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Ms. Betty McCauly  
Administration/Docketing  
Ohio Power Siting Board  
180 East Broad Street, 11<sup>th</sup> Floor  
Columbus, Ohio 43215-3793

PUCO

Re: **Blue Creek Wind Farm, LLC**  
**Case No. 11-1995-BGA**

Dear Ms. McCauly:

Enclosed, please find an original and the requisite copies of the Application of Blue Creek Wind Farm, LLC, a limited liability company, for an Amendment to its Certificate of Environmental Compatibility and Public Need under Chapter 4906-17 of the Ohio Administrative Code ("OAC"). Pursuant to OAC 4906-5-03(A)(3), the applicant makes the following declarations:

<b>Name of Applicant:</b>	Blue Creek Wind Farm, LLC whose sole member and manager is Iberdrola Renewables, Inc. 110 N Brockway Street, Suite 340, Palatine, IL 60067
<b>Name/Location of Proposed Facility:</b>	Blue Creek Wind Farm Hoaglin, Tully and Union Townships and Benton, Blue Creek and Latty Townships Van Wert and Paulding Counties, Ohio
<b>Authorized Representative Technical:</b>	Dan Litchfield Iberdrola Renewables, Inc. 110 N Brockway Street, Suite 340, Palatine, IL 60067 Telephone: (847) 241-1364 Facsimile: (847) 241-1367 E-mail: <u><a href="mailto:dlitchfield@iberdrolaren.com">dlitchfield@iberdrolaren.com</a></u>

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Ms. Betty McCauly  
April 12, 2011  
Page 2 of 2


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**Notarized Statement:**

See Attached Affidavit of Rany Raviv,  
Iberdrola Renewables, Inc. on behalf of  
Blue Creek Wind Farm, LLC

Sincerely on behalf of  
Blue Creek Wind Farm, LLC

  
Sally W. Bloomfield

Enclosure



**IBERDROLA  
RENEWABLES**

**Application of Blue Creek Wind Farm, LLC to the Ohio Power Siting  
for a Certificate of Environmental Compatibility and Public Need**



# **Application Amendment Appendices**

**CASE No. 11-1995-EL-BGA**

**April 12, 2011**



**BEFORE  
THE OHIO POWER SITING BOARD**

In the Matter of the Application of **BLUE CREEK**     )  
**WIND FARM, LLC** for an Amendment to its     )  
Certificate to Install a Wind-Powered Electric     ) Case No. 11-1995-EL-BGA  
Generation Facility in the Counties of Van Wert and     )  
Paulding, Ohio.     )

**AFFIDAVIT OF RANY RAVIV, IBERDROLA RENEWABLES, INC.  
ON BEHALF OF BLUE CREEK WIND, LLC**

STATE OF OREGON                                 :  
  : SS.  
COUNTY OF MULTNOMAH                         :


I, Rany Raviv, being duly sworn and cautioned, state that I am over 18 years of age and competent to testify to the matters stated in this affidavit and further state the following based upon my personal knowledge:

1. I am executing this affidavit on behalf of Blue Creek Wind Farm, LLC as I am so authorized by Iberdrola Renewables, Inc, the sole member and manager of Blue Creek Wind Farm, LLC.

2. I have reviewed Blue Creek Wind Farm, LLC's Amendment to its Certificate of Environmental Compatibility and Public Need for the Blue Creek Wind Farm project.

3. To the best of my knowledge, information and belief, the information and materials contained in the above-referenced Amendment are true and accurate.

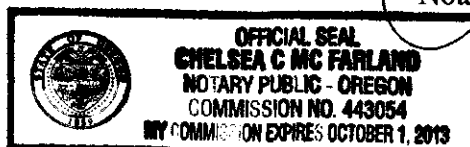
4. To the best of my knowledge, information and belief, the above-referenced Amendment is complete.

  
\_\_\_\_\_  
Rany Raviv

Sworn to before and signed in my presence this 6<sup>th</sup> day of April 2011.

  
\_\_\_\_\_  
Notary Public

[SEAL]



**BEFORE THE OHIO POWER SITING BOARD**  
**Application of a Certificate of Environmental Compatibility and Public Need**  
**Blue Creek Wind Farm Amendment**

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- 2-2 *Blue Creek Wind Farm Project Schedule*
  
- 3-1 *Blue Creek Wind Farm Area Project Location Map*
- 3-2 *Blue Creek Wind Farm Project Schedule*
  
- 4-1 *Blue Creek Wind Farm Area Constraint Map*
  
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- 5-3 *Blue Creek Wind Farm Area Site Map*
- 5-4 *Blue Creek Wind Farm Area Glacial Drift Thickness*
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- 8-1 Estimated Construction Noise Levels (provided but no change)
- 8-2 *Blue Creek Wind Farm Area Sound Sensitive Resources*
- 8-3 *Blue Creek Wind Farm Area Ecological Map*
- 8-4 *Blue Creek Wind Farm Area Land Use Map*
- 8-5 *Blue Creek Wind Farm Area Cultural Resources Map Site Map*
- 8-6 *Blue Creek Wind Farm Agricultural District Properties*

