participate in the Lancaster County Traffic Diversion program. The County shall pay \$100 per STOP class instructed. Term of the Contract is November 1, 2015 to June 30, 2016. (C-15-0575)**

MOTION: Hudkins moved and Wiltgen seconded approval of the agreement. Schorr, Wiltgen, Avery, Hudkins and Amundson voted aye. Motion carried 5-0.

- O. Statement of Intent to Negotiate with Zachary and Sarie Whitson, owners of land legally described as Lot 28 of irregular tracts located in the Northwest Quarter of Section 20, Township 9 North, Range 8 East of the 6th Principal Meridian, Lancaster County, Nebraska, to be filed with Chad Blahak, City of Lincoln Building and Safety Director, in accordance with the provisions of Neb. Rev. Stat. §§ 39-1311 through 39-1311.05 (Reissue 2008).**

MOTION: Hudkins moved and Avery seconded approval of the Statement of Intent to Negotiate. Wiltgen, Avery, Hudkins, Schorr and Amundson voted aye. Motion carried 5-0.

- P. Renewal application for Fiduciary Liability coverage for the Lancaster County Nebraska Employee Retirement Plan.**
- Q. Executive Session – Pending Litigation – Doug Cyr, Chief Deputy Lancaster County Attorney**

MOTION: Wiltgen moved and Hudkins seconded to table items P and Q until after the Board of Equalization meeting is adjourned and proceed to Item 6. Wiltgen, Schorr, Hudkins, Avery and Amundson voted aye. Motion carried 5-0.

6) **CONSENT ITEMS:** These are routine business items that are expected to be adopted without dissent. Any individual item may be removed for special discussion and consideration by a Commissioner or by any member of the public without prior notice. Unless there is an exception, these items will be approved as one with a single vote of the Board of Commissioners. These items are approval of:

A. Receive and place on the file the following reports:

1. County Sheriff

MOTION: Avery moved and Schorr seconded approval of the consent item. Hudkins, Avery, Wiltgen, Schorr and Amundson voted aye. Motion carried 5-0.

7) **PUBLIC COMMENT:** Those wishing to speak on items relating to County business not on the agenda may do so at this time.

Gary Aldridge, 7112 S. 45th Street, Lincoln, NE 68516, appeared and commented on the increase of property tax rate. He noted individuals living on a fixed income such as social security will not receive a cost of living increase this year while tax rates increase. Aldridge expressed concern with having called the County Board Office twice recently and received a recording. He said he left a message with his information repeating his phone number twice and has yet to receive a call back.

The Chair recessed the meeting at 10:55 a.m.

The Chair reconvened the meeting at 11:00 a.m.

RETURNING TO ITEMS P & Q

P. Renewal application for Fiduciary Liability coverage for the Lancaster County Nebraska Employee Retirement Plan.

Doug Cyr, Chief Deputy Attorney, informed the Board this is liability coverage that protects the County from being sued for losses on the pension plan.

MOTION: Hudkins moved and Wiltgen seconded approval of the application. Wiltgen, Schorr, Hudkins, Avery and Amundson voted aye. Motion carried 5-0.

Q. Executive Session – Pending Litigation – Doug Cyr, Chief Deputy Lancaster County Attorney

MOTION: Schorr moved and Hudkins seconded to enter into Executive Session at 11:02 a.m. for purposes of pending litigation and to protect the public interest. Schorr, Hudkins, Avery, Wiltgen and Amundson voted aye. Motion carried 5-0.

MOTION: Schorr moved and Wiltgen seconded to exit Executive Session at 11:22 a.m. Schorr, Hudkins, Avery, Wiltgen and Amundson voted aye. Motion carried 5-0.

8) **ANNOUNCEMENTS:**

- A. The Lancaster County Board of Commissioners will hold a staff meeting on Thursday, October 29, 2015 at 8:30 a.m., in the Bill Luxford Studio (Room 113) of the County-City Building (555 S. 10th Street, Lincoln).
- B. The Lancaster County Board of Commissioners will hold a public hearing on Thursday, October 29, 2015, at 6:30 p.m., in Room 112 of the County-City Building (555 S. 10th Street, Lincoln) regarding the One and Six-Year Road and Bridge Improvement Program.
- C. The Lancaster County Board of Commissioners will hold their next regular meeting on November 3, 2015 at 9:00 a.m., in Room 112 of the County-City Building (555 S. 10th Street, Lincoln) with the Board of Equalization immediately following.
- D. The County Commissioners can be reached at 402-441-7447 or commish@lancaster.ne.gov.
- E. The Lancaster County Board of Commissioners meeting is broadcast live. It is rebroadcast on Tuesday and Saturday on 5 City-TV, Cable Channel 5. In addition, the meeting may be viewed on the internet at lancaster.ne.gov under 5 City-TV, Video on Demand or 5 City-TV on YouTube.

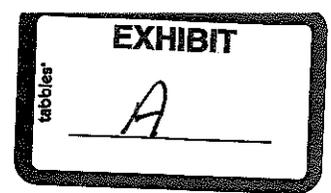
9) **ADJOURNMENT**

MOTION: Schorr moved and Wiltgen seconded to adjourn the Lancaster County Board of Commissioners meeting at 11:22 a.m. Avery, Wiltgen, Schorr, Hudkins and Amundson voted aye. Motion carried 5-0.

Dan Nolte

Dan Nolte, County Clerk





Dear Commissioner *Wiltgen*

We chose not to bring this up at a public meeting, so it is out of respect to the Board that this letter is written.

First and foremost we would like to thank the Board for all the hard work you do for all the employees and the taxpayers of Lancaster County. Without your wisdom and genuine concern, Lancaster County would not be in as good of shape that it currently is.

You may or may not know that we spent quite a bit of money this year on a CIR certified study regarding our wages and benefits. As you might expect there were some things that we were at or even a little above comparability, and some things below comparability. If you are interested, I would be happy to sit down and go over it with you sometime. Two of the things that stood out from this study were: 1) Lancaster County is paying way more in insurance premiums than everyone else. 2) Almost every county in our array are Defined Benefit instead of Defined Contribution. These concerns were brought up during negotiations but it didn't seem to matter.

We have included in this letter a copy of comparability of our insurance. You will see that both Lancaster County and the employees pay way more in monthly premiums and maximum out of pocket. This county self insurance plan is costing Lancaster County taxpayers a great deal!

As for Defined Benefit compared to Defined Contribution, we do realize that DB would be better for the employee, but the cost to the County and the taxpayers would be enormous, and a burden all of us would like to avoid if at all possible. That is why we thought if we stayed with the Defined Contribution we might be able to get some of the benefits back that the unrepresented were able to maintain, such as PEHP, and a frozen longevity plan.

Comparability came up, a lot during negotiations, so included in this letter is one more. We have included Lancaster County Commissioner salaries for 2014 and 2015. In 2014 Lancaster County Commissioners made \$39584, and in 2015 the wage is \$42001. That is over a 6% increase, plus you kept your PHEP. We are not pointing this out to make you angry or get defensive, because we know that you do much more then meet two mornings a week. We bring this up so you might look at it from our point of view. We are all Lancaster County employees and we all should get the same benefits.

At the very beginning I mentioned that out of respect to the Board, so that is the reason for this letter. It is not our desire to try and public embarrass you as commissioners, or us as a Union. It is our desire that we continue to work together on things that could benefit the employees and still be able to save the taxpayers of Lancaster County.

If you wish to discuss anything from this letter, or from our study, please feel free to contact our president, Rick DeBoer. He can be reached by email at : afscme2468@yahoo.com, or by phone at : 402-310-0140

Thank you for your service and support, we will be anxious to hear from you.

Sincerely,

A handwritten signature in black ink, appearing to be "R. DeBoer".

AFSCME 2468 Union President

AFSCME

Health Insurance

Total Monthly Premium

Input Point	Family	TwoParty	Single
Douglas	\$1,653.60	\$1,210.73	\$600.60
Linn	\$1,298.77	\$1,298.77	\$465.00
Minnehaha	\$1,633.60	\$1,633.60	\$549.11
Polk	\$1,165.34	\$1,165.34	\$466.14
Scott County	\$1,298.77	\$1,298.77	\$465.00
Dane	\$1,435.48	\$1,435.48	\$610.84
Shawnee	\$1,035.00	\$895.00	\$595.00
Larimer	\$1,581.38	\$1,228.92	\$641.82
Mean	\$1,387.74	\$1,270.83	\$549.19
Median	\$1,367.13	\$1,263.85	\$572.06
Midpoint	\$1,377.44	\$1,267.34	\$560.63 *
Mode			
Lancaster	\$2,011.60	\$1,508.80	\$670.40
% Change (Midpoint -Local)/Local	-31.53%	-16.00%	-16.37%

124

AFSCME

Health Insurance

Dollar Amount Paid - Employer

Input Point	Family	TwoParty	Single
Douglas	\$1,405.56	\$1,029.12	\$558.56
Linn	\$1,163.77	\$1,163.77	\$425.00
Minnehaha	\$1,143.52	\$1,143.52	\$408.92
Polk	\$1,025.50	\$1,025.50	\$433.51
Scott County	\$1,129.93	\$1,129.93	\$465.00
Dane	\$1,435.48	\$1,435.48	\$610.84
Shawnee	\$575.00	\$575.00	\$575.00
Larimer	\$1,184.46	\$920.12	\$597.72
Mean	\$1,132.90	\$1,052.81	\$509.32
Median	\$1,153.65	\$1,079.53	\$511.78
Midpoint	\$1,143.27	\$1,066.17	\$510.55
Mode			
Lancaster	\$1,709.86	\$1,282.48	\$636.88
% Change (Midpoint -Local)/Local	-33.14%	-16.87%	-19.84%

17

AFSCME

Health Insurance

Dollar Amount Paid - Employee

Input Point	Family	TwoParty	Single
Douglas	\$248.04	\$181.61	\$42.04
Linn	\$135.00	\$135.00	\$20.00
Minnehaha	\$490.08	\$490.08	\$140.19
Polk	\$139.84	\$139.84	\$32.62
Scott County	\$168.84	\$168.84	\$0.00
Dane	\$0.00	\$0.00	\$0.00
Shawnee	\$460.00	\$320.00	\$20.00
Larimer	\$396.92	\$308.80	\$44.10
Mean	\$254.84	\$218.02	\$37.37
Median	\$208.44	\$175.23	\$26.31
Midpoint	\$231.64	\$196.62	\$31.84
Mode			
Lancaster	\$301.74	\$226.32	\$33.52
% Change (Midpoint -Local)/Local	-23.23%	-13.12%	-5.01%

18

AFSCME

Health Plan Detail

Input Point	Deductibles		Stop Loss YES/NO	Percent co-pay	Stop Loss/Out of Pocket	
	Family	Single			Family	Single
Douglas	\$600	\$300	YES	80/20	\$1,950	\$1,300
Linn	\$550	\$275	YES	80/20	\$1,900	\$975
Minnehaha	\$1,500	\$500	YES	80/20	\$3,500	\$1,500
Polk	\$800	\$400	YES	80/20	\$1,200	\$600
Scott County	NA	NA	YES	80/20	\$2,500	\$1,000
Dane	NA	NA	YES	80/20	\$3,000	\$1,500
Shawnee	\$3,000	\$1,000	YES	80/20	\$9,000	\$3,000
Larimer	\$2,000	\$1,000	YES	80/20	\$12,000	\$6,000
Mean	\$1,408	\$579			\$4,381	\$1,984
Median	\$1,150	\$450			\$2,750	\$1,400
Midpoint	\$1,279	\$515			\$3,566	\$1,692
Mode			YES	80/20		
Lancaster	\$1,200	\$600	YES	80/20	\$5,200	\$2,600

619

 (https://twitter.com/intent/tweet?text=Check%20out%20County Attorney%20pay%20in%20the%20%40dataomaha%20public%20pay%20database%3A%2F%2Fdataomaha.com%2Fsalaries%2Fpositions%23county-attorney)  (http://www.facebook.com/sharer.php?u=http%3A%2F%2Fdataomaha.com/salaries/positions#county-attorney)

Name	Agency	Base Pay	Total Gross
Donald W. Kleinle (2014) (/salaries/2014/douglas-county/county-attorney/donald-w-kleinle)	Douglas County (/salaries/2014/douglas-county)	\$159,631	\$159,631
Joseph Patrick Kelly (2014) (/salaries/2014/lancaster-county/county-attorney/joseph-patrick-kelly)	Lancaster County (/salaries/2014/lancaster-county)	\$140,459	\$140,459
Leon K Polikov (2014) (/salaries/2014/sarpy-county/county-attorney/leon-k-polikov)	Sarpy County (/salaries/2014/sarpy-county)	\$138,824	\$138,824

County Board Member

 (https://twitter.com/intent/tweet?text=Check%20out%20County Board Member%20pay%20in%20the%20%40dataomaha%20public%20pay%20database%3A%2F%2Fdataomaha.com%2Fsalaries%2Fpositions%23county-board-member)  (http://www.facebook.com/sharer.php?u=http%3A%2F%2Fdataomaha.com/salaries/positions#county-board-member)

Name	Agency	Base Pay	Total Gross
Brent T. Smoyer (2014) (/salaries/2014/lancaster-county/board-of-commissioners/brent-t-smoyer)	Lancaster County (/salaries/2014/lancaster-county)	\$39,584	\$39,584
Debra E. Schorr (2014) (/salaries/2014/lancaster-county/board-of-commissioners/debra-e-schorr)	Lancaster County (/salaries/2014/lancaster-county)	\$39,584	\$39,584
Jane Michele Raybould (2014) (/salaries/2014/lancaster-county/board-of-commissioners/jane-michele-raybould)	Lancaster County (/salaries/2014/lancaster-county)	\$39,584	\$39,584
Larry D. Hudkins (2014) (/salaries/2014/lancaster-county/board-of-commissioners/larry-d-hudkins)	Lancaster County (/salaries/2014/lancaster-county)	\$39,584	\$39,584

Name	Agency	Base Pay	Total Gross
Roma Jean Amundson (2014) (/salaries/2014/lancaster-county/board-of-commissioners/roma-jean-amundson)	Lancaster County (/salaries/2014/lancaster-county)	\$39,584	\$39,584
Paul Morgan (2014) (/salaries/2014/douglas-county/county-board/paul-morgan)	Douglas County (/salaries/2014/douglas-county)	\$36,217	\$36,217
Pamela A Tusa (2014) (/salaries/2014/douglas-county/county-board/pamela-a-tusa)	Douglas County (/salaries/2014/douglas-county)	\$36,217	\$36,217
Mary Ann Borgeson (2014) (/salaries/2014/douglas-county/county-board/mary-ann-borgeson)	Douglas County (/salaries/2014/douglas-county)	\$36,217	\$36,217
Clare Duda (2014) (/salaries/2014/douglas-county/county-board/clare-duda)	Douglas County (/salaries/2014/douglas-county)	\$36,217	\$36,217
Marc G Kraft (2014) (/salaries/2014/douglas-county/county-board/marc-g-kraft)	Douglas County (/salaries/2014/douglas-county)	\$36,217	\$36,217
Christopher T Rodgers (2014) (/salaries/2014/douglas-county/county-board/christopher-t-rodgers)	Douglas County (/salaries/2014/douglas-county)	\$36,217	\$36,217
Michael Boyle (2014) (/salaries/2014/douglas-county/county-board/michael-boyle)	Douglas County (/salaries/2014/douglas-county)	\$36,217	\$36,217
James W. Thompson (2014) (/salaries/2014/sarpy-county/county-board/james-w-thompson)	Sarpy County (/salaries/2014/sarpy-county)	\$26,091	\$26,091
James E Warren (2014) (/salaries/2014/sarpy-county/county-board/james-e-warren)	Sarpy County (/salaries/2014/sarpy-county)	\$25,091	\$25,091
Thomas J. Richards (2014) (/salaries/2014/sarpy-county/county-board/thomas-j-richards)	Sarpy County (/salaries/2014/sarpy-county)	\$25,091	\$25,091

**LANCASTER COUNTY
UNCLASSIFIED SALARIES
ELECTED
2015**

CLASS CODE	CLASS TITLE	ANNUAL SALARY
5341	Deputy Sheriff - Captain	\$97,336-\$100,152
5355	Chief Deputy Sheriff	\$110,664
7161	Chief Deputy Clerk, District Court	\$85,774
7171	Chief Deputy County Treasurer	\$82,897
7181	Deputy County Clerk	\$81,350
7211	Chief Field Deputy (Assessor/Register of Deeds)	\$116,449
7221	Chief Administrative Deputy (Assessor/Register of Deeds)	\$104,444
7231	Chief Deputy County Surveyor	\$87,754
7355	Chief Deputy Public Defender	\$133,436
7355	Chief Deputy Public Defender (Felony)	\$133,583
7355	Chief Deputy Public Defender (Juvenile)	\$126,244
7375	Chief Deputy County Attorney	\$139,455
7375	Chief Deputy County Attorney (Civil)	\$135,785
7375	Chief Deputy County Attorney (Support)	Vacant
7375	Chief Deputy County Attorney (Juvenile)	\$128,446
8950	County Attorney	\$146,795
8951	Public Defender	\$146,795
8952	County Engineer	\$115,103
8953	County Assessor/Register of Deeds	\$120,051
8954	County Sheriff	\$116,488
8955	County Treasurer	\$87,260
8956	County Clerk	\$85,632
8957	Clerk of District Court	\$90,288
8960	Election Commissioner	\$80,437
8961	Deputy Election Commissioner*	\$57,914
8962	County Commissioner	\$42,001

*

* Deputy Election Commissioner is 72% of Election Commissioner.

Wind Energy Text Amendment Correspondence
Received October 20-27, 2015

1. Email and report from Daniel Clausen (10/21/15)
2. Email from Rev. Kim Morrow, Nebraska Interfaith Power & Light (10/23/15)
3. Email from Joseph and Samantha Dabbs (10/23/15)
4. Emails (2) from Judy Daugherty (10/23/15)
5. Email from David Henderson (10/23/15)
6. Email from Pippa White Lawson (10/23/15)
7. Emails (2) from JoJen Allder (10/25/15)
8. Email and letter from Curtis Schwaninger (10/26/15)
9. Email and attachments from Alan Friesen, Haberfeld Associates (10/26/15)
10. Email from John Atkeison, EnergyLinc (10/26/15)
11. Email from Sara Sanford, BancWise Realty, on behalf of Mrs. (Barbara) Vokoun (10/26/15)
12. Email from Sharad Seth, University of Nebraska-Lincoln (UNL)(10/26/15)
13. Email from Loyal C. Park (10/26/15)
14. Email from Bryan Trost (10/26/15)
15. Email from Rebecca Seth (10/26/15)
16. Email, letter and maps of Hallam-area project from Jeffrey Wagner, Volkswind USA, Inc. (10/26/15)
17. Email from John Abel (10/26/15)
18. Email from Dan Schmid (10/26/15)
19. Email from Carrie Smith (10/26/15)
20. Email from Andrea McClenahan Sand (10/26/15)
21. Email from Karen Meyer (10/27/15)
22. Torri Lienemann (10/27/15)

Kelly S. Lundgren

From: Minette M. Genuchi
Sent: Wednesday, October 21, 2015 2:55 PM
To: Bill Avery; Bill P. Avery; Deb E. Schorr; Deb Schorr (debschorr@aol.com); Roma Amundson; Roma B. Amundson; Todd J. Wiltgen; Todd Wiltgen
Cc: Kerry P. Eagan; Gwen K. Thorpe; Kelly S. Lundgren
Subject: FW: Wind Energy Testimony Follow Up
Attachments: McCunney et al 2014.pdf

Hardcopy – Larry H

From: Geri K. Rorabaugh
Sent: Wednesday, October 21, 2015 1:44 PM
To: Minette M. Genuchi; Steve S. Henrichsen
Subject: FW: Wind Energy Testimony Follow Up

Minette and Steve

This came into my Sendio. Not sure you rec'd this.

Geri Rorabaugh, Administrative Officer
Lincoln-Lancaster County Planning Department
(402) 441-6365

From: D. Clausen [<mailto:clausen.daniel@gmail.com>]
Sent: Wednesday, October 21, 2015 10:26 AM
To: Geri K. Rorabaugh <grorabaugh@lincoln.ne.gov>
Subject: Wind Energy Testimony Follow Up

Dear Commissioners,

I was asked to provide an article in my testimony last night, and didn't have a copy of the report with me. I have attached it to this email.

I would also like to encourage the board to read my full comments, which were submitted at the time.

I would further like to express my opinion that property values and public perception of wind energy will change rapidly. This is a generational divide, and as young people in their 30s begin to move back to small towns and acreages (just as these folks did in the past several decades) they will *appreciate* wind energy. It may actually *raise* property values for environmentally conscious millenials who enjoy seeing clean power production. I know I would feel good everyday looking at productive wind turbines. That's just to say that the aesthetic evaluation of the wind turbines is subjective--not correlated with sound, which is a spurious argument being used by obstructionists.

best,

--
Daniel Clausen

(208) 954-2463
clausen.daniel@gmail.com

Wind Turbines and Health: A Critical Review of the Scientific Literature

McCunney, Robert J. MD, MPH; Mundt, Kenneth A. PhD; Colby, W. David MD; Dobie, Robert MD; Kaliski, Kenneth BE, PE; Blais, Mark PsyD

Author Information

From the Department of Biological Engineering (Dr McCunney), Massachusetts Institute of Technology, Cambridge; Department of Epidemiology (Dr Mundt), Environ International, Amherst, Mass; Travel Immunization Clinic (Dr Colby), Middlesex-London Health Unit, London, Ontario, Canada; Dobie Associates (Dr Dobie), San Antonio, Tex; Environment, Energy and Acoustics (Mr Kaliski), Resource Systems Group, White River Junction, Vt; and Psychological Evaluation and Research Laboratory (Dr Blais), Massachusetts General Hospital, Boston.