## LIST OF TABLES

*Tables containing updated information for the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 are identified in bold italics. Other tables have not changed and are therefore not included in this application amendment.*

- 3-1 Wind Turbines under Consideration for the Facility
- 3-2 ***Anticipated Land Requirements for Construction and Operation of the Blue Creek Wind Farm***
- 5-1 Summary of Geotechnical Parameters for Foundation Design
- 5-2 Geologic and Geotechnical Hazards Summary
- 5-3 Relevant Water Quality Data for the Project Area
- 6-1 Cost Comparisons for Other IRI Projects
- 7-1 Ambient Air Monitoring Data near Van Wert and Paulding Counties
- 7-2 ***Emission Limits Required by General Permit 4.2 for Central Ready Mix Concrete Batch Plants (Applicant's General Contractor to purchase concrete and emissions table longer applicable)***
- 7-3 Emission Limits Required by General Permit 5.1 for Unpaved Roadways
- 7-4 Air Emissions Potentially Avoided by Operation of the Facility (assuming Ohio existing generation fleet)
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- 8-5 *Summary of Predicted Facility Noise Levels (Table A-4 in Appendix T replaces Table 8-5)*
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## LIST OF APPENDICES

*Appendices containing updated information for the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 are identified in bold italics. Other appendices have not changed and are therefore not included in this application amendment.*

- A Typical O&M Building
- B Typical Drawing of Wind Turbine and Tower
- C Product Data Sheet - General Cable PC 189469
- D Typical Drawing of Support Structures
- E General Design Information for the Met Tower Foundation
- F Photo of a Typical SODAR Unit
- G Motion for Waiver
- H IRI Avian and Bat Protection Plan
- I Federal Aviation Administration Studies***
- J Visual Impact Assessment Report
- K Shadow Flicker Analysis Report***
- L Geotechnical Investigation Report***
- M Stormwater Pollution Prevention Plan***
- N Typical Drawing of Batch Plant (no longer applicable to project)
- O Typical Drawing of Substation
- P Typical Drawing of Turbine Tower Foundation
- Q Brochure of G-90 Turbine
- R Interconnect Feasibility Study
- S System Impact Study
- T Noise Analysis Report***
- U Plant Species List***
- V Wetland/Waterbody Delineation Report***
- W Agency Correspondence***
- X Interim Bat Acoustic Monitoring Report
- Y Raptor Nest Survey Report
- Z Archaeology and Architecture Reports***



- AA Blue Creek Fact Sheet
- BB Comsearch Studies and Communications with NTIA
- CC *Area Transportation Study Maps*
- DD *Revised Layout Drawings*

## **GLOSSARY**

*The contents of the glossary have not changed and are therefore not included in this amendment.*

**(A) PROJECT SUMMARY AND OVERVIEW OF THE PROPOSED PROJECT**

No text changes have occurred in this section of the Blue Creek Application approved by the Ohio Power Siting Board (OPSB) for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following [Application, 2-1]:

- On November 18, 2010, OPSB entered a journal entry transferring the Certificate from Heartland Wind, LLC to Blue Creek Wind Farm, LLC (Blue Creek).
- The Applicant has identified specific locations for eight additional turbines and other related Facility components within this Amendment. The Facility will have up to 175 turbines for a maximum potential output of 350 MW.
- The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant will not be constructing a temporary concrete batch plant for producing concrete required during construction.
- The Facility will have two intra-project collection substations. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified three intra-project collection substations.

**(1) General Purpose of the Facility**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(2) Facility Description**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following [Application, 2-3]:

- There are over 200 participating landowners representing approximately 24,900 acres of leased land. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 140 participating landowners, representing approximately 17,000 acres of leased land.
- The distance between the eight turbines included in this Amendment ranges from 979 feet to 4,637 feet. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 892 to 3,617 feet. [Application 2-4]

**(3) Site Selection Process**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010

**(a) High Quality Wind Resource**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Suitable Transmission**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- The Facility would include 97.7 miles of underground collection lines and 7.8 miles of aboveground collection lines (rated at 34.5 kV), that would tie into one smaller collector substation. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 103.2 and 5.4 miles respectively. [Application, 2-4 to 2-5]
- Approximately 1.8 miles of 115 kV aboveground collection lines would connect the one Project collection substation to the 345 kV Interconnection Substation. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 7.0 miles connecting to two collector substations. [Application, 2-5]

**(c) Available Land and Land Use Constraints**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(d) Ecological and Environmental Impacts**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following at the end of the section [Application, 8-27]:

- Site visits to the Project area to characterize habitats and identify wetlands and waterbodies were performed during September and October 2009, March 2010 and March 2011. Figure 8-3, the ecological map for the Project area, has been updated to show the eight new turbines in a revised layout.

**(e) Community Support**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(f) Site Accessibility**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(4) Principal Environmental and Socioeconomic Considerations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(a) Ecological**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- The Applicant performed additional wetland delineations for eight additional turbines and support components in March 2011. A Revised Wetland Delineation Report will be submitted to the OPSB upon completion of the investigation and coordination with United States Army Corps of Engineers (USACE) and Ohio Environmental Protection Agency (OEPA). It is the intent of the Applicant to keep total wetland impacts per location to less than 0.1 acre, so the under the USACE Nationwide permit program the Facility can be authorized without a mitigation requirement.

**(b) Land Use and Community Development**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(c) Socioeconomic**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(d) Cultural Resources**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

The Applicant has performed additional archaeological investigations for eight turbines and support components in March 2011. No archeological artifacts were

recovered during the survey. Therefore, no historic properties, as defined in 36 CFR 800.16(l), will be impacted by the proposed project in the Amendment areas. A revised survey report will be submitted to the OPSB upon completion of the investigation and coordination with the Ohio Historic Preservation Office (OHPO). The eight new turbines are situated within the previously studied project boundary. They will not require any additional architectural surveys.

**(e) Noise**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- Potential noise from the Facility was evaluated for 160 Gamesa G90 2.0 MW wind turbines on 328-foot (100-meter) tall towers and associated substations. The expected operational project noise levels at residences within the Project area are anticipated to range between less than 30 decibels (A-weighted scale) (dBA) to 50 dBA. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 167 turbines and 30 dBA to 50 dBA. Appendix T provides the results of the additional noise assessment.

**(f) Visual Impact**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- A revised shadow flicker analysis was performed in March 2011 for 160 turbines including the eight additional turbines (assuming G-90 wind turbines on 328-foot [100 meter] tall towers) to evaluate the extent of potential shadow flicker experienced at each residence and nearby transportation corridor in the Project area. The revised shadow flicker analysis resulted in predicted shadow flicker effects over 30 hours per year at 11 residences in the



Project area. The Applicant plans to work with landowners to use a number of mitigation measures to reduce projected shadow flicker impacts to these affected residences. [Replaces first paragraph, Application, 2-12 to 2-13]

**(5) Project Schedule**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following: [Replaces last four sentences, Application, 2-13]

- OPSB issued a certificate for the Blue Creek Wind Farm on August 23, 2010.
- The Applicant will build the Facility, including the eight turbines covered by this Amendment, in one Phase rather than in two Phases as indicated in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. The Applicant will place the Facility in service beginning in December 2011, with full operation of the Facility by March 2012. Figure 2-2 shows the anticipated Facility schedule [Replaces Figure 2-2]



- Legend**
- County Boundary
  - City Boundary
  - Township Boundary
  - Highway
  - Interstate
  - Airport
  - End of 540 M Transmission Line
  - End of 135 M Transmission Line
  - Existing Roadway