Address correspondence to: Robert J. McCunney, MD, MPH, Department of Biological Engineering, Massachusetts Institute of Technology, 77 Massachusetts Ave, 16-771, Cambridge, MA 02139 (mccunney@mit.edu).

The Canadian Wind Energy Association (CanWEA) funded this project through a grant to the Department of Biological Engineering of the Massachusetts Institute of Technology (MIT). In accordance with MIT guidelines, members of the CanWEA did not take part in editorial decisions or reviews of the manuscript. Drs McCunney, Mundt, Colby, and Dobie and Mr Kaliski have provided testimony in environmental tribunal hearings in Canada and the USA. The Massachusetts Institute of Technology conducted an independent review of the final manuscript to ensure academic independence of the commentary and to eliminate any bias in the interpretation of the literature. All six coauthors also reviewed the entire manuscript and provided commentary to the lead author for inclusion in the final version.

The authors declare no conflicts of interest.

Supplemental digital contents are available for this article. Direct URL citation appears in the printed text and is provided in the HTML and PDF versions of this article on the journal's Web site (www.joem.org).

Abstract

Objective: This review examines the literature related to health effects of wind turbines.

Methods: We reviewed literature related to sound measurements near turbines, epidemiological and experimental studies, and factors associated with annoyance.

Results: (1) Infrasound sound near wind turbines does not exceed audibility thresholds. (2) Epidemiological studies have shown associations between living near wind turbines and annoyance. (3) Infrasound and low-frequency sound do not present unique health risks. (4) Annoyance seems more strongly related to individual characteristics than noise from turbines.

Discussion: Further areas of inquiry include enhanced noise characterization, analysis of predicted noise values contrasted with measured levels postinstallation, longitudinal assessments of health pre- and postinstallation, experimental studies in which subjects are "blinded" to the presence or absence of infrasound, and enhanced measurement techniques to evaluate annoyance.

The development of renewable energy, including wind, solar, and biomass, has been accompanied by attention to potential health effects among people living in the vicinity of wind turbines. It will include analysis and commentary of the scientific evidence regarding potential links to health effects, such as stress, annoyance, and sleep disturbance, among others, that have been explored and considered in a number of policy, regulatory, and legal proceedings.

Efforts will also be directed to specific components of noise associated with wind turbines such as infrasound and low-frequency sound and their potential health effects.

We will attempt to address the following questions regarding wind turbines and health:

1. Is there sufficient scientific evidence to conclude that wind turbines adversely affect human health? If so, what are the circumstances associated with such effects and how might they be prevented?
2. Is there sufficient scientific evidence to conclude that psychological stress, annoyance, and sleep disturbance can occur as a result of living in proximity to wind turbines? Do these effects lead to adverse health effects not associated with other sources of environmental noise?
3. Is there evidence to suggest that specific aspects of wind turbine sound such as infrasound and low-frequency sound have unique potential health effects not associated with other sources of environmental noise? and how might they be prevented?

The coauthors represent professional experience and training in occupational and environmental medicine, acoustics, epidemiology, otolaryngology, psychology, and public health.

Earlier reviews of wind turbines and potential health implications have been published in the peer-reviewed literature¹⁻⁶ by state and provincial governments (Massachusetts, 2012, and Australia, 2014) among others) and trade associations.⁷

- This review is divided into the following five sections:
1. Noise: The type associated with wind turbine operations, how it is measured, and noise measurements associated with wind turbines.
 2. Epidemiological studies of populations living in the vicinity of wind turbines.
 3. Potential otolaryngology implications of exposure to wind turbine sound.
 4. Potential psychological issues associated with responses to wind turbine operations and a discussion of the health implications of continuous annoyance.
 5. Governmental and nongovernmental reports that have addressed wind turbine operations.

METHODS

To identify published research related to wind turbines and health, the following activities were undertaken:

1. We attempted to identify and assess peer-reviewed literature related to wind turbines and health by conducting a review of PubMed, the National Library of Medicine's database that indexes more than 5500 peer-reviewed health and scientific journals with more than 21 million citations. Search terms were wind turbines, wind turbines and health effects, infrasound, infrasound and health effects, low-frequency sound, wind turbine syndrome, wind turbines and annoyance, and wind turbines and sleep disturbances.

2. We conducted a Google search for nongovernmental organization and government agency reports related to wind turbines and environmental noise exposure (see Supplemental Digital Content Appendix 1, available at: <http://links.lww.com/JOM/A179>).

3. After identifying articles obtained via these searches, they were categorized into five main areas that are noted below (section D) and referred to the respective authors of each section for their review and analysis. Each author then conducted their own additional review, including a survey of pertinent references cited in the identified articles. Articles were selected for review and commentary if they addressed exposure and a health effect—whether epidemiological or experimental—or were primary exposure assessments.

4. Identified studies were categorized into the following areas:

II. Epidemiology;

IV. Psychological factors associated with responses to wind turbines;

5. The authors are aware of reports and commentaries that are not in the scientific or medical peer-reviewed literature that have raised concern about potential health implications for people who live near wind turbines. These reports describe relatively common symptoms with numerous causes, including headache, tinnitus, and sleep disturbance. Because of the difficulties in comprehensively identifying non-peer-reviewed reports such as these, and the inherent uncertainty in the quality of non-peer-reviewed reports, they were not included in our analysis, aside from some books and government reports that are readily identified. A similar approach of excluding non-peer-reviewed literature in scientific reviews is used by the World Health Organization (WHO)'s International Agency for Research on Cancer (IARC) in its deliberations regarding identification of human carcinogens.⁸ International Agency for Research on Cancer, however, critically evaluates exposure assessments not published in the peer-reviewed literature, if conducted with appropriate quality and in accordance with international standards and guidelines. International Agency for Research on Cancer uses this policy for exposure assessments because many of these efforts, although containing valuable data in evaluating health risks associated with an exposure to a hazard, are not routinely published. The USA National Toxicology Program also limits its critical analysis of potential carcinogens to the peer-reviewed literature. In our view, because of the critical effect of scientific studies on public policy, it is imperative that peer-reviewed literature be used as the basis. Thus, in this review, only peer review studies are considered, aside from exposure-related assessments.

I. Sound, its components, and field measurements conducted in the vicinity of wind turbines;

III. Effects of sound components such as infrasound and low-frequency sound on health;

V. Governmental and nongovernmental reports.

RESULTS

Characteristics of Wind Turbine Sound

In this portion of the review, we evaluate studies in which sound near wind turbines sound is made up from both moving components and wind turbines has been measured, discuss the use of modeled sound interactions with nonmoving components of the wind turbine (Fig. 1). levels in dose-response studies, and review literature on For example, mechanical components in the nacelle can generate noise measurements of low-frequency sound and infrasound from operating and vibration, which can be radiated from the structure, including the wind turbines. We evaluate sound levels measured in areas, where tower. The blade has several components that create aerodynamic symptoms have been reported in the context of proximity to wind noise, such as the blade leading edge, which contacts the wind first in turbines. We address methodologies used to measure wind turbine rotation, the trailing edge, and the blade tip. Blade/tower noise and low-frequency sound. We also address characteristics of interactions, especially where the blades are downwind of the tower, wind turbine sound, sound levels measured near existing wind can create infrasound and low-frequency sound. This tower orientation turbines, and the response of humans to different levels and is no longer used in large wind turbines.⁹ characteristics of wind turbine sound. Special attention is given to challenges and methods of measuring wind turbine noise, as well as

low-frequency sound (20 to 200 Hz) and Infrasound (less than 20 Hz).

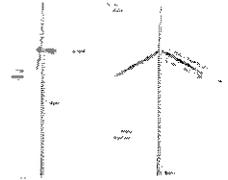


Figure 1

Sound Level and Frequency

Sound is primarily characterized by its pitch or frequency as measured in Hertz (Hz) and its level as measured in decibels (dB). To represent the overall sound level in a single value, the levels from each frequency band are logarithmically added. Because human hearing is relatively insensitive to very low- and high-frequency sounds, frequency-specific adjustments or weightings are added to the sound levels before summing to the overall level. The most common of these is the A-weighting, which simulates the human response to various frequencies at relatively low levels (40 phons or about 27.5 to 4186 Hz with middle C at 261.6 Hz). Examples of A-weighted sound levels are shown in Figure 2. The level of sound pressure for each frequency band is reported in decibel units.

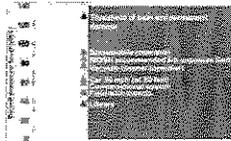


Figure 2

Beyond the overall level, wind turbine noise may be amplitude modulated or have tonal components. Amplitude modulation is a phenomenon where the level of pure tone or broadband sound fluctuates over time. A typical wind turbine operating at 15 RPM would have a modulation period or cycle length of about 1.3 seconds. Tones are narrow frequency bands that are much louder than the surrounding frequencies in sound spectra. Prominent tones can be identified through several standards, including ANSI S12.9 Part 4 and IEC 61400-11. Relative high-, mid-, and low-frequency content can also define how the sound is perceived, as well as many qualitative factors unique to the listener. Consequently, more than just the overall levels can be quantified, and studies have measured the existence of amplitude modulation, prominent tones, and spectral content in addition to the overall levels.

Wind Turbine Sound Power and Pressure Levels

The sound power level is the intrinsic sound energy radiated by a source. It is not dependent on the particular environment of the sound source and the location of the receiver relative to the source. Wind turbines produce sound at frequencies less than the 25 Hz 1/3 octave band, sound power data are rarely published below that frequency. Most larger, utility-scale wind turbines have sound power levels between 104 and 107 dBA. Measured sound levels because of wind turbines depend on several factors, including weather conditions, the number of turbines, turbine layout, local topography, the particular turbine used, distance between the turbines and the receiver, and local flora. Meteorological conditions alone can cause 7 to 14 dB variations in sound levels.¹⁰ Examples of the SPLs because of a single wind turbine with three different sound powers, and at various distances, are shown in Fig 3 as calculated with ISO 9613-2.¹¹ Measurement results of A-weighted, C-weighted, and G-weighted sound levels have confirmed that wind turbine sound attenuates logarithmically with respect to distance.¹²

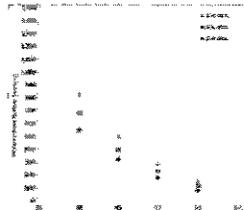


Figure 3

Owing to large number of variables that contribute to SPLs because of arithmetic average of 45 dBA daytime and 40 dBA nighttime for wind turbines at receivers, measured levels can vary dramatically. At a wind farm in Texas, O'Neal et al¹⁴ measured sound levels with the nearest turbine at 305 m (1000 feet) and with four turbines within 610 m (2000 feet) at 50 to 51 dBA and 63 dBC (10-minute Leq), with the evening-night level (Lden), day-night level (Ldn), equivalent average turbine producing sufficient power to emit the maximum sound level (Leq), level exceeded 90% of the time (L90), and median (L50). During the same test, sound levels were 27 dBA and 47 dBC (10-minute Leq) inside a home that was located 290 m (950 feet) from the nearest turbine and within 610 m (2000 feet) of four turbines¹⁵ from a practical standpoint, sound-level limits are even more varied than the explicit

numerical level. The Leq is one of the more commonly used metric. It (see Fig. 4) is the logarithmic average of the squared relative pressure over a period of time. This results in a higher weighting of louder sounds.



Figure 4

Bullimore et al¹⁶ measured wind turbine sound at distances from 100 to 754 m (330 to 2470 feet), where they found sound levels ranging from 40 to 55 dBA over various wind conditions. At typical receiver distances (greater than 300 m or 1000 feet), sound was attenuated to below the threshold of hearing at frequencies above the 1.25 kHz 1/3 octave band. In studies mentioned here, measurements were made with the microphone between 1 and 1.6 m (3 and 5 feet) above ground.

Wind Turbine Emission Characteristics

Low-Frequency Sound and Infrasound

Low-frequency sound is typically defined as sound from 20 to 200 Hz. Farther away from wind farms (1.5 km) infrasound is no higher than and infrasound is sound less than 20 Hz. Low-frequency sound and what would be caused by localized wind conditions, reinforcing the infrasound measurement results at distances close to wind turbines (<necessity for adequate wind-caused pseudosound reduction measures 500 meters) typically show infrasound because of wind farms, but not for wind turbine sound-level measurements.²² above audibility thresholds (such as ISO 226 or as published by the authors^{12, 15, 17-21, 149}). One study found sound levels 360 m and 200 m from a wind farm to be 61 dBG and 63 dBG, respectively. The threshold of audibility for G-weighted sound levels is 85 dBG. The same paper found infrasound levels of 69 dBG 250 m from a coastal cliff face and 76 dBG in downtown Adelaide, Australia.¹⁸ One study found that, even at distances less than 450 feet (136 m), infrasound levels were 80 dBG or less. At more typical receiver distances (greater than 300 m or 1000 feet), infrasound levels were 72 dBG or less. This corresponded to A-weighted sound levels of 56 and 49 dBA, respectively, higher than most existing regulatory noise limits.¹²

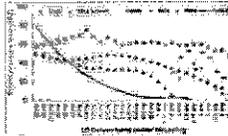


Figure 5

Amplitude Modulation

Wind turbine sound emissions vary with blade velocity and are characterized in part by amplitude modulation, a broadband oscillation in sound level, with a cycle time generally corresponding to the moving blade tips, yaw error of the turbine blades (where the blade passage frequency. The modulation is typically located in the 1/1 octave bands from 125 Hz to 2 kHz. Fluctuation magnitudes are typically not uniform throughout the frequency range. These fluctuations are typically small (2 to 4 dB) but under more unusual circumstances can be as great as 10 dB for A-weighted levels and as much as 15 dB in individual 1/3 octave bands.^{19, 24} Stigwood et al²⁴ found that, in groups of several turbines, the individual modulations can often synchronize causing periodic increases in the modulation magnitude for periods of 6 to 20 seconds with occasional periods where the individual turbine modulations average each other out, minimizing the modulation magnitude. This was not always the case though, with periods of turbine synchronization occasionally lasting for hours under consistent high wind shear, wind strength, and wind direction.

Tonality

Tones are specific frequencies or narrow bands of frequencies that are significantly louder than adjacent frequencies. Tonal sound is not typically generated by wind turbines but can be found in some cases.^{20, 26} In most cases, the tonal sound occurs at lower frequencies (less than 200 Hz) and is due to mechanical noise originating from the nacelle, but has also been found to be due to structural vibrations originating from the tower, and anomalous aerodynamic characteristics of the blades²⁷ (see Fig. 5).

Sound Levels at Residences where Symptoms Have Been Reported

One recent research focus has been the sound levels at (and in) the residences of people who have complained about sound levels emitted by turbines as some have suggested that wind turbine noise may be a different type of environmental noise.²⁸ Few studies have actually measured sound levels inside or outside the homes of people. Several hypotheses have been proposed about the characteristics of wind turbine noise complaints, including infrasound,²⁸ low-frequency tones,²⁰ amplitude modulation,^{19, 29} and overall noise levels.

Overall Noise Levels

Because of the large variability of noise sensitivity among people,

sound levels associated with self-reported annoyance can vary considerably. (Noise sensitivity and annoyance are discussed in more detail later in this review.) People exposed to measured external sound levels from 38 to 53 dBA (10-minute or 1-hour Leq). Department of Trade and Industry,¹⁹ Walker et al,²⁸ Gabriele et al,²⁹ and van den Berg et al^{30, 149} have reported annoyance. Sound levels have also been measured inside complainant residences at between 22 and 37 dBA (10-minute Leq).¹⁹

Low Frequency and Infrasonic Levels

Concerns have been raised in some settings that low-frequency sound and infrasonic sound levels at residences are typically well below published and infrasound may be special features of wind turbine noise that lead to audibility thresholds, even thresholds for those particularly sensitive to to adverse health effects.³¹ As a result, noise measurements in areas of infrasound. Nevertheless, low-frequency sound typically exceeds operating wind turbines have focused specifically on sound levels in the low-frequency range and occasionally the infrasonic range.

Hz.^{19, 20, 23} In some cases, harmonics of the blade passage frequency (about 1 Hz, ie infrasound) have been measured at homes of people who have raised concerns about health implications of living near wind turbine with sound levels reaching 76 dB; however, these are well below published audibility thresholds.²⁸

Amplitude Modulation

Amplitude modulation has been suggested as a major cause of limited studies have addressed the percentage of complaints surrounding wind turbines, although little data have been collected to confirm this hypothesis. A recent study of residents surrounding a wind farm that had received several complaints showed that the predicted sound levels at receiver distances to be 33 dBA or less. Residents were instructed to describe the turbine sound, when they approximately 4%. All except one of the complaints were made at found it annoying. Amplitude modulation was present in 68 of 95 residences, where wind farm sound levels exceeded 40 dBA.¹³ The complaints. Sound recorders distributed to the residents exhibited a high incidence of amplitude modulation.²⁹

LA90 is the A-weighted sound level that is exceeded 90% of the time. This metric is used to eliminate wind-caused spikes and other short-term sound events that are not caused by the wind farm.

In Northern New England, 5% of households within 1000 m of turbines complained to regulatory agencies about wind turbine noise.³² All complaints were included, even those that were related to temporary issues that were resolved. Up to 48% of the complainants were at wind farms, where at least one noise violation was found or a variance from the noise standard. A third of the all complaints were due to a single wind farm.

Sound Measurement Methodology

Collection of accurate, comparable, and useful noise data depends on careful and consistent methodology. The general methodology for environmental sound level monitoring is found in ANSI 12.9 Part 2. This standard covers basic requirements that include the type of measurement equipment necessary, calibration procedures, windscreen specifications, microphone placement guidance, and suitable meteorological conditions. Nevertheless, there are no recommendations for mitigating the effects of high winds (greater than 5 m/s) or measuring in the infrasonic frequency range (less than 20 Hz).³³ Another applicable standard is IEC 61400-11, which provides a method for determining the sound power of individual wind turbines. The standard gives specifications for measurement positions, the type of data needed, data analysis methods, report content requirements, determination of tonality, determination of directivity, and the definitions and descriptors of different acoustical parameters.³⁴ The standard specifies a microphone mounting method to minimize wind-caused pseudosound, but some have found the setup to be insufficient under gusty wind conditions, and no recommendations are given for infrasound measurement.³⁵ Because the microphone is ground mounted, it is not suitable for long-term measurements.

Low-Frequency Sound and Infrasound Measurement

There are no standards currently in place for the measurement of wind turbine noise that includes the infrasonic range (ie, frequencies less than 20 Hz), although one is under development (ANSI/ASA S12.9 due to air pressure fluctuation, because air flows over the microphone. Part 7). Consequently, all current attempts to measure low-frequency sound and infrasound have either used an existing methodology, adapted existing methodology, or proposed a new methodology.

with a wind screen and/or elimination of data measured during windy periods (less than 5 m/s [11 mph] at a 2-m [6.5 feet] height).³⁶ In the case of wind turbines, where maximum sound levels may be coincident with ground wind speeds greater than 5 m/s (11 mph), this is not the best solution. With infrasound in particular, wind-caused pseudosound can influence measurements, even at wind speeds down to 1 m/s.¹² In fact, many sound-level meters do not measure infrasonic frequencies.

A common method of dealing with infrasound is using an additional wind screen to further insulate the microphone from air flow.^{18, 35} In some cases, this is simply a larger windscreen that further insulates the microphone from air flow.³⁵ One author used a windscreen with a subterranean pit to shelter the microphone, and another used wind resistant cloth.³⁵ To further filter out wind-caused pseudosound, some authors have advocated a combination of microphone arrays and signal processing techniques. The purpose of the signal processing techniques is to detect elements of similarity in the sound field measured at different microphones in the array.

A compromise to an underground microphone

mounting is mounting the microphone close (20-cm height) to the ground, minimizing wind influence, or using a standard ground-mounted microphone with mounting plate, as found in IEC 61400-wind turbines and at other locations away from wind turbines in South Australia. A study of infrasound measured at mounted microphones with mounting plates, as found in IEC 61400-wind turbines and at other locations away from wind turbines in South Australia, found that the infrasound level at houses near the wind turbines is no greater than that found in other urban and rural environments. The contribution of wind turbines to the infrasound can be quite large. Nevertheless, increased measurement accuracy levels is insignificant in comparison with the background level of infrasound in the environment. Some methods.

Conclusions

Wind turbine noise measurement can be challenging because of the necessity of measuring sound levels during high winds, and down to low frequencies. No widely accepted measurement methodologies address all of these issues, meaning that methods used in published studies can differ substantially, affecting the comparability of results.

Measurements of low-frequency sound, infrasound, tonal sound and amplitude-modulated sound show that the levels at customary distances to wind turbines, but the levels at residential distances are typically well below audibility thresholds, even at residences where complaints have been raised. Low-frequency sound, often audible in wind turbine sound, typically crosses the audibility threshold between 25 and 125 Hz depending on the location and meteorological conditions. Amplitude modulation, or the rapid (once per second) and repetitive increase and decrease of sound level, has been measured at wind farms. Amplitude modulation is typically 2 to 4 dB but can vary more than 6 dB in some cases (A-weighted sound levels).