**FIGURE A02-1**  
**Blue Creek Mine Farm Area**  
**Project Location Map**  
Panel 1 of 1  
Created: March 21, 2011

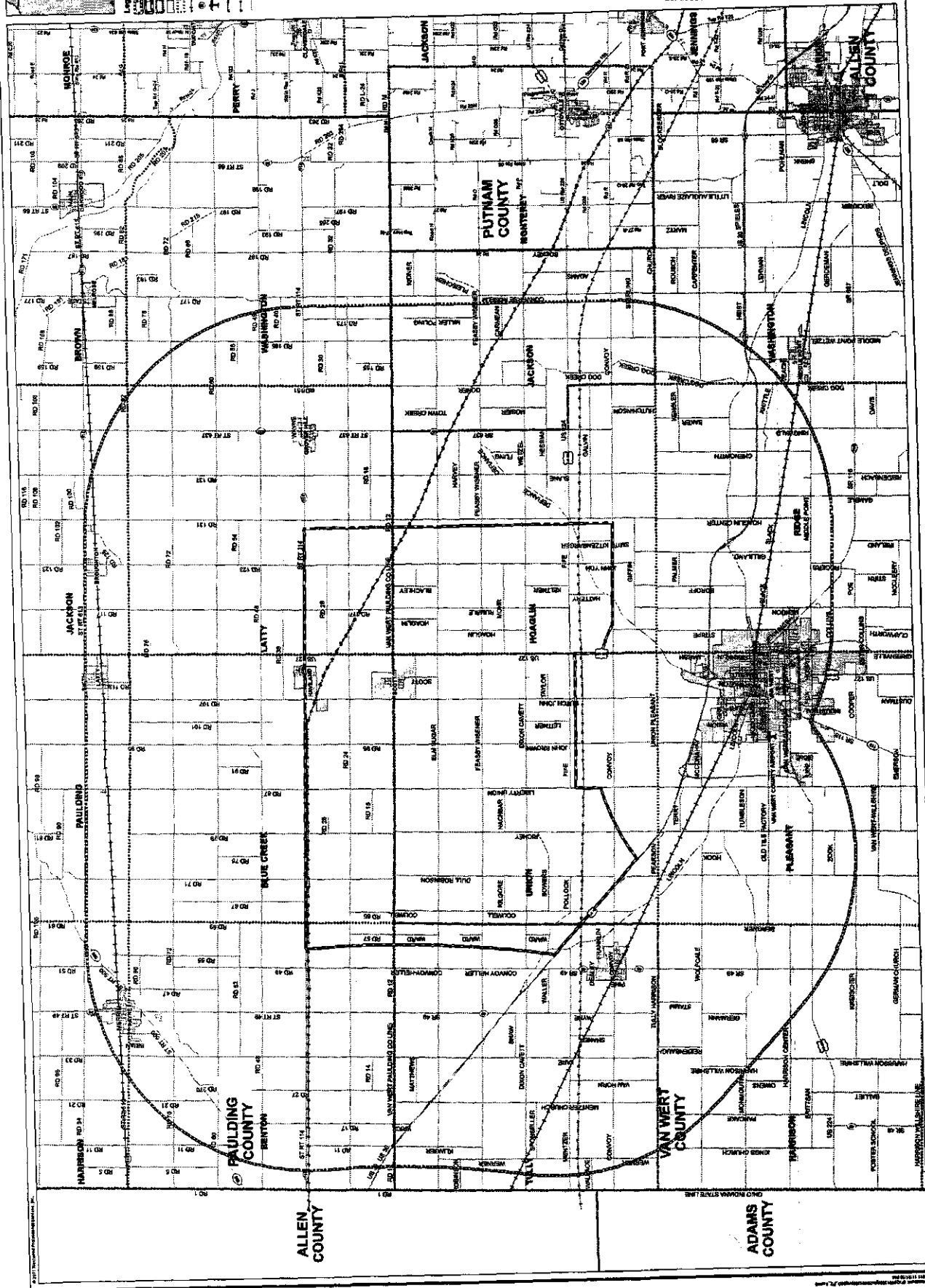
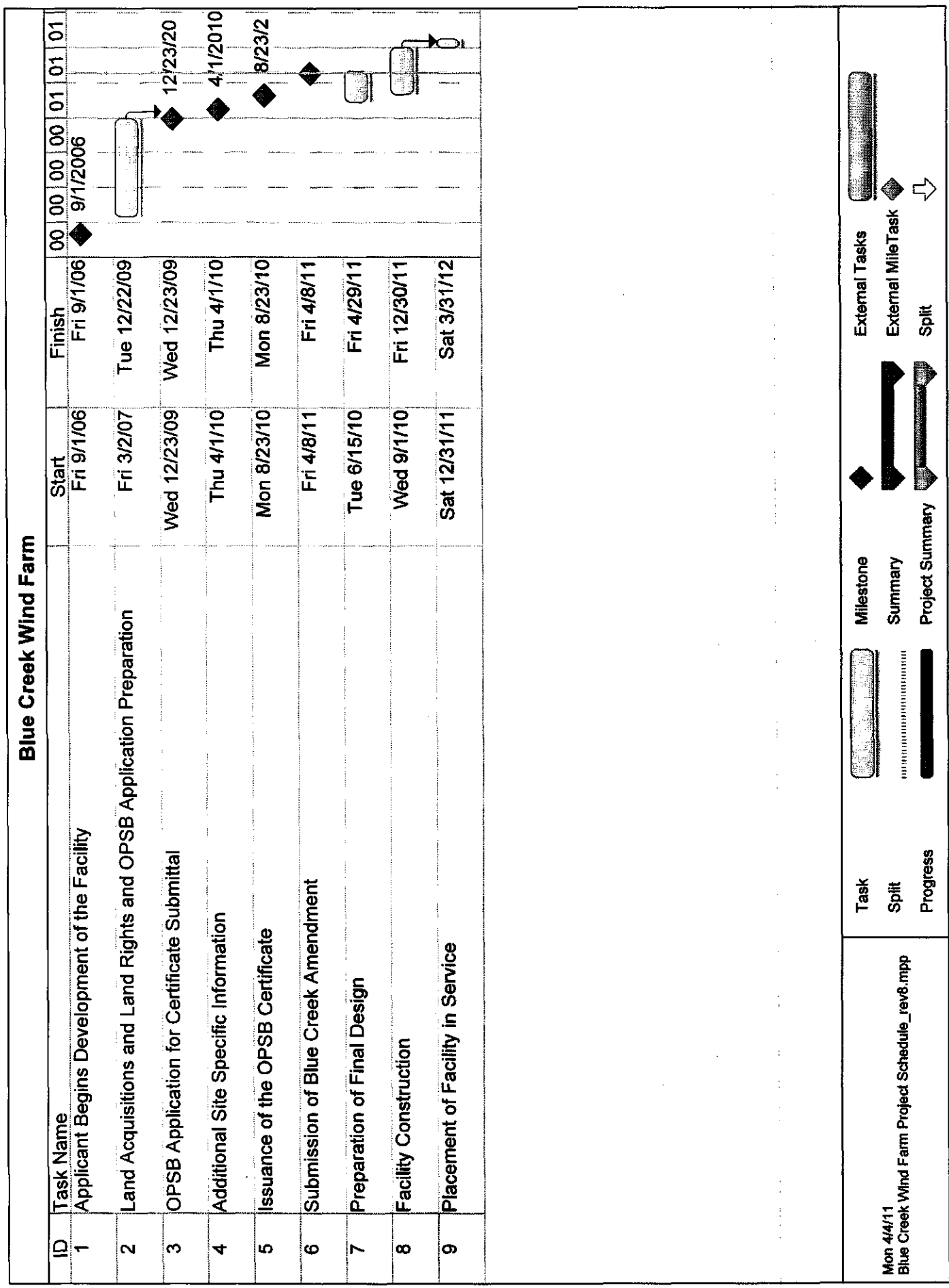