A Canadian report investigated the total number of noise-related complaints in the vicinity of wind farms can be effective in determining the level and extent of annoyance because of wind turbine noise, but there are limitations to this approach. A complaint may be made because of higher levels of annoyance (rather annoyed or very annoyed), and the amount of annoyance required for an individual to complain may be dependent on the personality of the person and the attitude toward the visual effect of the turbines, their respective attitudes toward wind energy, and whether they derive benefit from the turbines. (All of these factors are discussed in more detail later in this report.)

An Australian study found a complaint rate of less than 1% for residents living within 5 km of turbines greater than 1 MW. Complaints were concentrated among a few wind farms; many wind farms never received complaints.

Few studies have addressed sound levels at the residences of people who have described symptoms they consider because of wind turbines. Limited available data show a wide range of levels (38 to 53 dBA [10-minute or 1-hour Leq] outside the residence and from 23 to 37 dBA [10-minute Leq] inside the residence). The rate of complaints surrounding wind farms is relatively low; 3% for residents within 1 mile of wind farms and 4% to 5% within 1 km.

Epidemiological Studies of Wind Turbines

Key to understanding potential effects of wind turbine noise on human health is to consider relevant evidence from well-conducted epidemiological studies, which has the advantage of reflecting risks of real-world exposures. Nevertheless, environmental epidemiology is an observational (vs experimental) science that depends on design and implementation characteristics that are subject to numerous inherent and methodological limitations. Nevertheless, evidence from epidemiological studies of reasonable quality may provide the best available indication of whether certain exposures—such as industrial wind turbine noise—may be harming human health. Critical review and synthesis of the epidemiological evidence, combined with consideration of evidence from other lines of inquiry (ie, animal studies and exposure assessments), provide a scientific basis for identifying causal relationships, managing risks, and protecting public health.

Methods

Studies of greatest value for validly identifying risk factors for disease epidemiological studies selected for this review were identified through searches of PubMed and Google Scholar using the following key words individually and in various combinations: “wind,” “wind turbine,” “wind farm,” “windmill,” “noise,” “sleep,” “cardiovascular,” “health,” “symptom,” “condition,” “disease,” “cohort,” “case-control,” and “epidemiology.” In addition, general Web searches were performed, and references cited in all identified studies were reviewed. Approximately 65 documents were identified and obtained, and screened to determine whether (1) the study described a primary epidemiological study (including experimental or laboratory-based study) published in a peer-reviewed health, medical or relevant scientific journal; (2) the study focused on wind turbine noise as a risk factor; (3) the study measured at least one outcome of potential relevance to health; and (4) the study attempted to relate the wind turbine noise with the outcome.

Results

The 14 observational epidemiological studies were critically reviewed to assess their relative strengths and weaknesses on the basis of the human exposure studies, and these were reviewed in detail to study design and the general ability to avoid selection bias (eg, the determination of the relative quality and validity of reported findings). Other selective volunteering of individuals with health complaints, information bias (eg, under- or overreporting of health complaints, possibly because of reliance on self-reporting), and confounding bias

case reports, case studies, and surveys^{23, 52-54}; and documents (the mixing of possible effects of other strong risk factors for the same disease because of correlation with the exposure). One study published in media other than peer-reviewed journals. One study published as part of a conference proceedings did not meet the peer-reviewed journal eligibility criterion but was included because it seemed to be the first epidemiological study on this topic and an impetus for subsequent studies.⁵⁵

Figure 6 depicts the 14 observational epidemiological studies published in peer-reviewed health or medical journals, all of which were determined to be cross-sectional studies or surveys. As can be seen from the figure, the 14 publications were based on analyses of data from only eight different study populations, that is, six publications were based on analyses of a previously published study (eg, Pedersen et al⁵⁶ and Bakker et al⁵⁷ were based on the data from Pedersen et al⁵⁸) or on combined data from previously published studies (eg, Pedersen and Larsman⁵⁹ and Pedersen and Waye⁶⁰ were based on the combined data from Pedersen and Waye^{61, 62}; and Pedersen⁶³ and Janssen et al⁶⁴ were based on the combined data from Pedersen et al,⁵⁸ Pedersen and Waye,⁶¹ and Pedersen and Waye⁶²). Therefore, in the short summaries of individual studies below, publications based on the same study population(s) are grouped.

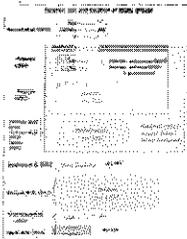


Figure 6

Summary of Observational Epidemiological Studies

Possibly the first epidemiological study evaluating wind turbine sound and noise annoyance was published in the proceedings of the 1993 European Community Wind Energy Conference.⁵⁵ Investigator the Wolsink⁵⁵ study) and Persson and Waye⁶¹ described a statistically significant association between modeled wind turbine audible noise (159 from the Netherlands, 216 from Germany, and 199 from Denmark). Up to 70% of the people resided near wind turbines for at least 5 years. No response rates were reported, so the potential for selection or participation bias cannot be evaluated. Wind turbine sound levels were calculated in 5 dB intervals for each respondent, on the basis of site measurements and residential distance from turbines. The authors claimed that noise-related annoyance was weakly correlated with objective sound levels (eg, tinnitus, cardiovascular disease, headaches, and irritability) but more strongly correlated with indicators of respondents' attitudes and personality.⁵³

In a cross-sectional study of 351 participants residing in proximity to wind turbines (power range 150 to 650 kW), Pedersen (a coauthor of the Wolsink⁵⁵ study) and Persson and Waye⁶¹ described a statistically significant association between modeled wind turbine audible noise and self-reported annoyance. In this section, "statistically significant" means that the likelihood that the results were because of chance is less than 5%. No respondents among the 12 exposed to wind turbine noise less than 30 dBA reported annoyance with the sound; however, the percentage reporting annoyance increased with noise levels exceeding 30 dBA. No differences in health or well-being outcomes were observed. With noise exposures greater than 35 dBA, 16% of respondents reported sleep disturbance, whereas no sleep disturbance was reported among those exposed to less than 35 dBA. Although the authors observed that the risk of annoyance from wind turbine noise exposure increased statistically significantly with each increase of 2.5 dBA, they also reported a statistically significant risk of reporting annoyance among those self-reporting a negative attitude toward the visual effect of the wind turbines on the landscape scenery (measured on a five-point scale ranging from "very positive" to "very negative" opinion). These results suggest that attitude toward visual effect is an important contributor to annoyance associated with wind turbine noise. In addition to its reliance on self-reported outcomes, this study is limited by selection or participation bias, suggested by the difference in response rate between the highest-exposed individuals (78%) versus lowest-exposed individuals (60%).

Pederson⁶² examined the association between modeled wind turbine sound pressures and self-reported annoyance, health, and well-being (described above) were published in two additional papers.^{59, 60} The pooled data included 1095 participants exposed to wind turbine noise and varying landscapes. A total of 1309 surveys were distributed, of at least 30 dBA. As seen in the two original studies, a significant association between noise annoyance and SPL was observed. A total of 84 participants (7.7%) reported being fairly or very annoyed by wind turbine noise. Respondents reporting wind turbines as having a negative effect on the scenery were also statistically significantly more annoyed by wind turbine noise reported a higher prevalence of lower sleep quality and negative emotions than those not annoyed by noise. Self-reported stress was higher among those who were fairly or very annoyed compared with those not annoyed; however, these associations could not be attributed specifically to wind turbine noise. No differences in self-reported health effects such as hearing impairment, diabetes, or cardiovascular diseases were reported between the 84 (7.7%) respondents who were fairly or very annoyed by wind turbine noise compared with all other respondents.⁶⁰ The authors did not report the power of the study.

Further analyses of the combined data from Pedersen and Waye^{61, 62} were published in two additional papers.^{59, 60} The pooled data included 1095 participants exposed to wind turbine noise and varying landscapes. A total of 1309 surveys were distributed, of at least 30 dBA. As seen in the two original studies, a significant association between noise annoyance and SPL was observed. A total of 84 participants (7.7%) reported being fairly or very annoyed by wind turbine noise. Respondents reporting wind turbines as having a negative effect on the scenery were also statistically significantly more annoyed by wind turbine noise reported a higher prevalence of lower sleep quality and negative emotions than those not annoyed by noise. Self-reported stress was higher among those who were fairly or very annoyed compared with those not annoyed; however, these associations could not be attributed specifically to wind turbine noise. No differences in self-reported health effects such as hearing impairment, diabetes, or cardiovascular diseases were reported between the 84 (7.7%) respondents who were fairly or very annoyed by wind turbine noise compared with all other respondents.⁶⁰ The authors did not report the power of the study.

Pederson et al⁵⁶⁻⁵⁸ evaluated the data from 725 residents in the Netherlands living within 2.5 km of a site containing at least two wind turbines of 500 kW or greater. Using geographic information systems methods, 3727 addresses were identified in the study target area, for which names and telephone numbers were found for 2056; after excluding businesses, 1948 were determined to be residences and contacted. Completed surveys were received from 725 for a response rate of 37%. Although the response rate was lower than in previous cross-sectional studies, nonresponse analyses indicated that similar

proportions responded across all landscape types and sound pressure categories.⁵⁷ Calculated sound levels, other sources of community noise, noise sensitivity, general attitude, and visual attitude toward wind turbines were evaluated. The authors reported an exposure-response relationship between calculated A-weighted SPLs and self-reported annoyance. Wind turbine noise was reported to be more annoying than transportation noise or industrial noise at comparable levels. Annoyance, however, was also correlated with a negative attitude toward the visual effect of wind turbines on the landscape. In addition, a statistically significantly decreased level of annoyance from wind turbine noise was observed among those who benefited economically from wind turbines, despite equal perception of noise and exposure to generally higher (greater than 40 dBA) sound levels.⁵⁸ Annoyance was strongly correlated with self-reporting a negative attitude toward the visual effect of wind turbines on the landscape scenery (measured on a five-point scale ranging from "very positive" to "very negative" opinion). The low response rate and reliance on self-reporting of noise annoyance limit the interpretation of these findings.

Results of further analyses of noise annoyance were reported in a separate report,⁵⁶ which indicated that road traffic noise had no effect on annoyance to wind turbine noise and vice versa. Visibility of, and disturbance increased with increasing SPL because of wind turbines; attitude toward, wind turbines and road traffic were significantly related to annoyance from their respective noise source; stress was significantly associated with both types of noise.^{56 157}

Additional analyses of the same data were performed using a structural equation approach that indicated that, as with annoyance, sleep disturbance increased with increasing SPL because of wind turbines; however, this increase was statistically significant only at pressures of 45 dBA and higher. Results of analyses of the combined data from the two Swedish^{61, 62} and the Dutch⁵⁸ cross-sectional studies have been published in two additional papers. Using the combined data from these three predecessor studies, Pedersen et al^{56, 58} identified 1755 (ie, 95.9%) of the 1830 total participants for which complete data were available to explore the relationships between calculated A-weighted SPLs and a range of indicators of health and well-being. Specifically, they considered sleep interruption; headache; undue tiredness; feeling tense, stressed, or irritable; diabetes; high blood pressure; cardiovascular disease; and tinnitus.⁶³ As in the precursor studies, noise annoyance indoors and outdoors was correlated with A-weighted SPLs. Sleep interruption seemed at higher sound levels and was also related to annoyance. No other health or well-being variables were consistently related to SPLs. Stress was not directly associated with SPLs but was associated with noise-related annoyance.

Another report based on these data (in these analyses, 1820 of the 1830 total participants) modeled the relationship between wind turbine noise exposure and annoyance indoors and outdoors.⁶⁴ The authors excluded respondents who benefited economically from wind turbines, then compared their modeled results with other modeled relationships for industrial and transportation noise; they claimed that annoyance from wind turbine noise at or higher than 45 dBA is associated with more annoyance than other noise sources.

The Shepherd et al,⁵⁶ who had conducted an earlier evaluation of noise sensitivity and Health Related Quality of Life (HRQL),¹⁵⁸ compared the survey results from 39 residents located within 2 km of a wind turbine in the South Makara Valley in New Zealand with 139 geographically matched individuals who resided at least 8 km from any wind farm. The response rates for both the proximal and more distant study groups were poor, that is, 34% and 32%, respectively, although efforts were made to blind respondents to the study hypotheses. No indicator of exposure to wind turbine noise was considered beyond the selection of individuals based on the proximity of their residences from the nearest wind turbine. Health-related quality-of-life (HRQOL) scales were used to describe and compare the general well-being and well-being in the physical, psychological, and social domains of each group. The authors reported statistically significant differences between the groups in some HRQOL domain scores, with residents living within 2 km of a turbine installation reporting lower mean physical HRQOL domain score (including lower component scores for sleep quality and self-reported energy levels) and lower mean environmental quality-of-life (QOL) scores (including lower component scores for considering one's environment to be less healthy and being less satisfied with the conditions of their living space). No differences were reported for social or psychological HRQOL domain scores. The group residing closer to a wind turbine also reported lower amenity but not related to traffic or neighborhood noise annoyance. Lack of actual wind turbine and other noise source measurements, combined with the poor response rate (both noted by the authors as limitations), limits the inferential value of these results because they may pertain to wind turbine emissions.⁶⁶

Possibly the largest cross-sectional epidemiological study of wind turbine noise on QOL was conducted in an area of northern Poland industrial wind turbines compared sleep and general health outcomes with the most wind turbines.⁶⁷ Surveys were completed by a total of 1277 adults (703 women and 574 men), aged 18 to 94 years, representing a 10% two-stage random sample of the selected nearest wind turbine.⁶⁸ Participants completed questionnaires and interviews on a range of health and attitudinal topics. Although the response rate was not reported, participants were sequentially enrolled until a 10% sample was achieved, and the proportion of individuals invited to participate but by distance from the wind turbines, statistically controlling for age, unable or refusing to participate was estimated at 30% (B. Mroczek, dr sex, site, and household cluster in some analyses. Participants living hab n. zdr., e-mail communication, January 2, 2014). Proximity of within 1.4 km of a wind turbine reported worse sleep, were sleepier residence was the exposure variable, with 220 (17.2%) respondents during the day, and had worse SF-36 Mental Component Scores within 700 m; 279 (21.9%) between 700 and 1000 m; 221 (17.3%) compared with those living farther than 3.3 km away. Statistically significant correlations were reported between Pittsburgh Sleep m from the nearest wind turbine. Indicators of QOL and health were Quality Index, Epworth Sleepiness Scale, SF-36 Mental Component measured using the Short Form-36 Questionnaire (SF-36). The SF-36 Score, and log-distance to the nearest wind turbine. The authors consists of 36 questions specifically addressing physical functioning, attributed the observed differences to the wind turbines⁶⁸; role-functioning physical, bodily pain, general health, vitality, social methodological problems such as selection and reporting biases were functioning, role-functioning emotional, and mental health. An overlooked. This study has a number of methodological limitations, additional question concerning health change was included, as well as

the Visual Analogue Scale for health assessment. It is unclear whether most notably that all of the "near" turbine groups were plaintiffs in a lawsuit against the wind turbine operators and had already been interviewed by the lead investigator prior to the study. None of the living closest to wind farms reported the best QOL, and those living "far" group had been interviewed; they were "cold called" by an farther than 1500 m scored the worst. They concluded that living in the proximity of wind farms does not result in the worsening of, and bias in the integrity of the methods and corresponding results. Details might improve, the QOL in this region.⁶⁷

In another study, the role of negative personality traits (defined by the In a study of residents living near a "wind park" in Western New York authors using separate scales for assessing neuroticism, negative affectivity, and frustration intolerance) on possible associations between actual and perceived wind turbine noise and medically unexplained nonspecific symptoms was investigated via a mailed survey.⁶⁹ Of the 1270 identified households within 500 m of eight 0.6 kW micro-turbine farms and within 1 km of four 5 kW small turbine farms in two cities in the United Kingdom, only 138 questionnaires were returned, for a response rate of 10%. No association was noted between calculated and actual noise levels and nonspecific symptoms. A correlation between perceived noise and nonspecific symptoms was seen among respondents with negative personality traits. Despite the participant group's representativeness of the target population, the low survey rate precludes firm conclusions on the basis of these data.⁶⁹

of the far group, as well as participation rates, were not noted.⁶⁸

A small but detailed study on response to the wind turbine noise was carried out in Poland.⁷¹ The study population consisted of 156 people, age 15–82 years, living in the vicinity of 3 wind farms located in the central and northwestern parts of Poland. No exclusion criteria were applied, and each individual agreeing to participate was sent a questionnaire patterned after the one used in the Pederson 2004 and Pederson 2007 studies and including questions on living conditions, self-reported annoyance due to noise from wind turbines, and self-assessment of physical health and well-being (such as headaches, dizziness, fatigue, insomnia, and tinnitus). The response rate was 71%. Distance from the nearest wind turbine and modeled A-weighted SPLs were considered as exposure indicators. One third (33.3%) of the respondents found wind turbine noise annoying outdoors, and one fifth (20.5%) found the noise annoying while indoors. Wind turbine noise was reported as being more annoying than other environmental noises, and self-reported annoyance increased with increasing A-weighted SPLs. Factors such as attitude toward wind turbines and "landscape littering" (visual impact) influenced the perceived annoyance from the wind turbine noise. This study, as with most others, is limited by the cross-sectional design and reliance on self-reported health and well-being indicators; however, analyses focused on predictors of self-reported annoyance, and found that wind turbine noise, attitude toward wind turbines, and attitude toward "landscape littering" explain most of the reported annoyance.

Other Possibly Relevant Studies

A publication based on the self-reporting of 109 individuals who "perceived adverse health effects occurring with the onset of industrial wind turbine facility" indicated that 102 reported either "altered health or altered quality of life." The authors appropriately noted that this was a survey of self-selected participants who respond to a questionnaire specifically designed to attract those who had health complaints they attributed to wind turbines, with no comparison group. Nevertheless, the authors conclude that "Results of this study suggest an underlying relationship between wind turbines and adverse health effects and support the need for additional studies."⁴⁸ (p. 336) Such a report cannot provide valid evidence of any relationship for which there is no comparison and is of little if any inferential value.

Researchers at the School of Public Health, University of Sydney, in Australia conducted a study to explore psychogenic explanations for the increase around 2009 of wind farm noise and/or health complaints and the disproportionate geographic distribution of complaints about noise or health from residents living near all 51 wind farms (1634 turbines) operating between 1993 and 2012 from wind farm companies and government public enquiries, with documents such as news media records, and court affidavits. Of the 51 wind farms, 33 (64.7%) had no record of noise or health complaints, including all wind farms in Western Australia and Tasmania. The researchers identified 129 individuals who had filed complaints, 94 (73%) of whom lived near six wind farms targeted by anti-wind advocacy groups. They observed that 90% of complaints were registered after anti-wind farm groups included health concerns as part of their advocacy in 2009. The authors concluded that their findings were consistent with their psychogenic hypotheses.

Discussion

No cohort or case-control studies were located in this updated review of the peer-reviewed literature. The lack of published case-control studies is less surprising and less critical because there has been no discrete disease or constellation of diseases identified that likely might be explained by wind turbine noise. Anecdotal reports of symptoms associated with wind turbines include a broad array of nonspecific symptoms, such as headache, stress, and sleep disturbance, that afflict large proportions of the general population and have many recognized risk factors. Retrospectively associating such symptoms with wind turbines or even measured wind turbine noise—as would be necessary in case-control studies—does not prevent recall bias from influencing the results.

Although cross-sectional studies and surveys have the advantage of being relatively simple and inexpensive to conduct, they are susceptible to a number of influential biases. Most importantly, the temporal sequence of exposure—outcome relationship cannot be demonstrated. If the exposure cannot be established to precede the incidence of the outcome—and not the reverse, that is, increased perception of or annoyance with noise—the association cannot be evaluated for a possible causal nature.

Conclusions

A critical review and synthesis of the evidence available from the eight study populations studied to date (and reported in 14 publications) provides some insights into the hypothesis that wind turbine noise harms human health in those living in proximity to wind turbines. These include the following:

* No clear or consistent association is seen between noise from wind turbines and any reported disease or other indicator of harm to human health.
* In most surveyed populations, some individuals (generally a small proportion) report some degree of annoyance with wind turbines;

however, further evaluation has demonstrated:

* Certain characteristics of wind turbine sound such as its intermittence or rhythmicity may enhance reported perceptibility and annoyance; annoyance;

* Factors such as attitude toward visual effect of wind turbines on scenery, attitude toward wind turbines in general, personality characteristics, whether individuals benefit financially from the presence of wind turbines, and duration of time wind turbines have been in operation all have been correlated with self-reported annoyance; and

* Studies of QOL including physical and mental health scales and residential proximity to wind turbines report conflicting findings—study (with only 38 participants living within 2.0 km of the nearest wind turbine) reported lower HRQOL among those living closer to wind turbines than respondents living farther away, whereas the largest of all studies (with 853 living within 1500 m of the nearest wind turbine) found that those living closer to wind turbines reported higher QOL and health than those living farther away.⁶⁷

Notwithstanding the limitations inherent in cross-sectional studies and surveys—which alone may provide adequate explanation for some of the reported correlations—several possible explanations have been suggested for the wind turbines-associated annoyance reported in the many of these studies, including attitudinal and even personality characteristics of the survey participants.⁶⁹ Pedersen and colleague also found that wind turbines might be more likely to elicit annoyance because some perceive them to be “intrusive” visually and with respect to their noise.⁶⁵ Alternative explanations on the basis of evaluation of all health complaints filed between 1993 and 2012 with wind turbine operators across Australia include the influence of anti-wind power activism and the surrounding publicity on the likelihood of health complaints, calling the complaints “communicated diseases.”⁵²

* Annoyance does not correlate well or at all with objective sound measurements or calculated sound pressures.

* Complaints such as sleep disturbance have been associated with A-weighted wind turbine sound pressures of higher than 40 to 45 dB but not any other measure of health or well-being. Stress was associated with annoyance but not with calculated sound pressures.⁶³

Because these statistical correlations arise from cross-sectional studies and surveys in which the temporal sequence of the exposure and outcome cannot be evaluated, and where the effect of various forms of bias (especially selection/volunteer bias and recall bias) may be considerable, the extent to which they reflect causal relationships cannot be determined. For example, the claims such as “We conclude that the noise emissions of wind turbines disturbed the sleep and caused daytime sleepiness and impaired mental health in residents living within 1.4 km of the two wind turbines installations studied” cannot be substantiated on the basis of the actual study design used and some of the likely biases present.⁷⁰

Recent controlled exposure laboratory evaluations lend support to the notion that reports of annoyance and other complaints may reflect, at least in part, preconceptions about the ability of wind turbine noise to harm health^{52, 71, 72} or even the color of the turbine⁷³ more than the actual noise emission.

Sixty years ago, Sir Austin Bradford Hill delivered a lecture entitled “Observations and Experiment” to the Royal College of Occupational Medicine. In his lecture, Hill stated that “The observer may well have to be more patient than the experimenter—awaiting the occurrence of the natural succession of events he desires to study; he may well have to be more imaginative—sensing the correlations that lie below the surface of his observations; and he may well have to be more logical and less dogmatic—avoiding as the evil eye the fallacy of ‘post hoc ergo propter hoc,’ the mistaking of correlation for causation.”⁷⁴(p.1000)

Although it is typical and appropriate to point out the obvious need for additional research, it may be worth emphasizing that more research of a similar nature—that is, using cross-sectional or survey approaches—is unlikely to be informative, most notably for public policy decisions. Large, well-conducted prospective cohort studies that document baseline health status and can objectively measure the incidence of new disease or health conditions over time with the introduction of wind turbine exposures—primarily noise and visual effect—are not dissimilar to many other environmental (eg, noise of waves along shorelines) and anthropogenic (eg, noise from indoor Heating Ventilation and Air Conditioning or road traffic) stimuli, for which research and practical experience indicate no direct harm to human health.

Sound Components and Health: Infrasound, Low-Frequency Sound, and Potential Health Effects

Introduction

This section addresses potential health implications of wind turbines produce two kinds of sound. Gears and generators can low-frequency sound because claims have been made that the frequency of wind turbine sound has special characteristics that may present unique health risks in comparison with other sources of environmental sound.

Wind turbines produce two kinds of sound. Gears and generators can low-frequency sound because claims have been made that the frequency of wind turbine sound has special characteristics that may present unique health risks in comparison with other sources of environmental sound.

Several studies^{44, 75, 76} have shown that at distances of 300 m or more, wind turbine sounds are below human detection thresholds for frequencies less than 50 Hz. The most audible frequencies (those whose acoustic energies exceed human thresholds the most) are in the 2000 Hz range. At this distance from a single wind turbine, levels are typically 35 to 45 dBA.^{77, 78} These levels can be audible in typical residence with ambient noise of 30 dBA and windows open in room with an ambient level of 30 dBA would be considered by people to be quiet or very quiet. In outdoor environments, sound intensity is usually measured in decibels (dB), with 0 dB SPL corresponding to the softest sounds humans can hear. Nevertheless, humans hear well only within the frequency range that includes the frequencies most important for speech understanding—about 500 to 5000 Hz. At lower frequencies, hearing thresholds are much higher.⁷⁵ Although frequencies lower than 20 Hz are conventionally referred to as “infrasound,” sounds in fact be heard, but only when they are extremely intense (a sound of 97 dB SPL has 10 million times as much energy as

reduced by 35 dB.

The cochlea contains two types of hair cells. It is often said that we hear with our inner hair cells (IHCs) because all the "type I" afferent neurons that carry sound-evoked impulses to the brain connect to the IHCs. The outer hair cells (OHCs) are important as "pre-amplifiers" that make it possible to hear very soft sounds; they are exquisitely tuned to specific frequencies, and when they move they create fluid currents that then displace the stereocilia of the IHCs.

Although more numerous than the IHCs, the OHCs receive only very scanty afferent innervation, from "type II" neurons, the function of which is unknown. Salt and Hullar⁸² have pointed out that OHCs generate measurable electrical responses called cochlear microphonics to very low frequencies (eg, 5 Hz) at levels that are presumably inaudible to the animals and have hypothesized that the type II afferent fibers from the OHCs might carry this information to the brain. Nevertheless, it seems that no one has ever recorded action potentials from type II cochlear neurons, nor have physiological responses other than cochlear microphonics been recorded in response to inaudible sounds.^{86, 87} In other words, as Salt and Hullar⁸² acknowledge, "The fact that some inner ear components (such as the OHC) may respond to [airborne] infrasound at the frequencies and levels generated by wind turbines does not necessarily mean that they will be perceived or disturb function in any way."^(p.19)

Responses of the Vestibular Organs

As previously noted, vestibular hair cells are efficiently coupled to the skull. The three semicircular canals in each ear are designed to respond to head rotations (roll, pitch, yaw, or any combination). When the head rotates, as in shaking the head to say "no," the fluid in the canals lags behind the skull and bends the hair cells. The otolith organs (utricle and saccule) contain calcium carbonate crystals (otoconia) that are denser than the inner ear fluid, and this allows even static head position to be detected; when the head is tilted, gravitational pull on the otoconia bends the hair cells. The otolith organs also respond to linear acceleration of the head, as when a car accelerates.

Many people complaining about wind turbines have reported dizziness, which can be a symptom of vestibular disorders; this has led to suggestions that wind turbine sound, especially inaudible infrasound, can stimulate the vestibular organs.^{83, 84} Pierpont⁸³ introduced a term "Wind Turbine Syndrome" based on a case series of 10 families who reported symptoms that they attributed to living near wind turbines. The author invited people to participate if they thought they had symptoms from living in the vicinity of wind turbines; this approach introduces substantial selection bias that can distort the results and their corresponding significance. Telephone interviews were conducted; no medical examination, diagnostic studies or review, and documentation of medical records were conducted as part of the case series. Noise measurements were not provided. Nonetheless, the author described a collection of nonspecific symptoms that were described as "Wind Turbine Syndrome." The case series, at the time of preparation of this review, has not been published in the peer-reviewed scientific literature. Although not medically recognized, advocates of this "disorder" suggest that wind turbines produce symptoms, such as headaches, memory loss, fatigue, dizziness, tachycardia, irritability, poor concentration, and anxiety.⁸⁸

To support her hypotheses, Pierpont cited a report by Todd et al⁸⁹ that demonstrated human vestibular responses to bone-conducted sound at levels below those that can be heard. But as previously noted, this effect is not surprising because the vestibular system is designed to respond to head movement (including head vibration induced by direct contact with a vibrating source). The relevant issue is how the vestibular system responds to airborne sound, and here the evidence is inconclusive. They go on to hypothesize that infrasound may cause endolymphatic hydrops, a condition in which one of the inner ear fluid compartments is swollen and may disturb normal hair cell function. But here, too, they acknowledge the lack of evidence—"... it has never been tested whether stimuli in the infrasound range cause endolymphatic hydrops."^(p.19) In previous research, Salt⁹² was able to create temporary hydrops in animals using airborne sound, but only at levels (115 dB at 200 Hz) that are many orders of magnitude higher than levels that could exist at residential distances from wind turbines.

Human Vibrotactile Sensitivity to Airborne Sound

Very loud sound can cause head and body vibration. As previously noted, a person with absent middle ear function but an intact cochlea may hear sounds at 50 to 60 dB SPL. Completely deaf people can detect airborne sounds using the vibrotactile sense, but only at levels far above hearing threshold, for example, 128 dB SPL at 16 Hz.⁹⁴ Vibrotactile sensation depends on receptors in the skin and joints.

Pierpont⁸³ hypothesized that "visceral graviceptors,"^{95, 96} which contain somatosensory receptors, could detect airborne infrasound transmitted from the lungs to the diaphragm and then to the abdominal viscera. These receptors would seem to be well suited to detect body tilt or perhaps whole-body vibration, but there is no evidence that airborne sound could stimulate sensory receptors in the abdomen. Airborne sound is almost entirely reflected

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Friday, October 23, 2015 12:19 PM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Scott E. Etherton; Steve S. Henrichsen
Subject: FW: support for fair wind policy

Hard copy: Hudkins

From: Kim Morrow [<mailto:kim@nebraskaip.org>]
Sent: Friday, October 23, 2015 10:13 AM
To: Commish
Subject: support for fair wind policy

Dear Commissioner Hudkins,

Greetings. I want to write to express my support for reasonable wind development policy in Lancaster County that takes into account the concerns of acreage owners but also sets a healthy precedent for other counties to access significant economic development in our state. Our organization supports the Planning Commission's recommendations of 50 decibels in the day and 45 at night.

Climate change is the issue that drives my work for a healthier and more resilient Nebraska. The seriousness of the issue demands that we move to more renewable energy as quickly as possible. As you know, Nebraska has some of the best wind resources in the country, yet it is a vastly under-developed resource. The regulations that the Planning Commission will accept will likely become guidelines for other counties. Paving the way for wise wind energy development in Nebraska is a concrete action that we can take that will improve the lives of our communities, improve the quality of our air, and help slow climate change.

Thank you for your service to our community.

Blessings,
Kim

--

Rev. Kim Morrow
Executive Director
Nebraska Interfaith Power & Light
2012 S. 13th St.
Lincoln, NE 68502
www.nebraskaip.org
402.405.9425
@KimMorrowGo

Facilitating the faith community's response to our changing climate

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Friday, October 23, 2015 12:19 PM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Scott E. Etherton; Steve S. Henrichsen
Subject: FW: Lancaster County Wind Turbine Project

Hard copy: Hudkins

From: joesamdabbs@gmail.com [<mailto:joesamdabbs@gmail.com>] **On Behalf Of** Joe&Samantha Dabbs
Sent: Friday, October 23, 2015 11:35 AM
To: Commish
Subject: Lancaster County Wind Turbine Project

Dear Commissioners,

We would like to voice our strong opposition to raising the sound limits and setbacks for the county. The population density is simply too great to allow such wind turbine farms in Lancaster county and will be of great harm to those who live in the Cortland/Hallam area.

Environmental damage due to noise, shadows and degradation of landscape will not be worth the energy derived from this resource.

Electrical power in the midwest and especially Nebraska is very economical. We do not need another source of power at the risk of destroying our environment.

Please vote against any efforts on the 27th that would make this project move forward.

Sincerely,

Joseph and Samantha Dabbs
26240 SW 86th Street
Hallam, Nebraska 68368

Joe&Samantha Dabbs <joesamdabbs@gmail.com>

Kelly S. Lundgren

From: Gwen K. Thorpe
Sent: Friday, October 23, 2015 12:21 PM
To: Kelly S. Lundgren
Subject: FW: research for commissioners on wind turbines

You need this, too!

From: Gwen K. Thorpe **On Behalf Of** Commish
Sent: Friday, October 23, 2015 10:46 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Steve S. Henrichsen; Scott E. Holmes
Subject: FW: research for commissioners on wind turbines

Hard copy: Hudkins

From: Cowgirlcabin@aol.com [<mailto:Cowgirlcabin@aol.com>]
Sent: Friday, October 23, 2015 10:18 AM
To: Commish
Subject: research for commissioners on wind turbines

To all of the Lancaster County Commissioners:

My name is Judy Daugherty and I spoke at the last meeting on Tuesday to all of you. I told you all that I have been researching wind turbines for a year now. I am going to provide you with some excellent research links to check out on siting wind turbines. Some of you were having difficulty with the wording on setbacks in regards to one setback for 10 acres or less and one for 20 acres or less. I can tell you that wording came directly from the wind developer Volkswind. It in essence is going to allow them to take more advantage of a 20 acre owner than a 10 acre or less owner. That's it in a nutshell. If you own 20 acres, they are going to be able to site a turbine closer to your property line than someone on less acreage. It discriminates! In all of my research there is no other zoning anywhere in our country or internationally that has that kind of discrimination between property size in it. It should be thrown out! Letting a wind developer write our zoning policy is never a smart choice. Every property owner deserves the same rights as the next.

When the state of Minnesota started to get wind farms they did a very thorough research of other state's zoning and international zoning before deciding on their own. This research is available online in two different reports. This research is from zoning in other countries: This report is 42 pages and was done Oct. 2011.

[mn.gov/commerce/energyfacilities/documents/International Review of Wind Policies and Recommendations.pdf](http://mn.gov/commerce/energyfacilities/documents/International_Review_of_Wind_Policies_and_Recommendations.pdf)

This report was done in Jan. 2012 for the Minnesota Public Utilities Commission Funded by the U.S. Department of Energy. NARUC is The National Association of Regulatory Utility Commissioners. The report title is: Wind Energy and Wind Park Siting and Zoning Best Practices and Guidance for States. One note from me is to look at page 27 and they are also recommending 40dba as an ideal goal for noise limit. This report is also about 147 pages just to let you know.

[http://www.nrri.org/pubs/electricity/NNRI Wind Siting Jan12-03.pdf](http://www.nrri.org/pubs/electricity/NNRI_Wind_Siting_Jan12-03.pdf).

I am pleased to be able to help you find some of the research you are in need of to make the right choices for us all. Thank you for your time, Judy Daugherty

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Friday, October 23, 2015 1:49 PM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Steve S. Henrichsen; Scott E. Holmes; Kelly S. Lundgren
Subject: FW: wind turbines and property values for the county commissioners

Hard copy: Hudkins (Larry, if you want to see the links please let me know). Gwen

From: Cowgirlcabin@aol.com [<mailto:Cowgirlcabin@aol.com>]
Sent: Friday, October 23, 2015 1:44 PM
To: Commish
Subject: wind turbines and property values for the county commissioners

To all of the Lancaster County commissioners:

I am providing a link that has 3 pages of links of studies and reports concerning property values and wind turbines for your research. Personally I think common sense goes a long way on certain issues and I believe this is one issue. Why would you spend your hard earned money on a home with wind turbines around it when you could buy one some where with out them? Ask yourself, would you buy a home with 12 turbines within one mile of it at fair market value? For those that need more proof than their common sense please research this link. Thank you for your time, Judy Daugherty

pweb.westelcom.com/brvmug/WindPower/REValues.pdf

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 7:21 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: zoning regulations pertaining to wind power in Lancaster County

Hard copy: Hudkins

From: David Henderson [<mailto:dkhndrsn1@gmail.com>]
Sent: Friday, October 23, 2015 5:50 PM
To: Commish
Subject: zoning regulations pertaining to wind power in Lancaster County

Dear Commissioner Larry Hudkins,

I am concerned that the zoning regulations being considered pertaining to wind power in Lancaster County are overly restrictive in several respects. I believe that the restrictions being entertained would likely have unfortunate consequences for citizens who would desire to harvest the wind from their farms and properties. The restrictions are themselves problematic or ill-informed in several of their motivations:

- There is, for example, little evidence that wind development has a significant adverse effect on property values, so it does not seem that one needs to deeply restrict wind development to prevent negative impacts on property values.
- There is simply no evidence that the production of wind energy has negative health impacts in the short or long term.
- Further, the proposed sound limitations on wind farms make little sense, insofar as many commercial activities already occurring in the county, and surrounding areas in which wind farms might be sited, already routinely exceed these limitations. These commercial activities include standard and recurring aspects of the regions commercial agriculture. Reasonable policies seem not hard to imagine. For example, a common suggestion is that noise levels of 50 decibels in the daytime and 45 at night are fitting. What seems most relevant is noise measured at dwellings, not noise at property lines.

To restrict wind development in the ways being entertained would contravene the strong pro-wind sentiment on the part of citizens in southeast Nebraska generally, and Lancaster County in particular. I fear that it would thus be an ill-motivated policy that would fail to reflect the sense of the majority of citizens for the balance of benefits to be gotten from wind development.

I am led to believe that you yourself have a open mind with respect to these matters, and indeed that you are inclined to a balanced policy that would be friendly to wind development in in Lancaster County. Thus, I write to you to encourage you and thank you for supporting a forward looking zoning policy—one that protects public health and wellbeing (not much threatened by wind development) while allowing for reasonable commercial wind development.

Among the reasons for thinking that wind development is and ought to be a policy whose time is upon us is that it will be a crucial part of our national and regional energy portfolio in the coming decades. This will be so because public opinion and public policy will increasingly support a clean energy mix—which will be seen as absolutely necessary if we are to maintain our standards of living while avoiding costly and damaging climatic change. So, it would be a shame were Lancaster County, so rich in wind resources, to needlessly miss out on the associated opportunities due to misguided resistance.

Sincerely,
David Henderson
2557 Van Dorn St
Lincoln, NE 68502
402-390-3821

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 7:22 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Wind Farms

Hard copy: Hudkins

From: pipcompany@aol.com [<mailto:pipcompany@aol.com>]
Sent: Friday, October 23, 2015 5:32 PM
To: Bill P. Avery; Commish; Todd J. Wiltgen
Subject: Wind Farms

Dear Commissioners,

All around Nebraska there are states with successful wind farms. I understand there is resistance here, especially in Lancaster County, to Nebraska investing in the same technology.

Surely there must be a way, and an easy one, to both protect public health and allow wind development in our area. It will mean jobs, and harnessing Nebraska's strong winds seems such an obvious solution to many of our energy problems.

Why waste Nature's gift to Lancaster County and Nebraska? Please do what you can to let Lancaster County move ahead with wind power development.

Thank you,

Pippa White Lawson

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 7:17 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Attn Roma Amundsun

Hard copy: Hudkins

From: JoJen Alder [<mailto:jojenalder@gmail.com>]
Sent: Sunday, October 25, 2015 12:54 PM
To: Commish
Subject: Attn Roma Amundsun

Lancaster County Commissioners,

After attending the hearing on October 20th I wanted to take this opportunity to say "Thank You!" It's apparent you have researched and fully understand how this proposed wind project could affect the people of Lancaster and Gage counties.

You need to trust what the experts have highly researched and studied and bring back the safe noise levels of 37 decibels during the night and 40 decibels during the day. Many who testified mentioned the fact that other counties will follow what Lancaster uses as safe noise levels. As they should! Lincoln is our State Capital. Your decision will be respected throughout the State! Counties who have not updated safe setbacks and noise levels can then apply what has already been researched, eliminating each county having to go through the same long process that Lancaster and Gage counties has been experiencing this past year! These noise levels will allow Wind Projects in many counties with less population, more landmass where farmers and smaller communities can grow and prosper. Responsible safe noise levels and safe setbacks does not eliminate wind projects, it means you have achieved a safe and responsible decision protecting the people of Lancaster and the entire State of Nebraska.

Commissioners, Please protect the Property Rights of all citizens in the State of Nebraska!

Thank You!

JoJen Alder

Nebraska

Kelly S. Lundgren

From: Gwen K. Thorpe
Sent: Monday, October 26, 2015 7:20 AM
To: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Attn Larry Hudkins

Identical email but to Larry -

Gwen

From: Gwen K. Thorpe **On Behalf Of** Commish
Sent: Monday, October 26, 2015 7:19 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Subject: FW: Attn Larry Hudkins

Hard copy: Hudkins

From: JoJen Alder [<mailto:jojenalder@gmail.com>]
Sent: Sunday, October 25, 2015 12:56 PM
To: Commish
Subject: Attn Larry Hudkins

Lancaster County Commissioners,

After attending the hearing on October 20th I wanted to take this opportunity to say "Thank You!" It's apparent you have researched and fully understand how this proposed wind project could affect the people of Lancaster and Gage counties.

You need to trust what the experts have highly researched and studied and bring back the safe noise levels of 37 decibels during the night and 40 decibels during the day. Many who testified mentioned the fact that other counties will follow what Lancaster uses as safe noise levels. As they should! Lincoln is our State Capital. Your decision will be respected throughout the State! Counties who have not updated safe setbacks and noise levels can then apply what has already been researched, eliminating each county having to go through the same long process that Lancaster and Gage counties has been experiencing this past year! These noise levels will allow Wind Projects in many counties with less population, more landmass where farmers and smaller communities can grow and prosper. Responsible safe noise levels and safe setbacks does not eliminate wind projects, it means you have achieved a safe and responsible decision protecting the people of Lancaster and the entire State of Nebraska.

Commissioners, Please protect the Property Rights of all citizens in the State of Nebraska!

Thank You!

JoJen Alder

Nebraska

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 10:33 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: To Roma Amundson & Larry Hudkins
Attachments: Curtis letter 10-26-15 to Commissioners.docx

Hard copy: Hudkins

From: Curtis Schwaninger [<mailto:cjschwan@hotmail.com>]
Sent: Monday, October 26, 2015 9:39 AM
To: Commish
Subject: To Roma Amundson & Larry Hudkins

Please read the attached letter and give serious consideration to the requests.