FIGURE A02-2 [NEW: REPLACES MARCH 31, 2010 SUPPLEMENT FIGURE 2-2]  
Blue Creek Project Schedule



**(A) PROPOSED FACILITY DESCRIPTION****(1) Project Description****(a) Types of Turbines**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Land Area Requirements**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following that should replace the narrative in the December 21, 2009 OPSB Application [Application, 3-2]:

- The Applicant has identified specific locations for eight additional turbines and other related Facility components within this Amendment. The Facility will have up to 175 turbines for a maximum potential output of 350 MW.
- As depicted in Table A3-2, the total construction impact area (including turbine construction area, access roads, collection lines, substations, temporary staging and construction laydown areas, O&M building, permanent met towers, and a SODAR facility) would be 1,484.2 acres. The permanent impact of the Facility would be significantly less (approximately 166.3 acres). The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 1,264.4 acres and 233.0 acres respectively.

**TABLE A3-2 [REPLACES TABLE 3.2, APPLICATION, 3-3]**  
 Anticipated Land Requirements for Construction and Operation of the Blue Creek Wind Farm

Facility Component	Assumptions	Original 152 Turbines		Additional 8 Turbines		Total 160 Turbines	
		Temporary <sup>4</sup>	Permanent	Temporary	Permanent	Temporary <sup>4</sup>	Permanent
Wind Turbines	175-foot radius for construction limits and 34-foot diameter permanent gravel pad for each turbine (8-foot ring around foundation turbine)	335.7 acres	3.2 acres	17.7 acres	0.2 acres	353.4 acres	3.4 acres
Access Roads	100-foot wide construction limits <sup>1</sup> ; 16-foot wide permanent roadway, 10-foot compacted shoulders during construction on each side for a total wide of approximately 36 feet	40.2 miles		2.7 miles		42.9 miles	
		486.0 acres	78.8 acres	33.2 acres	5.2 acres	519.2 acres	84.0 acres
Crane Path	50-foot wide construction corridor <sup>2</sup> ; No permanent impacts	507.8 acres	Zero	9.5 acres	Zero	517.3 acres	Zero
Underground Collection Lines (34.5 kV)	Temporary impacts for collector lines: 1 collector = 20 feet, 2 collectors = 30 feet, 3 collectors = 40 feet No impact for permanent disturbance	94.2 miles		3.5 miles		97.7 miles	
		228.0 acres	Zero	6.2 acres	Zero	234.2 acres	Zero
Aboveground Collection Lines (34.5 kV)	50-foot wide construction corridor; 50-foot wide permanent clearing corridor	47.5 acres	47.5 acres	—	—	47.5 acres	47.5 acres
Aboveground Collection Lines (115 kV)		10.6 acres	10.6 acres	—	—	10.6 acres	10.6 acres
Interconnection Substation	610-foot x 345-foot area for the interconnection pad	5.0 acres	5.0 acres	—	—	5.0 acres	5.0 acres
Collection Substation	610-foot x 575-foot area for the collector pad and perimeter grading	8.0 acres	8.0 acres	—	—	8.0 acres	8.0 acres
Operations and Maintenance Building	Approximately 610-foot x 380-foot area for building, lay down and septic system and associated grading area	5.3 acres	5.3 acres	—	—	5.3 acres	5.3 acres
Collection Substation (Taylor Road)	330-foot x 330-foot area for the substation pad and perimeter grading	2.5 acres	2.5 acres	—	—	2.5 acres	2.5 acres

**TABLE A3-2 [REPLACES TABLE 3.2, APPLICATION, 3-3]**  
 Anticipated Land Requirements for Construction and Operation of the Blue Creek Wind Farm