Curtis Schwaninger

3750 W. Hallam Rd.
Hallam, NE 68368
October 26, 2015

To Roma Amundson & Larry Hudkins,

Industrial wind complexes have no relation to agriculture. Agriculture land is zoned for food production. Wind turbines are an industrial entity—much like Sheldon Station, although using a different energy source. To put an industrial wind complex on ag-zoned land should require a zoning change on that land. Not to do so would seem to go against the zoning laws of Lancaster County, and could be challenged.

Please require a Performance Bond for the safety of the County and the people involved.

Also, please vote for the noise levels of 40 db during the day and 37 db during the night that was suggested by Scott Holmes of the Lancaster County Health Department. Not doing so would be highly disrespectful of Scott and the Health Department who spent hundreds of hours of research.

Accepting testimony of Volkswind, whose only desire is to force an industrial wind complex on a highly populated area (without community involvement) and for a nearly 40-million dollar profit, cannot be justified.

Curtis Schwaninger

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 12:24 PM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Final Thoughts
Attachments: Lancaster County Acreage List.pdf; Lancaster County Precinct Grid.pdf; _Certification_.htm

Hard copy: Hudkins

From: Alan Friesen [<mailto:Alan@haberfeld.com>]
Sent: Monday, October 26, 2015 11:36 AM
To: Commish
Subject: Final Thoughts

Dear Commissioner Amundson:

As you continue to evaluate the necessary zoning regulations for industrial wind development in Lancaster County please consider the following:

- 1- Approximately 250 new and existing acreages change hands annually.
- 2- There are almost 5900 acreages under 100 acres in the County (attached spreadsheets show by size and location).
- 3- Lancaster County is growing by 6000+ residents annually, many desiring the rural life offered in Lancaster County.
- 4- We have yet to meet anyone that would choose to build/develop/buy in the shadow of a 460 foot turbine.
- 5- It will kill the long-term development in the Hallam area.

Over the past 75 days the potential industrial wind development surrounding our 80 acre family farm has consumed our attention and efforts to both understand the positives and the negatives. While being supportive of renewable energy it seems incongruent with densely populated areas of our county. When visiting Steel Flats we noted far fewer homes than exist in Lancaster County. Upon further review, there is only one home that is nonparticipating and that resident is a renter. Steel Flats, in comparison to the Hallam area, feels almost desolate.

Please adopt the sound limits recommended by our health department and set backs of at least 3 times the turbine height from non participants property lines.

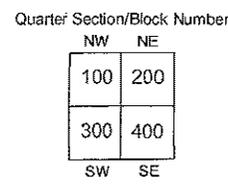
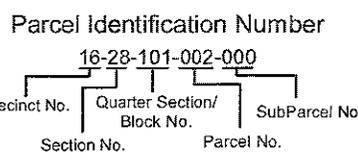
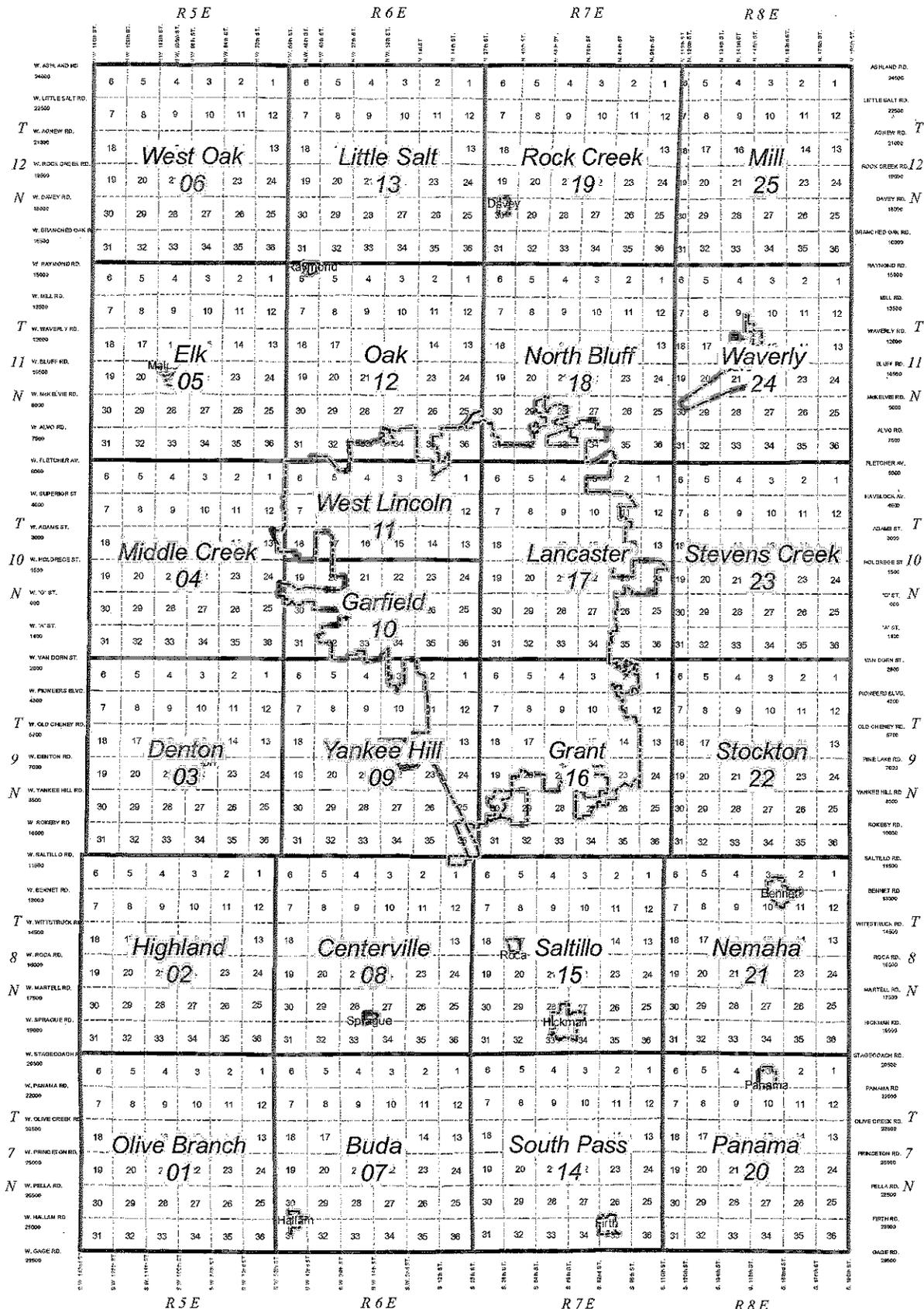
Thank you again for your consideration.

Alan Friesen
Chairman & CEO
Haberfeld Associates
402.770.7939

Count of Address1	Column Labels					
Row Labels	2-5 acres	5-10 acres	10-25 acres	25-100 acres	Over 100 acres	Grand Total
01	11	16	27	53	20	127
02	37	56	61	53	17	224
03	124	124	107	54	16	425
04	80	82	74	53	17	306
05	30	105	123	59	21	338
06	26	33	31	31	17	138
07	20	29	41	33	17	140
08	121	63	52	47	22	305
09	356	78	44	25	12	515
10	134	15	3	1	3	156
11	5	2	1			8
12	79	47	74	50	15	265
13	66	46	126	56	18	312
14	125	82	83	50	11	351
15	160	124	58	47	17	406
16	336	85	41	13	3	478
17	53	92	9	13	4	171
18	115	37	38	27	11	228
19	27	56	29	32	16	160
20	27	28	54	41	13	163
21	29	63	81	49	12	234
22	59	69	90	45	10	273
23	98	87	53	37	14	289
24	31	37	24	22	11	125
25	28	25	23	23	12	111
Grand Total	2177	1481	1347	914	329	6248

Lancaster County Assessor's Office

Precincts



Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 2:05 PM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Three points about wind farm regulation (Text Amendment #15009)

Hard copy: Hudkins

From: John Atkeison [<mailto:john@energyline.org>]
Sent: Monday, October 26, 2015 1:27 PM
To: Commish
Subject: Three points about wind farm regulation (Text Amendment #15009)

Dear Commissioner Hudkins,

I will be as succinct as possible with my comments about the three issues that seem most important about Text Amendment #15009.

Also, an urgent question is, "Why adopt this at all? Won't actual problems be addressed in the application for a special permit?"

1) Should possible impacts be measured at the property line rather than the dwelling? While it is appropriate to enact setbacks from property lines and public roads regarding the physical turbines, it is dangerous to do so for noise. In the very unlikely event that a tower should fall or a large piece of ice should become dislodged at precisely the right point of the arc of a blade's path to be thrown toward the property line, the path to impact is governed by the laws of physics and is predictable. In these cases, the proposed setback of the greater of 1,000 feet or three turbine heights (~1400 feet) seems excessive but certainly extremely "safe."

The one aspect of the noise issue that is of most concern is that it sets an extreme standard of intrusion on the property of a neighbor. If the same standards were to be applied to the sound of harvesting and other older agricultural activities, many could not survive the test. The result would be to outlaw farming in Lancaster County and any other county that adopted similar regulations. If the principles were to be applied to smell, livestock would be challenged as well.

Perhaps that is acceptable to those who have launched this campaign to derail the non-existent wind farm, but I doubt this is acceptable to the people of the County.

2) Health issues again. As I said in my testimony, I have found no credible study that shows that health is adversely affected by wind turbines. The one connection that is demonstrable is to annoyance, but there is no evidence that related health effects are connected to wind turbines. In fact, there is a credible study that shows that it is more likely that the health effects that have been

reported have their roots in the publicity of the anti-wind farm campaigners. The relevant mechanism is that of setting expectations that are then mirrored in the population that has been prepared. The study is titled *Wind Turbine Sound and Health Effects: An Expert Panel Review* and can be found at <http://bit.ly/CanWeaTurbineSoundAndHealth>.

3) I know that it is not popular to raise issues that question the motives of participants. In this case, however, I feel compelled to point out that the “Stop Hallam Wind” group has used manipulative tactics and has not produced strong evidence of their position. I would cite their postcard to County residents that shows a long line of wind towers that loom over the city in a way that make them appear larger than they are (Or than they probably will be, since no specific model has been chosen.). We also saw their final testifier ask the other testifier who came to the front at the same time to precede her, thus ensuring that she was the final speaker. She then asked the Board to take her word as a supposed professional that special needs kids would be harmed by wind turbines. She presented no evidence. But it would strain credulity to suppose that the testifier was not aware that two board members have special needs people as family members. I would be wary of siding with these folks when it is not strictly necessary.

Sincerely,

John

For EnergyLinc

John Atkeison
(402) 915-3210

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 2:06 PM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: My Client, Barbara Vokoun Concerning Windmill Farm Proposal

Hard copy: Hudkins

From: Sara Sanford [<mailto:SSanford@bancwise.com>]
Sent: Monday, October 26, 2015 1:47 PM
To: Commish
Subject: My Client, Barbara Vokoun Concerning Windmill Farm Proposal

Dear Commissioner Hudkins,

I am writing on behalf of my client, Mrs. Vokoun who has lived in the Hallam are for 67 years and in the same home in Hallam for 23 years. She does not want to move out of Hallam but is needing less to maintain with her husband's recent passing. Her home is currently for sale and she just lowered the price by almost \$10,000. The potential decline in property value as a result of the windmill farms was something she was forced to consider when contemplating lowering the price of her home at 150 N Harrison Street, Hallam, NE. My heart goes out to her and her family as she has invested so much of her time and money into the town of Hallam. There is no doubt that she has been an invaluable member of that community. It would be unfortunate timing having invested so much only to have the value of her property be reduced as a result. Would you kindly consider my client, Barbara Vokoun, when you're making decisions regarding the following:

1. I urge you to lower the sound levels back to the health department recommendations of 40 decibels during the day and 37 at night.
2. I urge you to protect landowners rights to their own land by starting the setbacks at the property line and not at the dwelling.

Thank you in advance for your time and consideration.

With Kind Regards,

Sara Sanford
BancWise Realty
Cell: 402-430-5540
Fax: 402-23-6778

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 3:21 PM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Please vote for reasonable regulations for wind farms in Lancaster County

Hard copy: Hudkins

From: sharadcseth@gmail.com [<mailto:sharadcseth@gmail.com>] **On Behalf Of** Sharad Seth
Sent: Monday, October 26, 2015 2:16 PM
To: Commish
Subject: Please vote for reasonable regulations for wind farms in Lancaster County

Dear Mr. Hudkins:

I urge you to vote on reasonable regulations that would allow wind development in Lancaster County. Regulations that allow balancing of public health with economic development. Lancaster County regulations are likely to be used as the model by other counties in Nebraska hence your decision can have a significant impact on whether or not we are able to use this abundant energy source in our state, as our neighbor to the east, Iowa, has been able to do.

Thank you!

Sharad Seth
Professor Emeritus
University of Nebraska-Lincoln

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 3:24 PM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Develop Wind Energy in Lancaster County

Hard copy: Hudkins

From: Loyal Park [<mailto:lp94238@windstream.net>]
Sent: Monday, October 26, 2015 2:56 PM
To: Commish
Subject: Develop Wind Energy in Lancaster County

Hello Larry,

I am writing to ask your support for Lancaster County regulations that will not only permit, but encourage, the development of wind energy in the county. Some of the objections to wind turbines are so severe that they are requiring unrealistic limits on audible noise and requiring extreme setback distances. These objections are being made to stop the development of wind energy rather than help in adopting reasonable county regulations that will allow properly-sited wind farms.

It hardly makes sense for Lincoln Electric System to be buying electricity from wind farms in Oklahoma when Nebraska and specifically Lancaster County has better natural wind available right here. We will all benefit from the development of wind energy right here and it will keep our dollars spent for renewable energy here in Lancaster County. With a valuation of approximately 1.5 million dollars for each wind turbine site, the property taxes paid to Lancaster County will be a big benefit to all land and property owners in spreading the tax load across an increased tax base.

Please support reasonable county regulations for wind farms. Oppose requests to tighten siting restrictions virtually eliminating future development of clean, renewable energy in Lancaster County.

Sincerely,
Loyal C. Park
7200 Van Dorn Street, Apt. 263
Lincoln, NE 68506
(402) 489-6662

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 3:57 PM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Industrial Wind Topic

Hard copy: Hudkins

From: Bryan Trost [<mailto:bryan.trost@bancwise.com>]
Sent: Monday, October 26, 2015 3:47 PM
To: Commish
Subject: Industrial Wind Topic

Dear Commissioner Hudkins,

Thank you for all the time you have committed to the industrial wind topic in Lancaster County. I know there is much debate and I appreciate you taking the time to listen to all information in order to make an informed decision. With that said, I urge you to consider the following:

- 1) Please lower the sound levels back to the health department recommendations of 40 dec during the day and 37dec at night. I understand this probably impact profitability, but the government agencies behind this decision I'm sure don't have their personal residence near the turbines. This really is a nuisance that can and will affect families.
- 2) Please protect landowners rights to their own land by starting the setbacks at the property line and not at the dwelling. I believe this will have a major negative impact on the economy for development. It also would give a little more cushion to help with the sound nuisance for current home owners that will be affected by this decision.

I don't know all the facts, but there are always unknown's that surface after a decision like this is made. Thank you for the countless hours of listening and research to try and know all the known and possible unknown problems like health issues that can arise after the fact. Your dedication and investment of time doesn't go unnoticed. Thank you.

Bryan Trost

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 3:58 PM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Wind turbine zoning vote

Hard copy: Hudkins

From: Rebecca Hruby Seth [mailto:becky_seth@hotmail.com]
Sent: Monday, October 26, 2015 3:51 PM
To: Commish
Subject: Wind turbine zoning vote

Dear Commissioner Hudkins,

I am a citizen of Lancaster County and a strong supporter of renewable energy. I understand that there are landowner concerns about the siting of wind turbines, but feel that the zoning restrictions here should not be any more stringent than in neighboring states. They have done a much better job on harnessing the wind for energy than we have, and we should not put more barriers to its development here than necessary. This zoning vote may well have repercussions in other areas of the state. I urge you to find a just balance for those restrictions.

Thank you, Rebecca Seth, Lincoln

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Monday, October 26, 2015 4:23 PM
To: David A. Derbin; Kristy R. Bauer; Steve S. Henrichsen; Scott E. Holmes; Kelly S. Lundgren; Kerry P. Eagan; Gwen K. Thorpe
Subject: FW: Wind Turbines text amendments & Letter
Attachments: Volkswind - Letter to Lancaster Cty Commiss - 2015Oct26.pdf

-----Original Message-----

From: Jeffrey Wagner [<mailto:Jeffrey.Wagner@volkswind.com>]
Sent: Monday, October 26, 2015 4:08 PM
To: Minette M. Genuchi; Commish
Cc: Kerry P. Eagan; Gwen K. Thorpe; David A. Derbin; Kristy R. Bauer; Bill Avery; Bill P. Avery; Deb E. Schorr; Roma Amundson; Roma B. Amundson; Todd J. Wiltgen; Todd Wiltgen
Subject: RE: Wind Turbines text amendments & Letter

Dear Minette, Gwen & Board of Commissioners

Please find attached letter from Volkswind in advance of the Board's October 27 meeting. Anne DeVries will also bring to your office 5 hardcopies of this to be provided to each of the Commissioners. We would also welcome if you would forward this email to the county attorney.

Kind regards,

Jeffrey Wagner

President, Volkswind USA Inc.
205 SE Spokane Street, Ste 306
Portland, OR 97202
Tel +1 503 236 4900
Cell +1 503 560 9379
Fax +1 503 296 2295
www.volkswind.us

This email is confidential and may also be privileged. If you are not the intended recipient please notify us immediately per phone or email. You should not copy it or use it for any purpose nor disclose its content to any other person.

On Oct 21, 2015, at 7:30 AM, Jeffrey Wagner
<Jeffrey.Wagner@volkswind.com<<mailto:Jeffrey.Wagner@volkswind.com>>> wrote:

Dear Minette

Could you please pass this message on to the Commissioners (via email or fax)? I would like to coordinate with you and/or the Commissioners regarding the following two items:

1) We would like to provide illustrations (maps) of our Hallam-area project to depict implied constraints for the various setbacks & noise limits for wind turbines under consideration by the Commissioners. Could you assist in arranging a 5 minute meeting with each Commissioner (or two at a time is also fine) during the week of October 26 in which we can provide the maps and information to them?

2) I understood from the Oct. 20 hearing that the Commissioners will not make a final vote on a wind energy text amendment by next week Oct. 27. Can you please confirm? I ask because we would like to present the items in Item 1) above to them prior to a vote on the text language (and prior to county attorney's draft of the text).

On this important issue we would like to provide these illustrated maps for consideration.

I will call you to follow up

Kind regards, Jeff Wagner

Volkswind USA
503 560 9379 cell

Thanks, Jeff Wagner

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Volkswind GmbH Registergericht: Oldenburg HRB 140700 Geschäftsführer: Katja Stommel, Viktor Lir; Vorsitzender des Aufsichtsrates: Marcus Seiler.

Diese Nachrichten und sämtliche Anhänge sind vertraulich und dürfen nicht an Dritte weitergeleitet oder sonst veröffentlicht werden, soweit nicht ausdrücklich etwas anderes bestimmt ist. Falls Sie nicht der beabsichtigte Empfänger sind, bitten wir Sie, mit dem Absender telefonisch oder per Email Kontakt aufzunehmen und diese Nachricht und sämtliche Anlagen von Ihrem System zu löschen. In diesem Fall sind Sie weder berechtigt, diese Nachricht oder etwaige Anhänge zu kopieren, noch deren Inhalt einem Dritten zugänglich zu machen.

This email is confidential and may also be privileged. If you are not the intended recipient please notify us immediately per phone or email. You should not copy it or use it for any purpose nor disclose its content to any other person.

October 26, 2015

Lancaster County Commissioners:
Roma Amundson
Bill Avery
Larry Hudkins
Deb Schorr
Todd Wiltgen

County-City Building
555 South 10th Street, Room 110
Lincoln, NE 68508
(402) 441-7447

Re: Text Amendment – Commercial Wind Energy Conversion Systems

Dear County Commissioners:

Thank you for your attention. Your consideration of wind energy regulations has an enormous impact on air quality, energy supply and livelihoods in Lancaster County and beyond. Please find enclosed several maps illustrating the constraints to site wind turbines in the Hallam area. These are for illustrative purposes and are not to be construed as final planning maps.

If you'll pardon the expression, I would like to "call a spade a spade" and make the following key points:

- Peer-reviewed scientific studies make it clear sound level limits of 50 dBA (daytime) and 45 dBA (nighttime), or a 5 dBA increase over background, will protect residents from adverse health effects and annoyance.
- The noise limits proposed by Scott Holmes would prohibit wind energy in almost any jurisdiction (including sparse populations), even in remote areas unlikely to host transmission. Frogs, cicadas, crickets, and weather alone would violate those limits – not to mention human-related noise. None of the research cited supports the limits proposed.
- The "squeezing out" of possible siting areas is not specific to Hallam. As was demonstrated at the Oct. 20, 2015 hearing, even a limit of **42dBA** at residences would eliminate 60% of the sites at the Steele Flats Facility (it was shown only 18 sites out of 44 would comply with a 42 dBA limit). Steele Flats has had no complaints and no issues.
- In our recommendations we refer to the need for an independent noise engineer Board Certified by the Institute of Noise Control Engineering (INCE); Board Certification by INCE is equivalent to Professional Engineer's (PE) license for the field of noise control engineering.
- With respect to property values, hopefully you have reviewed the 2013 U.S. Department of Energy study with broad-based data (more than 50,000 homes sales in

27 counties in nine states, including 1,198 sales within 1 mile of a turbine) which concluded, “we find no statistical evidence that home values near turbines were affected in the post-construction or post-announcement / pre-construction periods.”¹

- The **most conservative** Tier One wind turbine manufacturers have a guideline of 1.5 times total system height setback to a residence. The Health Department proposes to double this. 2 times system height setback is already ultra-conservative, and is more reasonable with respect to project feasibility and property owners’ fair use of their land for energy. Please compare Illustration 3A with 3B.
- In addition to \$700,000 to \$800,000 property and nameplate tax impact, there is a substantial economic impact locally for electrical and civil supply for construction, ongoing landowner income and jobs during operations, all of which have multiplier effects in the local economy.