Facility Component	Assumptions	Original 152 Turbines		Additional 8 Turbines		Total 160 Turbines	
		Temporary <sup>4</sup>	Permanent	Temporary	Permanent	Temporary <sup>4</sup>	Permanent
Staging and Construction Laydown Area	2.0 acres west of Richey Road, 20.0 acres east of Richey Road	22.0 acres	Zero	---	---	22.0 acres	Zero
Two Permanent Meteorological Towers	320-foot x 320-foot construction limits: 16-foot diameter permanent pad	4.7 acres	0.0 acres <sup>3</sup>	---	---	4.7 acres	0.0 acres <sup>3</sup>
Total Facility Impact		1417.6 acres <sup>4</sup>	160.9 acres	66.6 acres	5.4 acres	1484.2 acres <sup>4</sup>	166.3 acres

1 Access road construction corridor varies in width in certain areas to protect wetlands/waterbodies

2 Corridor varies in width in certain locations, for crane breakdowns, OH power crossings and in other instances to accommodate efficient construction practices

3 Actual impact value for the permanent met tower is 0.01 acres, however for consistency in rounding the impact is illustrated as 0.0 acres

4 The Temporary Total Facility Impact is not based on the sum of the temporary disturbance column. This is due to the design efficiencies associated with the project; for example, where collection lines and crane paths are within the same construction corridor or within the access road corridor. The Facility Total Impact has been calculated as the overall construction limits for the entire site, considering these efficiencies.

**(i) Access Roads**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following [Application, 3-4]:

- The facility would utilize 42.9 miles of access roads. The access road and adjacent cleared areas would be approximately 36 feet wide during construction of the Facility. The post-construction access road width would be up to 20 feet wide (including the 16-foot wide access road and 4-foot wide area for stormwater drainage). The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, identified 41.5 miles.

**(ii) Temporary Staging and Construction Laydown Area**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(iii) Operation and Maintenance Building**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(iv) Temporary Concrete Batch Plant**

No text changes from the December 21, 2009 Blue Creek OPSB Application text have occurred in this section, except for the following would be added [Application, 3-6]:

- The Applicant's General Contractor will purchase all concrete from a local supplier and does not intend on constructing an onsite temporary concrete batch plant. In the March 31, 2010 Supplement, the Applicant was considering constructing a temporary batch plant at one of two locations.

**(2) Description of Equipment**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(a) Wind Energy Turbines**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Description of New Transmission Lines**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following [Application, 3-7]:

- The Facility would include 97.7 miles of underground collection lines and 7.8 miles of aboveground collection lines (rated at 34.5 kV) that would tie into two smaller collector substations. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 103.2 and 5.4 miles, respectively.



- Approximately 1.8 miles of 115 kV aboveground collection lines would connect one collector substation to the 345 kV Interconnection Substation. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 7.0 miles connecting to two collector substations.

**(4) Description of New Substations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following to be added at the end of this section [Application, 3-9]:

- The Applicant has been able to reduce the number of collector substations (from two collector substations to one collector substation) required through electrical system layout efficiencies. The proposed voltage transmission process will require only one collector substation that connects to the Project collection substation. In turn, the Project collection substation connects to the interconnection substation.

**(5) Description of Met Tower [Renumbered, [Application, 3-9]**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(6) Description of SODAR [Renumbered [Application, 3-9]:**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(B) DETAILED PROJECT SCHEDULE****(1) Project Schedule**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following that would replace the last five sentences [Application, 3-10]:

- OPSB issued a certificate for the Blue Creek Wind Farm on August 23, 2010.
- The Applicant will build the Facility, including the eight turbines covered by this Amendment, in one phase. The Facility will no longer be built in two phases as previously indicated in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. The Applicant will place the facility in service beginning in December 2011 with full operation of the Facility by March 2012. Figure 3-2 shows the anticipated Facility schedule.