In Volkswind’s Hallam area project there are to-date 65 separate participating contracts involving more than 14,000 acres, some of those represent several families within the same contract. All are recorded in the respective county clerk & recorder’s office as a public record.

I urge you to carefully review the enclosed illustrations and Volkswind’s proposed language [**Blue Text** – alternative, clarifying text; **Red Text** – explanations for the alternative text] we provided prior to the October 20, 2015 Board of Commissioner’s hearing, addressing important clarifications regarding feasibility and safety of wind energy in Lancaster County.

Sincerely,



Jeffrey Wagner
Volkswind USA Inc.

Enclosures: Illustrations of wind energy constraints in the Hallam, NE area

¹ <http://energy.gov/eere/wind/downloads/spatial-hedonic-analysis-effects-wind-energy-facilities-surrounding-property>

INDEX OF ENCLOSED ILLUSTRATIONS

1 – Communication beampaths / waterways

2 – Roads / transmission lines / railroads / 1 mile buffers from NGPC and villages / irrigation systems / Crete airport approach

3A – Distance setbacks of 2 times system height from residences and property lines

3B – Distance setbacks of 3 times system height from residences and property lines

Slides 4A to 4E: implied indicative constraints relating to various noise limits at residences

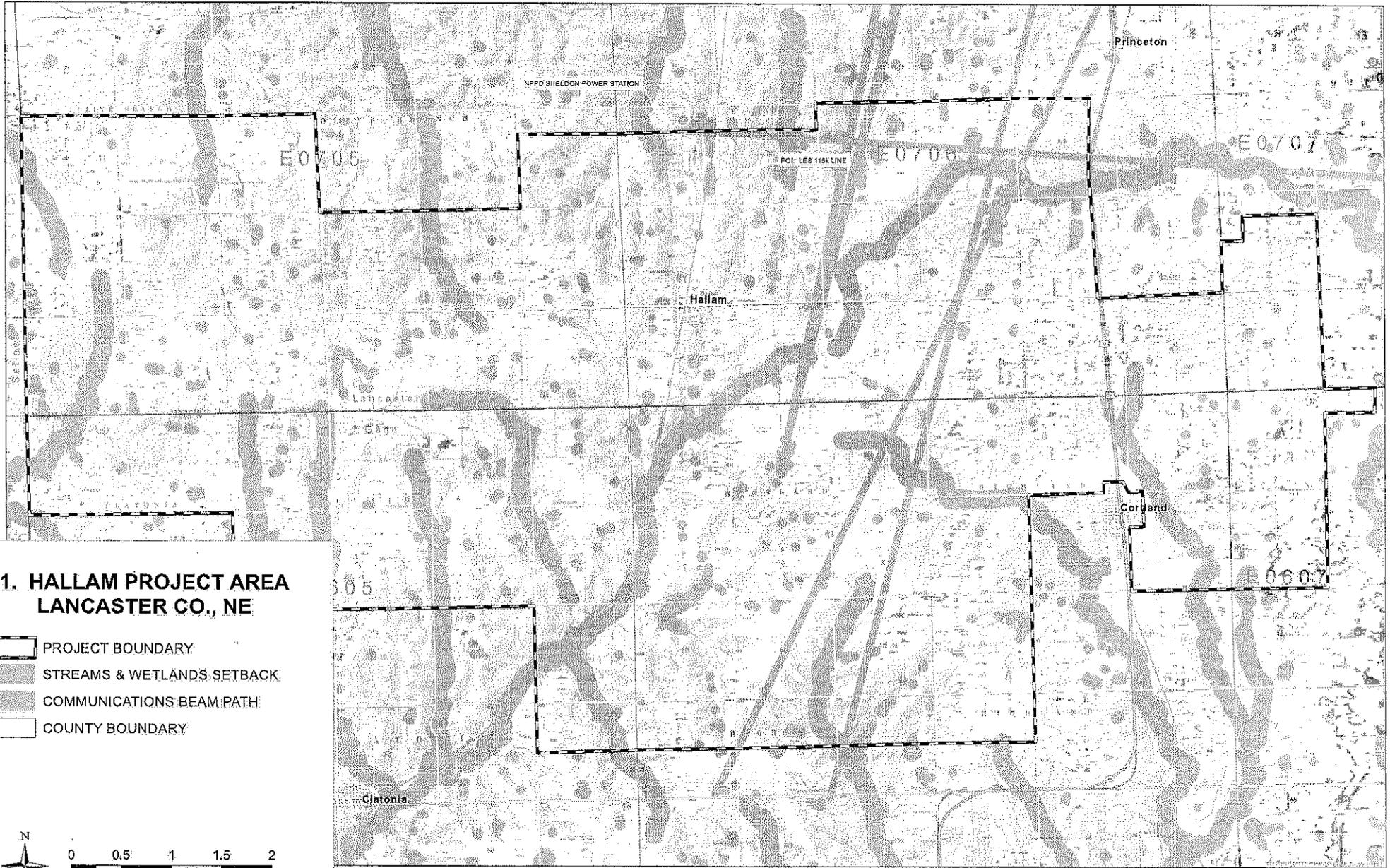
4A – 50 dBA

4B – 45 dBA

4C – 42 dBA

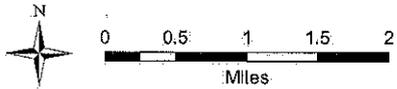
4D – 40 dBA

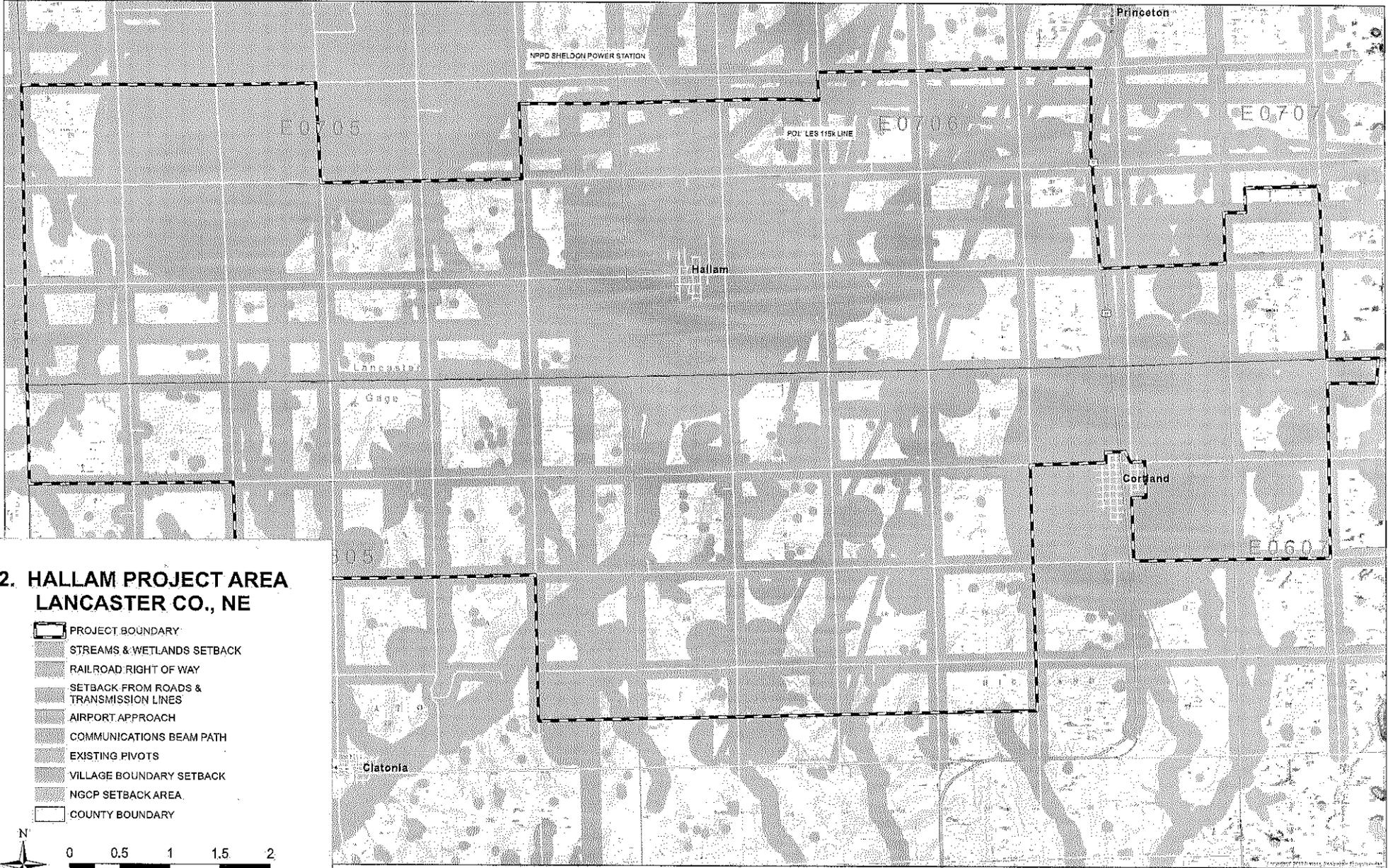
4E – 37 dBA

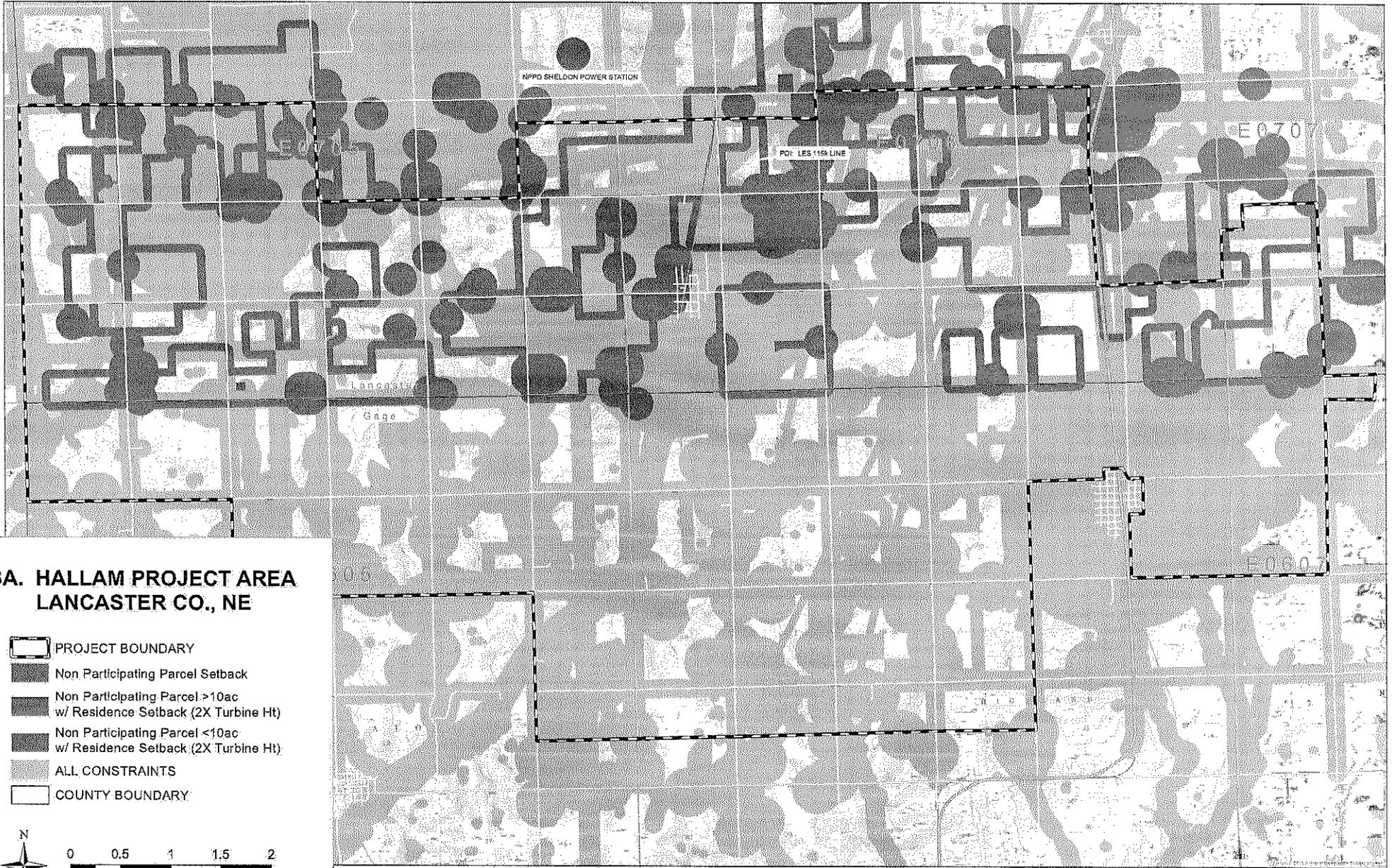


**1. HALLAM PROJECT AREA
LANCASTER CO., NE**

-  PROJECT BOUNDARY
-  STREAMS & WETLANDS SETBACK
-  COMMUNICATIONS BEAM PATH
-  COUNTY BOUNDARY



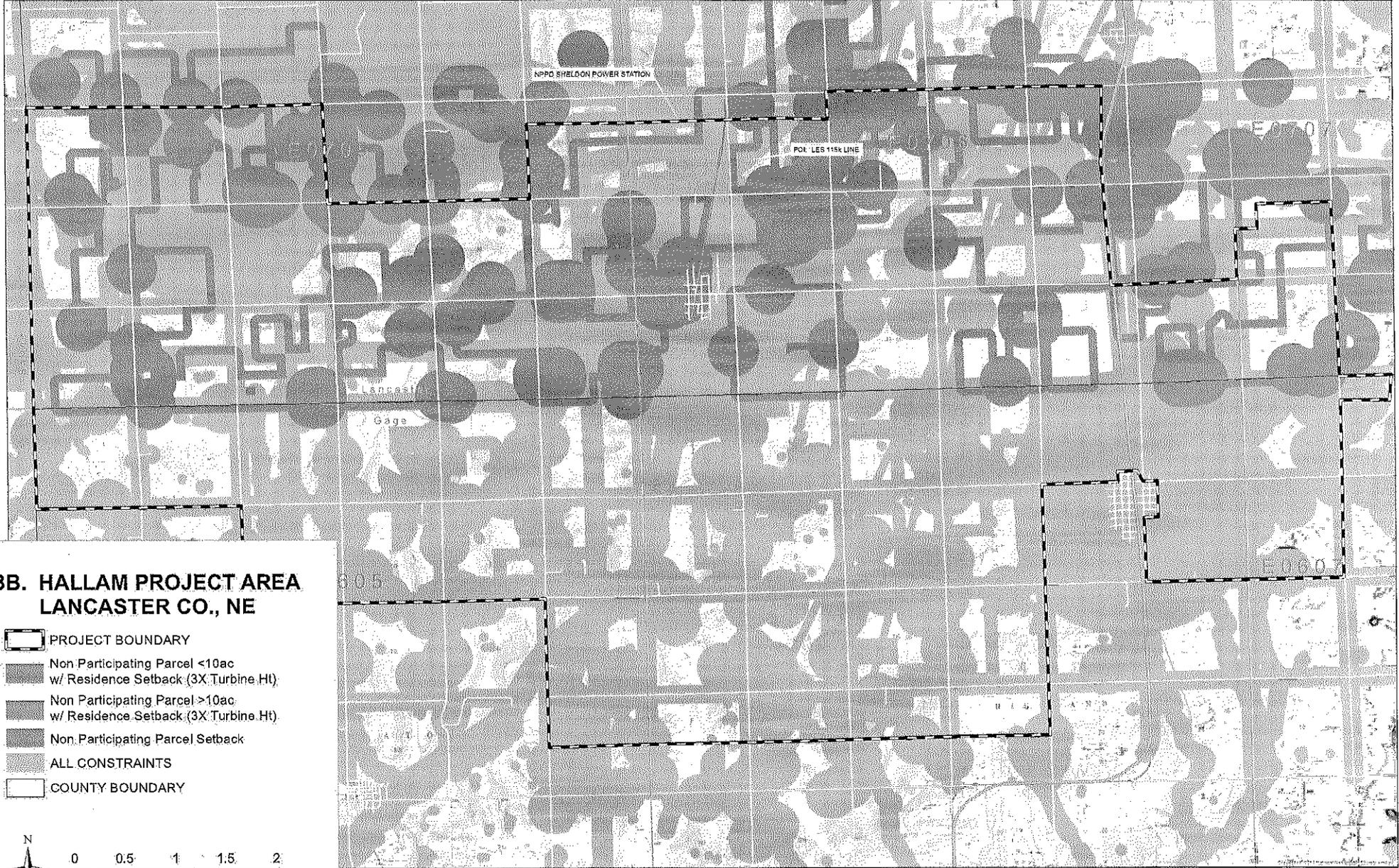




**3A. HALLAM PROJECT AREA
LANCASTER CO., NE**

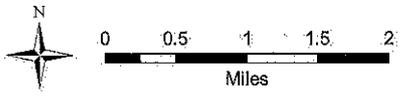
-  PROJECT BOUNDARY
-  Non Participating Parcel Setback
-  Non Participating Parcel >10ac
w/ Residence Setback (2X Turbine Ht)
-  Non Participating Parcel <10ac
w/ Residence Setback (2X Turbine Ht)
-  ALL CONSTRAINTS
-  COUNTY BOUNDARY

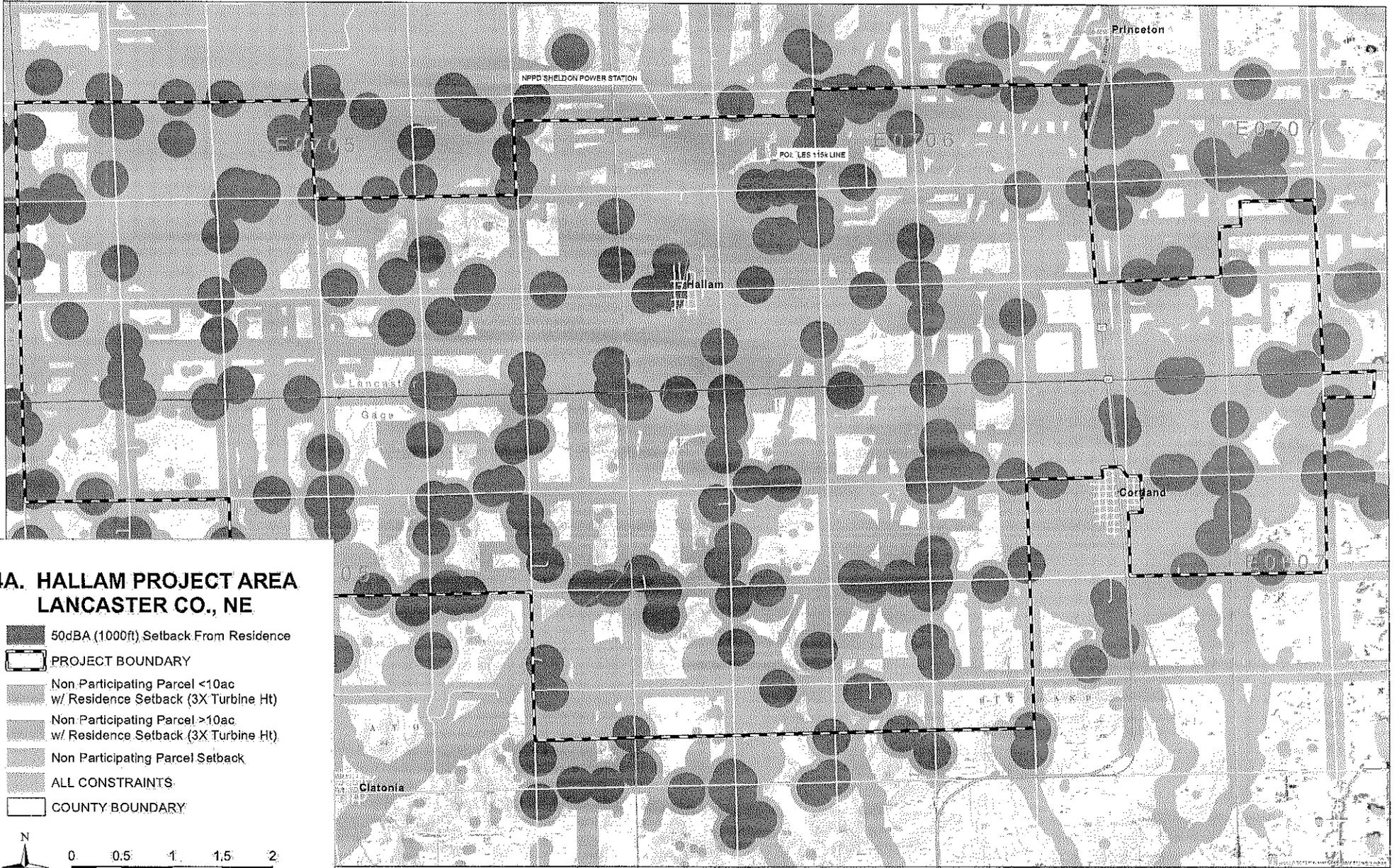




**3B. HALLAM PROJECT AREA
LANCASTER CO., NE**

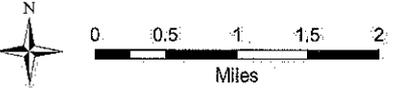
-  PROJECT BOUNDARY
-  Non Participating Parcel <10ac
w/ Residence Setback (3X Turbine.Ht)
-  Non Participating Parcel >10ac
w/ Residence Setback (3X Turbine.Ht)
-  Non Participating Parcel Setback
-  ALL CONSTRAINTS
-  COUNTY BOUNDARY