**(2) Delays**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

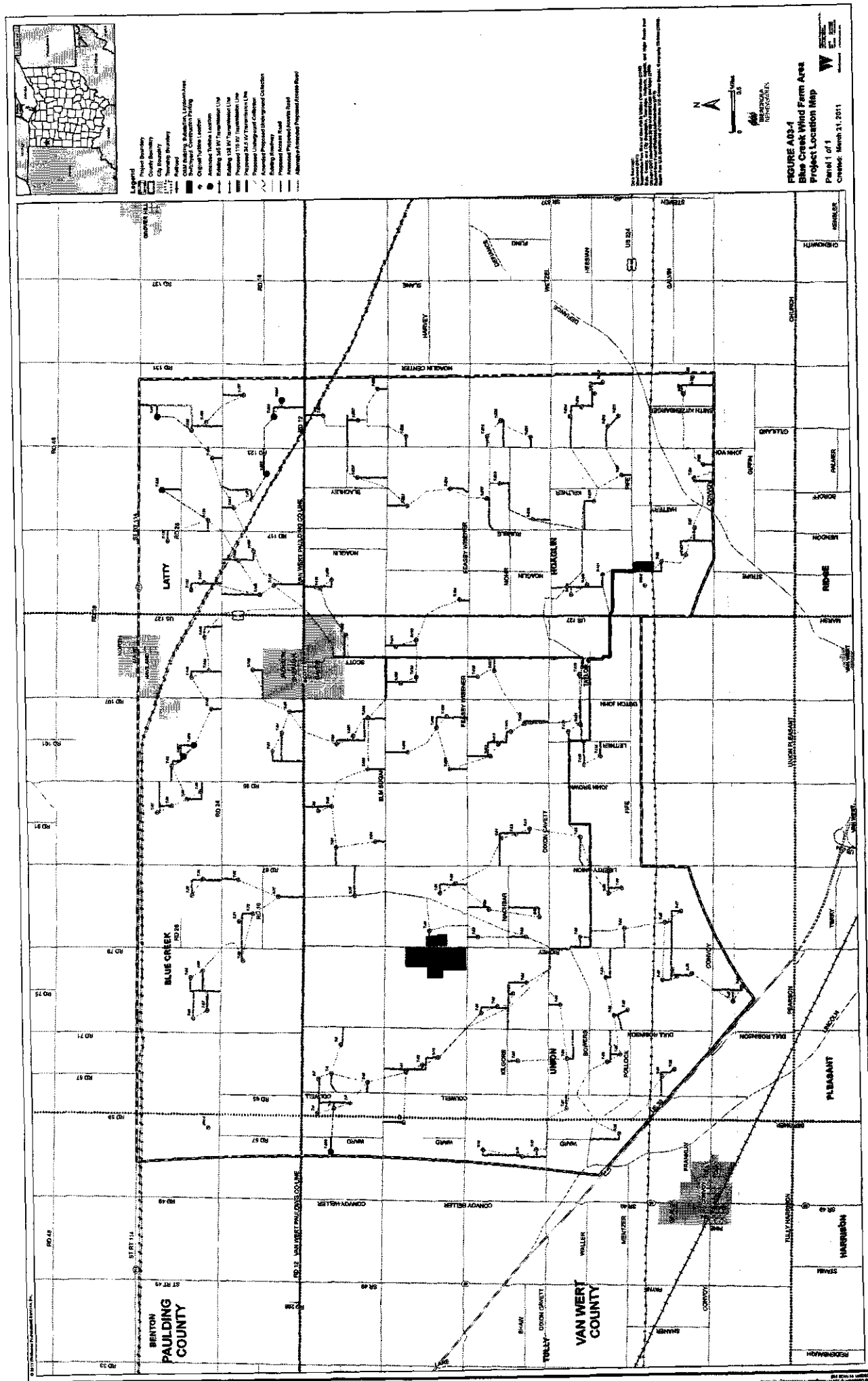
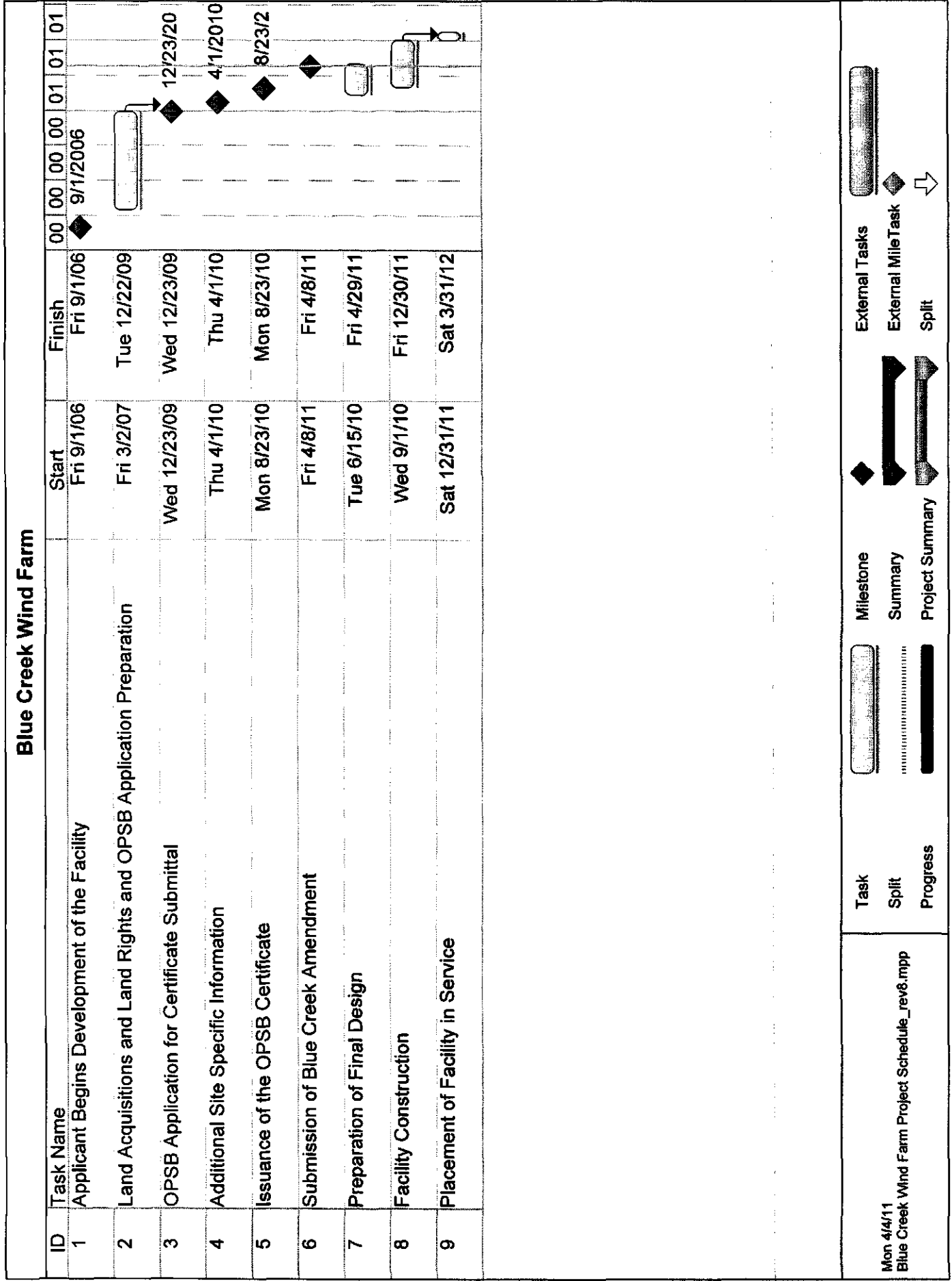