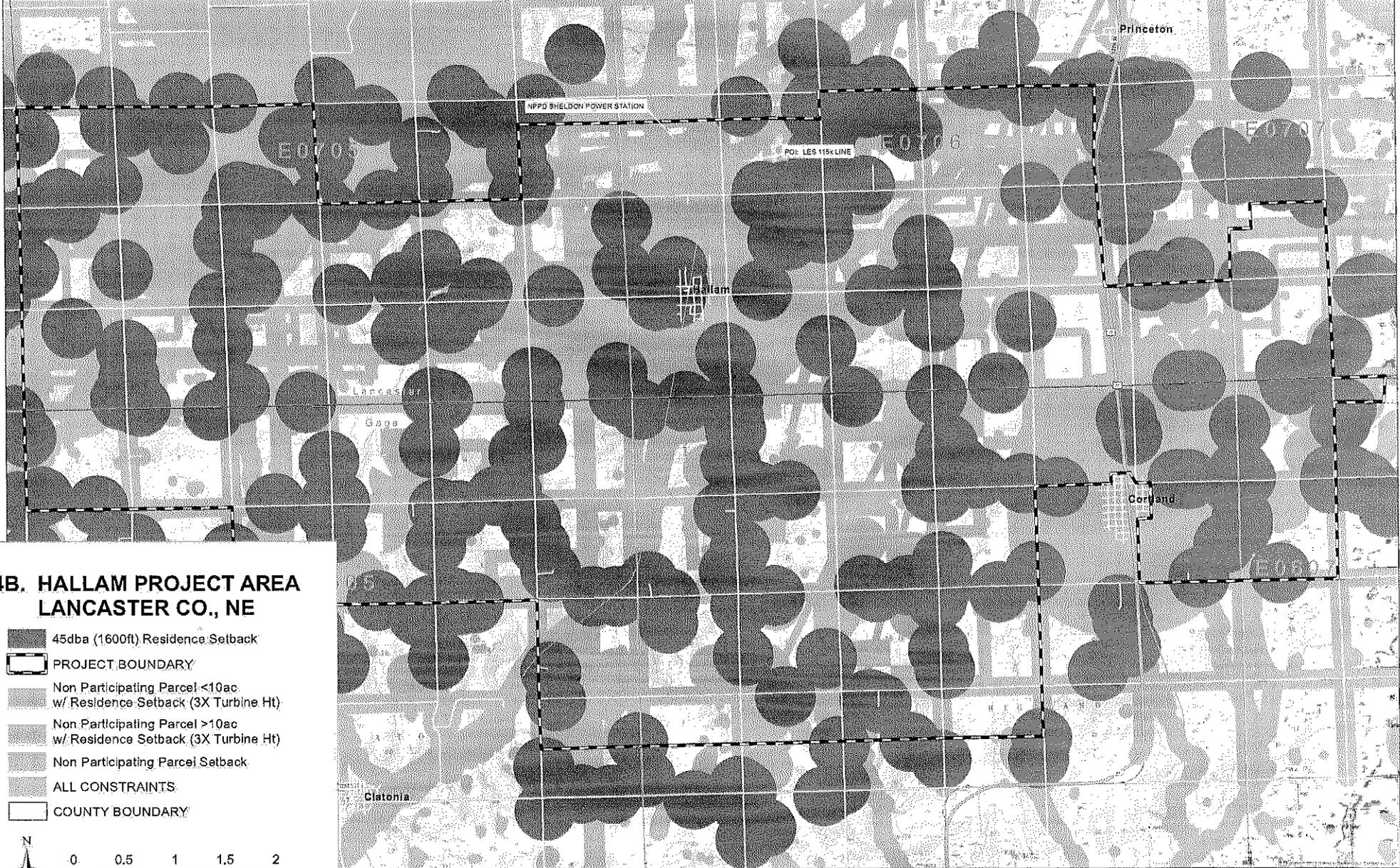




**4A. HALLAM PROJECT AREA
LANCASTER CO., NE**

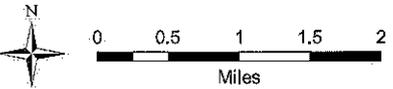
- 50cBA (1000ft) Setback From Residence
- PROJECT BOUNDARY
- Non Participating Parcel <10ac
w/ Residence Setback (3X Turbine Ht)
- Non Participating Parcel >10ac
w/ Residence Setback (3X Turbine Ht)
- Non Participating Parcel Setback
- ALL CONSTRAINTS
- COUNTY BOUNDARY

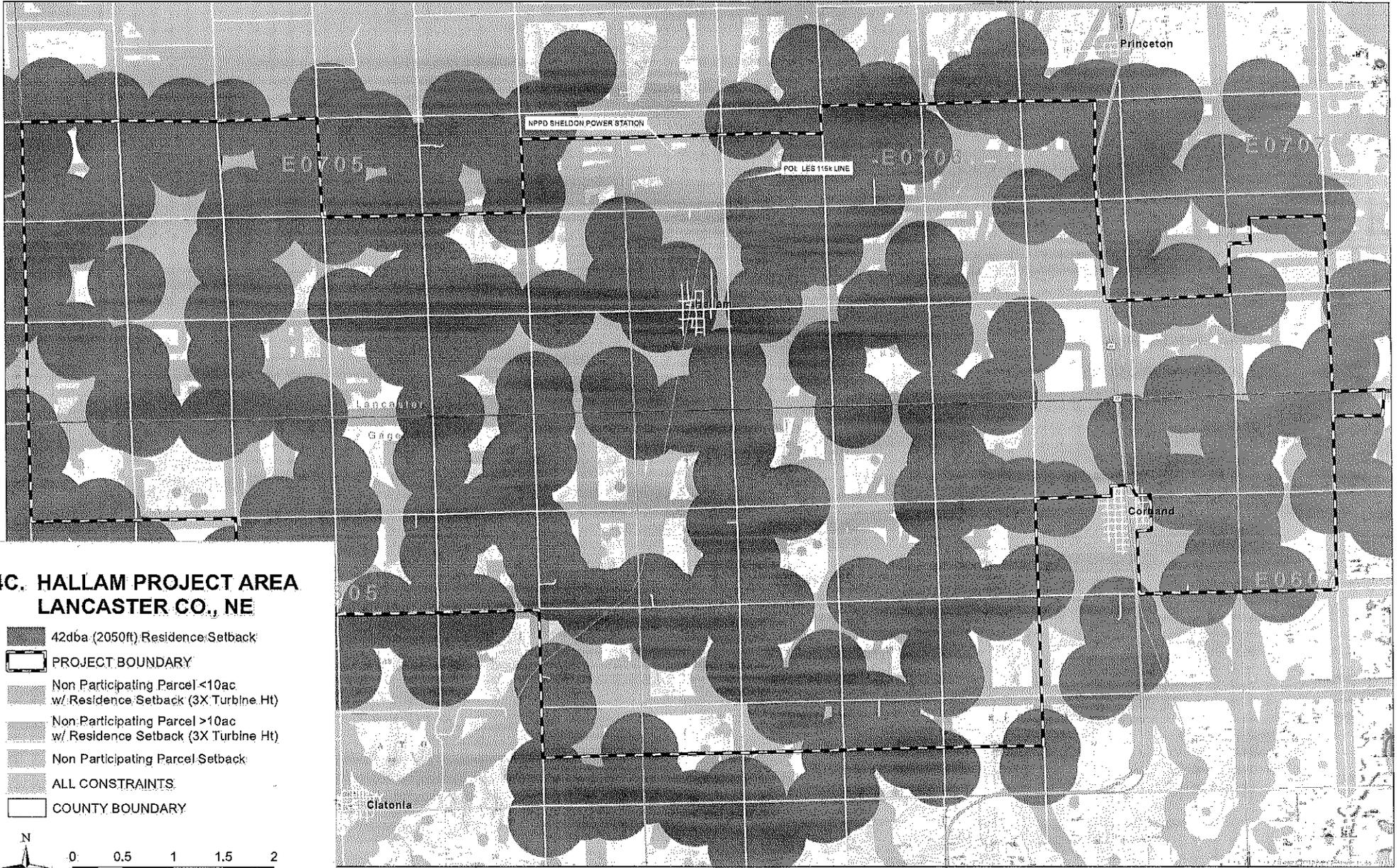




**4B. HALLAM PROJECT AREA
LANCASTER CO., NE**

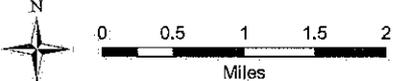
-  45dba (1600ft) Residence Setback
-  PROJECT BOUNDARY
-  Non Participating Parcel <10ac
w/ Residence Setback (3X Turbine Ht)
-  Non Participating Parcel >10ac
w/ Residence Setback (3X Turbine Ht)
-  Non Participating Parcel Setback
-  ALL CONSTRAINTS
-  COUNTY BOUNDARY

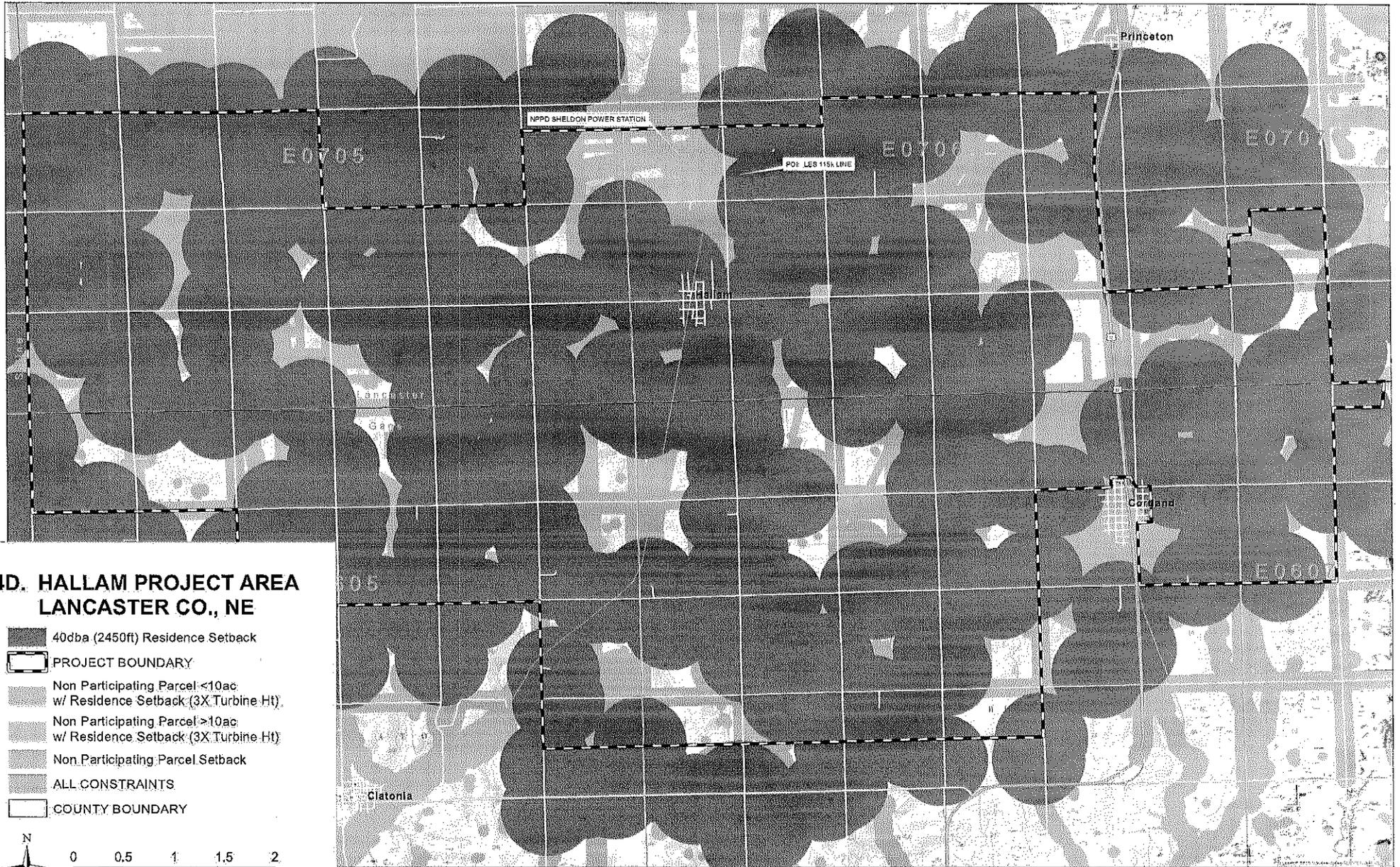




**4C. HALLAM PROJECT AREA
LANCASTER CO., NE**

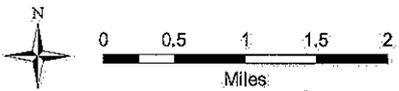
-  42dba (2050ft) Residence Setback
-  PROJECT BOUNDARY
-  Non Participating Parcel <10ac
w/ Residence Setback (3X Turbine Ht)
-  Non Participating Parcel >10ac
w/ Residence Setback (3X Turbine Ht)
-  Non Participating Parcel Setback
-  ALL CONSTRAINTS
-  COUNTY BOUNDARY

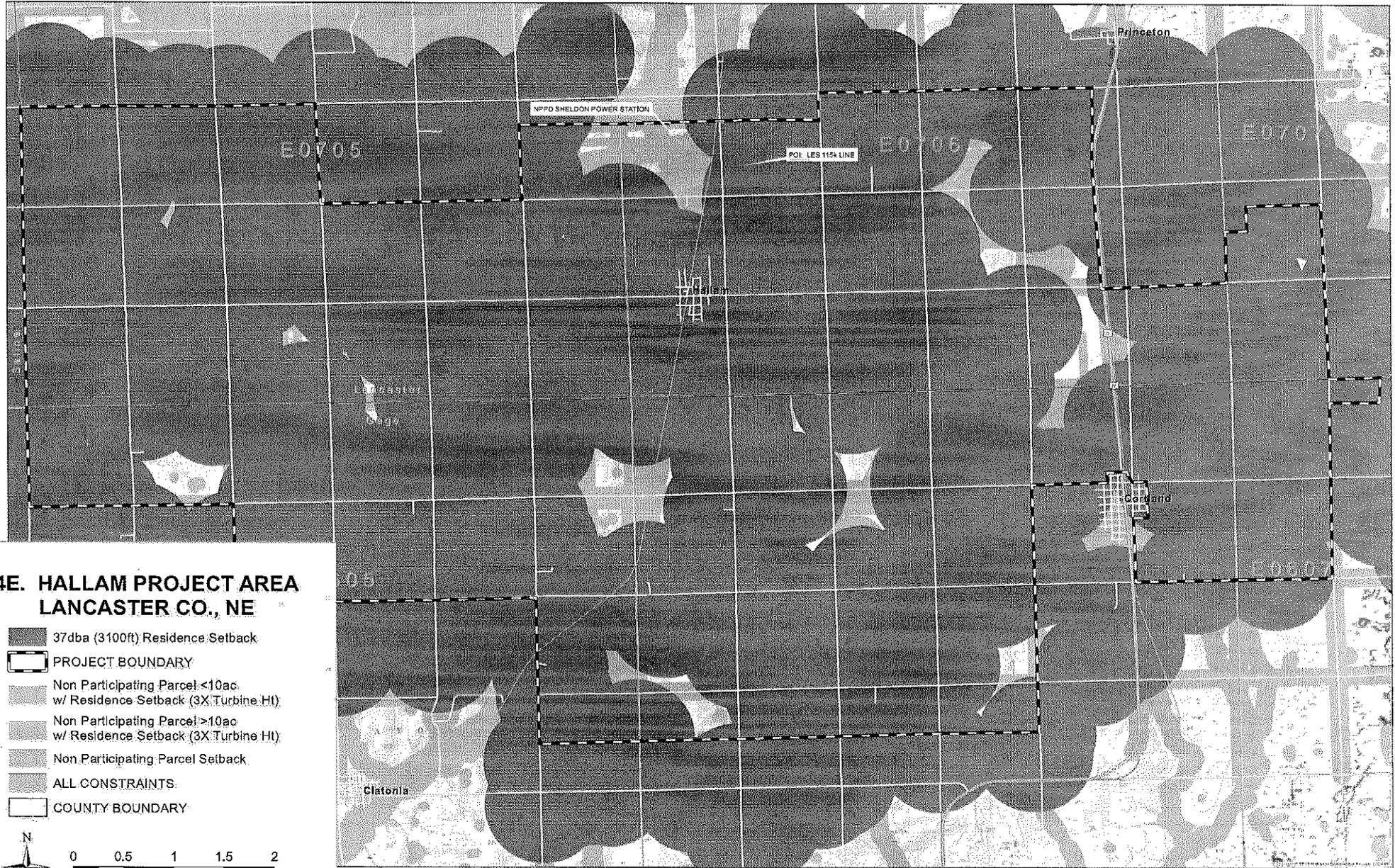




**4D. HALLAM PROJECT AREA
LANCASTER CO., NE**

-  40dba (2450ft) Residence Setback
-  PROJECT BOUNDARY
-  Non Participating Parcel <10ac
w/ Residence Setback (3X Turbine Ht)
-  Non Participating Parcel >10ac
w/ Residence Setback (3X Turbine Ht)
-  Non Participating Parcel Setback
-  ALL CONSTRAINTS
-  COUNTY BOUNDARY





**4E. HALLAM PROJECT AREA
LANCASTER CO., NE**

-  37dba (3100ft) Residence Setback
-  PROJECT BOUNDARY
-  Non Participating Parcel <10ac
w/ Residence Setback (3X Turbine Ht)
-  Non Participating Parcel >10ac
w/ Residence Setback (3X Turbine Ht)
-  Non Participating Parcel Setback
-  ALL CONSTRAINTS
-  COUNTY BOUNDARY



Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Tuesday, October 27, 2015 7:25 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Atth:Comm. Hudkins

Hard copy: Hudkins

From: AbelJohn96@aol.com [mailto:AbelJohn96@aol.com]
Sent: Monday, October 26, 2015 11:38 PM
To: Commish
Subject: Fwd: Atth:Comm. Hudkins

From: AbelJohn96@aol.com
To: AbelJohn96@aol.com
Sent: 10/26/2015 11:31:10 P.M. Central Daylight Time
Subj: Atth:Comm. Hudkins



Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Tuesday, October 27, 2015 7:26 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Wind amendments

Hard copy: Hudkins

-----Original Message-----

From: Schmid, Daniel [<mailto:Daniel.Schmid@united.com>]
Sent: Monday, October 26, 2015 10:01 PM
To: Commish
Subject: Wind amendments

Hi all - are you all planning on a final vote on Tues 27 Oct concerning the amendments for commercial wind energy regulation?

Thanks

Dan Schmid

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Tuesday, October 27, 2015 7:26 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Nebraska wind power

Hard copy: Hudkins

From: smith smith [<mailto:smith.printess@gmail.com>]
Sent: Monday, October 26, 2015 7:22 PM
To: Commish
Subject: Nebraska wind power

Dear Mr. Hudkins:

Please adopt zoning regulations that will promote wind power in Nebraska. The benefits will far outweigh any negative impacts.

Thank you,
Carrie Smith

402-742-3101
1721 Prospect Street
Lincoln, NE 68502

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Tuesday, October 27, 2015 7:27 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Wind

Hard copy: Hudkins

-----Original Message-----

From: andi sand [<mailto:andimcclenahan@yahoo.com>]
Sent: Monday, October 26, 2015 6:47 PM
To: Commish
Subject: Wind

Dear Commissioner Hudkins,

Thank you for all your work and countless hours of your time being taken on the industrial wind topic in Lancaster County. I urge you to lower the sound levels back to the health department recommendations of 40d during the day and 37d at night. Also, I believe it is very important to protect the rights of the landowner by starting the setbacks at the lot line and not at the dwelling. In my opinion, it does not seem right that a wind turbine just across the lot line of a property might prohibit the owner of the property from building a home on their own land in the future. Please protect us from the known and unknown health and sensory problems that are created by industrial wind turbines.

Thank you for considering this,
Andrea McClenahan Sand
7915 Preserve Lane
Lincoln, Ne 68516

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Tuesday, October 27, 2015 7:55 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Wind towers

Hard copy: Hudkins

From: watermyhealth [<mailto:watermyhealth@gmail.com>]
Sent: Tuesday, October 27, 2015 7:33 AM
To: Commish
Subject: Wind towers

Commissioners, Roma and Larry, I would very much hope you support us in southern Lancaster, northern Gage counties in lowering the sound back to what the health department recommended and measuring the distance from the property line. Thank you, Karen Meyer

Sent from my Sprint Samsung Galaxy S® 6.

Kelly S. Lundgren

From: Gwen K. Thorpe on behalf of Commish
Sent: Wednesday, October 28, 2015 7:52 AM
To: 'Todd Wiltgen'; Bill P. Avery; 'Deb Schorr'; Roma B. Amundson; Kerry P. Eagan; Gwen K. Thorpe
Cc: Kelly S. Lundgren; Steve S. Henrichsen; Scott E. Holmes
Subject: FW: Proposed Wind Turbines

Hard copy: Hudkins

From: Lienemann, Torri [<mailto:Torri.Lienemann@cune.edu>]
Sent: Tuesday, October 27, 2015 8:34 AM
To: Deb E. Schorr; Commish; Todd J. Wiltgen; Commish; Bill P. Avery
Subject: Proposed Wind Turbines

Lancaster County Commissioners,

I respectfully submit, for your review, some additional information for consideration. As noted in my testimony, our "ranch" will be host to the 2016 Cattlemen's Ball, and has been host to many foreign dignitaries based on our proximity to Lincoln, ability to share "our story," and the natural beauty of the landscape. We have been chosen repeatedly by the NE Department of Ag to represent Nebraska beef producers. The thought of having wind turbines towering over our property in all directions would undoubtedly destroy that opportunity. Here is a link to a [video](#) that featured our oldest daughter. This was a STEM video that was recently shown at the World Food Prize Conference in Iowa. This video was taken on our "ranch". Please watch and imagine wind turbines towering above her in all directions.

Additionally, I would like to make my plea for all persons with disabilities. The extra sensory stimuli the wind turbines would provide (i.e., light flicker, beacon, visual of turning blades, and constant hum) would trigger a whole host of issues. Sensory-perceptual abnormalities in people with disabilities are well documented in the research (Ben-Sasson, et. al., 2009). A range of abnormalities, including hyper- and hyposensitivity, sensory distortion and overload, and multichannel receptivity and processing difficulties, are predominant characteristics. Evidence from clinical studies suggests that unusual sensory responses are present in a majority of persons with sensory disabilities, such as Autism, Attention Deficit/Hyperactivity Disorder. Please consider the difficulties the extra stimulation the wind turbines would cause and the irreparable harm to these persons and the people who care for them. If you would like to visit about this, please feel free to contact me. 402-560-6824

Sincerely,
Torri Lienemann
26969 Homestead Expressway (US Highway 77)
Princeton, NE

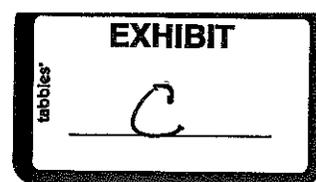
Torri Ortiz Lienemann, PhD

Director of Graduate Studies in Special Education & Early Childhood Special Education, and
Director of Education Partnerships for the College of Graduate Studies and Adult Education
Concordia University Nebraska

Office: 402-643-7295

Cell: 402-360-6624





MOTION TO AMEND #2 "B"

Amendment to Setback section to delete lot size differentiation and measure setback to all non-participating lots at the property line.

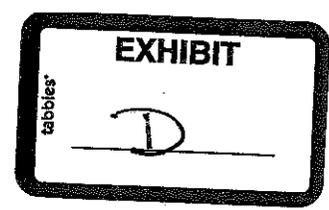
Amendment to the Lincoln/ Lancaster County Planning Commission Recommendation

13.018 Commercial Wind Energy Conversion System (CWECS).

Section (g) Setbacks to the turbine base:

- 1) For a non-participating lot of less than 10 acres, the setback shall be 1,000 feet or 3 2 times the turbine height (hub height plus the rotor radius) measured to the property line, or 3 1/2 times the turbine height, measured to the closest exterior wall of the dwelling unit, whichever is greater.
- 2) For a non-participating lot of 10 acres or greater, when there is a dwelling unit on the lot, the setback shall be 1,000 feet or 3 times the turbine height, whichever is greater, measured to the closest exterior wall of the dwelling unit.
- 2) For participating dwelling units, the setback shall be 1,000 feet 2 times the turbine height, measured to the closest exterior wall of the dwelling.
- 3) The setback to any public right-of-way or private roadway shall be no less than the turbine height.
- 4) Setbacks to the external boundary of the special permit area shall be no less than the turbine height, as stated above, except that the owner of the adjacent property may sign an agreement allowing that setback to be reduced to the rotor radius plus the setback of the zoning district.

Prepared by the Lancaster County Attorney, Lincoln/ Lancaster County Health Department and Lincoln/ Lancaster County Planning Department
October 26, 2015



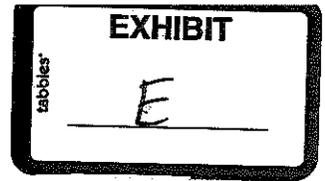
MOTION TO AMEND #1

Requested by Larry Hudkins

Amendment to the Lincoln/ Lancaster County Planning Commission Recommendation
13.018 Commercial Wind Energy Conversion System (CWECS).

Section (c) Each application shall have a decommissioning plan outlining the means, procedures and cost of removing the turbine(s) and all related supporting infrastructure and a bond or equivalent enforceable resource to guarantee removal and restoration upon discontinuance, decommissioning or abandonment. Each tower shall be removed within one year of decommissioning or revocation of the special permit. Upon removal of the tower, there shall be four five feet of soil between the average surrounding ground level and former tower's cement base.

Prepared by the Lincoln/ Lancaster County Planning Department
October 20, 2015



MOTION TO AMEND #3A

Amendment to revise the noise limit from 50 to 40 dBA day time and from 42 to 37 night time.

Amendment to the Lincoln/ Lancaster County Planning Commission Recommendation
13.018 Commercial Wind Energy Conversion System (CWECS).

Section (i) Noise: No CWECS or combination of CWECS turbine(s) shall be located as to cause an exceedance of the following as measured at the closest exterior wall of any dwelling located on the property. If a turbine violates a noise standard on a dwelling unit, constructed after the turbine is approved, then the turbine becomes a non-conforming use. For both participating and nonparticipating properties:

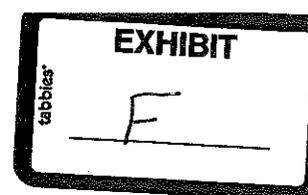
(1) From the hours of 7 am to 10 pm:

- o ~~Forty (40) Fifty (50)~~ dBA maximum 10 minute Leq or;
- o Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 15 hour period.

(2) From the hours of 10 pm to 7 am:

- o ~~Thirty-seven (37) Forty-two (42)~~ dBA maximum 10 minute Leq or;
- o Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 9 hour period.

Prepared by the Lancaster County Attorney, Lincoln/ Lancaster County Health Department and Lincoln/ Lancaster County Planning Department
October 21, 2015



MOTION TO AMEND #3B

Amendment to revise the noise limit from 50 to 40 dBA day time and from 42 to 37 night time AND to measure the noise at the property line, not the dwelling unit.

Amendment to the Lincoln/ Lancaster County Planning Commission Recommendation

13.018 Commercial Wind Energy Conversion System (CWECS).

Section (i) Noise: No CWECS or combination of CWECS turbine(s) shall be located as to cause an exceedance of the following as measured at the closest exterior wall of any dwelling located on the property. For both participating and property line for nonparticipating properties, and at the closest exterior wall of any participating dwelling:

(1) From the hours of 7 am to 10 pm:

- o Forty (40) Fifty (50) dBA maximum 10 minute Leq or;
- o Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 15 hour period.

(2) From the hours of 10 pm to 7 am:

- o Thirty-seven (37) Forty-two (42) dBA maximum 10 minute Leq or;
- o Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 9 hour period.

If a turbine violates a noise standard on a participating dwelling unit, constructed after the turbine is approved, then the turbine becomes a non-conforming use.

Prepared by the Lancaster County Attorney, Lincoln/ Lancaster County Health Department and Lincoln/ Lancaster County Planning Department
October 21, 2015



Kelly S. Lundgren

From: Steve S. Henrichsen
Sent: Tuesday, October 27, 2015 11:24 AM
To: David A. Derbin; Scott E. Holmes; Kelly S. Lundgren; Cori R. Beattie
Subject: Motion 2B as adopted by County Board
Attachments: TX15009 Wind Motion 2 B.docx; TX15009 Wind Motion 1.docx; TX15009 Wind Motion 3A.docx; TX15009 Wind Base Motion.docx

To All

Attached is the Motion 2B which was the first motion approved by the County Board today. It reflects the change I described orally at the meeting.

After the vote, I realized the sentence should end with "to the property line" as that was there intent. So I added the words "to the property line" as a clarification since the sentence references both the property line and dwelling unit.

Dave – if you have any further clarifications to propose let me know.

I have also included the Base Motion as proposed by the Planning Commission, and the other two amendments labeled 1 and 3A which they also adopted.

Steve

MOTION TO AMEND #2 "B"

Amendment to Setback section to delete lot size differentiation and measure setback to all non-participating lots at the property line.

Amendment to the Lincoln/ Lancaster County Planning Commission Recommendation
13.018 Commercial Wind Energy Conversion System (CWECS).

Section (g) Setbacks to the turbine base:

- 1) For a non-participating lot of less than 10 acres, the setback shall be 1,000 feet or 3-2 times the turbine height (hub height plus the rotor radius) measured to the property line, or 3 1/2 times the turbine height, measured to the closest exterior wall of the dwelling unit, whichever is greater, but at a minimum 1,000 feet to the property line.

- 2) For a non-participating lot of 10 acres or greater, when there is a dwelling unit on the lot, the setback shall be 1,000 feet or 3 times the turbine height, whichever is greater, measured to the closest exterior wall of the dwelling unit.

- 2) For participating dwelling units, the setback shall be 1,000 feet 2 times the turbine height, measured to the closest exterior wall of the dwelling.

- 3) The setback to any public right-of-way or private roadway shall be no less than the turbine height.

- 4) Setbacks to the external boundary of the special permit area shall be no less than the turbine height, as stated above, except that the owner of the adjacent property may sign an agreement allowing that setback to be reduced to the rotor radius plus the setback of the zoning district.

As adopted by County Board on October 27, 2015 with clarification proposed by Planning Department that intent was that "at a minimum 1,000 feet" was meant to be measured to the property line.

MOTION TO AMEND #1

Requested by Larry Hudkins

Amendment to the Lincoln/ Lancaster County Planning Commission Recommendation

13.018 Commercial Wind Energy Conversion System (CWECS).

Section (c) Each application shall have a decommissioning plan outlining the means, procedures and cost of removing the turbine(s) and all related supporting infrastructure and a bond or equivalent enforceable resource to guarantee removal and restoration upon discontinuance, decommissioning or abandonment. Each tower shall be removed within one year of decommissioning or revocation of the special permit. Upon removal of the tower, there shall be ~~four~~ five feet of soil between the average surrounding ground level and former tower's cement base.

Prepared by the Lincoln/ Lancaster County Planning Department
October 20, 2015

MOTION TO AMEND #3A

Amendment to revise the noise limit from 50 to 40 dBA day time and from 42 to 37 night time.

Amendment to the Lincoln/ Lancaster County Planning Commission Recommendation

13.018 Commercial Wind Energy Conversion System (CWECS).

Section (i) Noise: No CWECS or combination of CWECS turbine(s) shall be located as to cause an exceedance of the following as measured at the closest exterior wall of any dwelling located on the property. If a turbine violates a noise standard on a dwelling unit, constructed after the turbine is approved, then the turbine becomes a non-conforming use. For both participating and nonparticipating properties:

(1) From the hours of 7 am to 10 pm:

- o Forty (40) ~~Fifty (50)~~ dBA maximum 10 minute Leq or;
- o Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 15 hour period.

(2) From the hours of 10 pm to 7 am:

- o Thirty-seven (37) ~~Forty-two (42)~~ dBA maximum 10 minute Leq or;
- o Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 9 hour period.

Prepared by the Lancaster County Attorney, Lincoln/ Lancaster County Health Department and Lincoln/ Lancaster County Planning Department
October 21, 2015

BASE MOTION

Adoption of Lincoln/ Lancaster County Planning Commission Recommendation

13.018 Commercial Wind Energy Conversion System (CWECS).

A Commercial Wind Energy Conversion System (CWECS) may be allowed in the AG District by special permit under the conditions listed below:

(a) In cases where CWECS wind turbines are part of a unified plan, parcels which are separated from one another only by the presence of public right-of-way may be combined into one special permit application. When a special permit covers multiple premises, the lease or easement holder may sign the application rather than the lot owner.

~~(a) Each CWECS machine shall be no less than 1,000 feet from any property line of a dwelling unit not associated with the project.~~

~~(b) The distance from all external boundary lot lines and/or right-of-way lines of the special permit to any tower support base of the CWECS shall be equal to the height of the tower plus the rotor radius.~~

~~(c) Each CWECS machine, including all equipment, shall have a sound emission rating of no more than 35 dBA. Noise levels caused from the CWECS turbine(s) shall not exceed 35 dBA at the property line of any dwellings within a one mile radius of a CWECS turbine. A noise study, incorporating both A and C weighted noise impacts on property within one mile may be required. Noise rating shall conform to International Electrotechnical Commission (IEC) standards unless otherwise directed by a government agency.~~

~~(d) (b) Turbines shall meet all FAA requirements, including but not limited to lighting and radar interference issues. Strobe lighting shall be avoided if alternative lighting is allowed. Color and finish shall be white, gray or another non-obtrusive, non-reflective finish. There shall be no advertising, logo, or other symbols painted on the turbine other than those required by the FAA or other governing body. Each turbine shall have onsite a name plate which is clearly legible from the public right-of-way and contains contact information of the operator of the wind facility.~~

~~(e) All applicable electrical, building, utility tie-in codes and other government regulations shall apply.~~

~~(f) The distance from any tower base of a CWECS to any tower support base of another CWECS under other ownership shall be spaced a minimum of five (5) rotor diameters distance figured by the size of the largest rotor.~~

~~(g) (c) Each application shall have a decommissioning plan outlining the means, procedures and cost of removing the turbine(s) and all related supporting infrastructure and a bond or equivalent enforceable resource to guarantee removal and restoration upon discontinuance, decommissioning or abandonment. Each tower shall be removed within one year of decommissioning or revocation of the special permit. Upon removal of the tower, there shall be four feet of soil between the ground level and former tower's cement base.~~

~~(h) Said CWECS shall meet all Federal, State and local rules and regulations.~~

(d) Any proposed turbine which is within half mile of any non-participating dwelling shall provide shadow flicker modeling data showing the expected effect of shadow flicker on non-participating properties. Shadow flicker shall not fall upon any non-participating dwelling, or other building which is occupied by humans, for more than 30 minutes in any one day, nor a total of 30 hours per any calendar year. If shadow flicker exceeds these limits, measures shall be taken to reduce the effects of shadow flicker on buildings, which may include shutting the turbine down during periods of shadow flicker. If a turbine violates this standard on a non-participating dwelling unit, constructed after the turbine is approved, then the turbine becomes a non-conforming use.

(e) Construction and operation shall not adversely impact identified State or Federal threatened or endangered species such as saline wetlands, or rare natural resources such as native prairie and grasslands.

(f) No turbine shall obstruct or impair an identified view corridor or scenic vista of public value, as mapped on the Capitol View Corridors map in the Lincoln/ Lancaster County Comprehensive Plan. The views from prominent environmental areas, such as Nine Mile Prairie and Spring Creek Prairie, shall also be protected from adverse visual or noise impacts. Any application which, upon initial review, poses a possible impact to these views will be required to be relocated or provide view shed mapping, and visual simulations from key observation points for review.

(g) Setbacks to the turbine base:

- 1) For a non-participating lot of less than 10 acres, the setback shall be 1,000 feet or 3 times the turbine height (hub height plus the rotor radius), whichever is greater, measured to the property line.
- 2) For a non-participating lot of 10 acres or greater, when there is a dwelling unit on the lot, the setback shall be 1,000 feet or 3 times the turbine height, whichever is greater, measured to the closest exterior wall of the dwelling unit.
- 3) For participating dwelling units, the setback shall be 1,000 feet to the closest exterior wall of the dwelling.
- 4) The setback to any public right-of-way or private roadway shall be no less than the turbine height.
- 5) Setbacks to the external boundary of the special permit area shall be no less than the turbine height, except that the owner of the adjacent property may sign an agreement allowing that setback to be reduced to the rotor radius plus the setback of the zoning district.

(h) ~~Any single~~ The turbine(s) shall not impact a non-participating lot, (vacant or occupied; of any size), to the extent that, because of the location of turbine(s), the lot owner is left with less than 3 acres of land outside of the CWECS setbacks and ~~or~~ the noise impact area in Section (i) below, unless they are part of an agreement with the CWECS owner/operator.

(i) Noise: No CWECS or combination of CWECS turbine(s) shall be located as to cause an exceedance of the following as measured at the closest exterior wall of any dwelling located on the property. If a turbine violates a noise standard on a dwelling unit, constructed after the turbine is approved, then the turbine becomes a non-conforming use. For both participating and nonparticipating properties:

(1) From the hours of 7 am to 10 pm:

- o ~~Forty (40)~~ Fifty (50) dBA maximum 10 minute Leq or;
- o Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 15 hour period.

(2) From the hours of 10 pm to 7 am:

- o ~~Thirty-seven (37)~~ Forty-two (42) dBA maximum 10 minute Leq or;
- o Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 9 hour period.

(j) A professional pre-construction noise study shall be conducted which includes all property with a dwelling within one mile of a tower support base. The protocol and methodology for such studies shall be submitted to the Lincoln-Lancaster County Health Department for review and approval. Such studies shall include noise modeling for all four seasons and include typical and worst case scenarios for noise propagation. The complete results and full study report shall be submitted to the Lincoln-Lancaster County Health Department for review.

(k) Prior to the commencement of construction of any turbine, pre-construction noise monitoring may be conducted to determine ambient sound levels in accordance with procedures acceptable to the Lincoln-Lancaster County Health Department.

(l) Prior to the commencement of construction of any turbine, the applicant shall enter into an agreement with the County Engineer regarding use of County roads during construction.

(m) At the discretion of the County Board, post-construction noise level measurements may be required to be performed in accordance with procedures acceptable to the Lincoln-Lancaster County Health Department.

(n) All noise complaints regarding the operation of any CWECS shall be referred to the County Board. The County Board shall determine if noise monitoring shall be required to determine whether a violation has occurred.

MINUTES
LANCASTER COUNTY BOARD OF EQUALIZATION
COUNTY-CITY BUILDING, ROOM 112
TUESDAY, OCTOBER 27, 2015
IMMEDIATELY FOLLOWING THE LANCASTER COUNTY
BOARD OF COMMISSIONERS MEETING

Advance public notice of the Board of Equalization meeting was posted on the County-City Building bulletin board and the Lancaster County, Nebraska, web site and emailed to the media on October 23, 2015.

Commissioners present: Roma Amundson, Chair; Larry Hudkins, Vice Chair; Bill Avery, Deb Schorr and Todd Wiltgen

Others present: Scott Gaines, County Assessor/Register of Deeds Office; Gwen Thorpe, Deputy Chief Administrative Officer; David Derbin, Deputy County Attorney; Cori Beattie, Deputy County Clerk; and Kelly Lundgren, County Clerk's Office

The Chair called the meeting to order at 10:55 a.m., and the location of the Nebraska Open Meetings Act was announced.

1) **MINUTES: Approval of the minutes of the Board of Equalization meeting held on Tuesday, October 20, 2015.**

MOTION: Wiltgen moved and Hudkins seconded approval of the minutes. Avery, Schorr, Hudkins, Wiltgen and Amundson voted aye. Motion carried 5-0.

2) **ADDITIONS AND DEDUCTIONS TO THE TAX ASSESSMENT ROLLS: (See attached additions and deductions)**

MOTION: Schorr moved and Hudkins seconded approval of the additions and deductions. Hudkins, Wiltgen, Schorr, Avery and Amundson voted aye. Motion carried 5-0.

3) **PUBLIC HEARING:**

A. **Motor Vehicle Tax Exemption Applications**

**House of Prayer Christian Church
Lincoln Medical Education Partnership
Northern Lighthouse**

The Chair opened the public hearing.

No one appeared to testify in support, opposition or in a neutral position.

The Chair closed the public hearing.

PUBLIC HEARING CONTINUED:

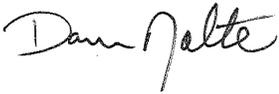
MOTION: Wiltgen moved and Hudkins seconded approval of the exemptions. Schorr, Avery, Wiltgen, Hudkins and Amundson voted aye. Motion carried 5-0.

4) **PUBLIC COMMENT:** Those wishing to speak on items relating to County Board of Equalization business not on the agenda may do so at this time.

No one appeared for public comment.

5) **ADJOURNMENT**

MOTION: Wiltgen moved and Avery seconded to adjourn the Lancaster County Board of Equalization meeting at 11:00 a.m. Avery, Hudkins, Schorr, Wiltgen and Amundson voted aye. Motion carried 5-0.



Dan Nolte, County Clerk