FIGURE A03-2 [NEW: REPLACES MARCH 31, 2010 SUPPLEMENT FIGURE 2-2]  
Blue Creek Project Schedule



## **4906-17-04      Project Area Analyses**

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### **(A)    SITE SELECTION STUDY**

#### **(1)    General**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

##### **(a)    Siting Criteria**

No text changes have occurred in this section (Sections (a)(i) through (a)(iv)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

##### **(b)    Relevant Factors in the Site Selection Process**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

##### **(i)    Wind Resource**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

##### **(ii)   Available Land and Land Use Constraints**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(iii) Environmental or Ecological Considerations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**a) Avian and Wildlife**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- A bat acoustic monitoring report was submitted to the OPSB in February 2010. The report covers the complete Project area, including the eight amendment turbines.

**b) Aeronautical Study**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- The Applicant submitted FAA 7460 forms to the Federal Aviation Administration on March 10, 2011 for the eight additional turbines. Appendix I provides more information.

**c) Communication/Electromagnetic Interference**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**d) Cultural Resources**

No text changes from the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- A cultural resource report was submitted to the Ohio Historic Preservation Office (OHPO) with a copy to the OPSB Staff in February 2010.
- The Applicant has performed additional cultural resource investigations for the eight additional turbines and support components during March 2011. No archeological artifacts were recovered during the survey. Therefore, no historic properties, as defined in 36 CFR 800.16(l), will be impacted by the proposed project in the Amendment areas. A revised survey report will be submitted to the OPSB upon completion of the investigation and coordination with the OHPO.

**e) Geotechnical**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- The Applicant submitted the results of turbine-specific geotechnical studies conducted in spring 2010 and the final geotechnical report to the OPSB in July 2010. Appendix L provides additional analysis conducted for the eight additional turbines.

**f) Wetlands**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following, which should be added after the second sentence of the first paragraph [Application, 4-11]:

- The Applicant performed additional wetland delineations for the eight additional turbines and support components during March 2011. A Revised Wetland Delineation Report will be submitted to the OPSB upon completion of the investigation and coordination with the USACE and OEPA. It is the intent of the Applicant to keep total "Waters of the U.S." impacts per location to less than 0.1 acre, so under the USACE Nationwide permit program the Facility can be authorized without a mitigation requirement.

**g) Noise**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following at the end of the discussion [Application, 4-12]:

- The expected operational Project noise levels from 160 Gamesa G90 turbines and associated substations are anticipated to be less than 50 dBA (A-weighted scale) at individual receptors. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 30 dBA to 50 dBA. Appendix T presents the findings of the noise assessment.



**h) Visual**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following to be added at the end of the discussion [Application, 4-13]:

- A revised shadow flicker analysis was performed in March 2011 for the eight additional turbines (assuming G-90 wind turbines on 328-foot [100-meter] tall towers) to evaluate the extent of potential shadow flicker experienced at each residence and primary transportation corridor in the Project area. The revised shadow flicker analysis resulted in predicted shadow flicker effects over 30 hours per year at 11 residences in the entire Project area. The Applicant plans to use a number of mitigation measures relating to the April 2010 Visual Impact Assessment (VIA), as described in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, to reduce projected shadow flicker impacts to these affected residences. Appendix K provides the results of the additional shadow flicker analysis.

**(iv) Site Accessibility**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(v) Community Support**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(2) Constraint Map**

No text changes from the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 have occurred in this section, except that Figure 4-1 has been modified to show the additional eight turbines and associated facilities.

**(B) SUMMARY TABLE OF EVALUATED SITES**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

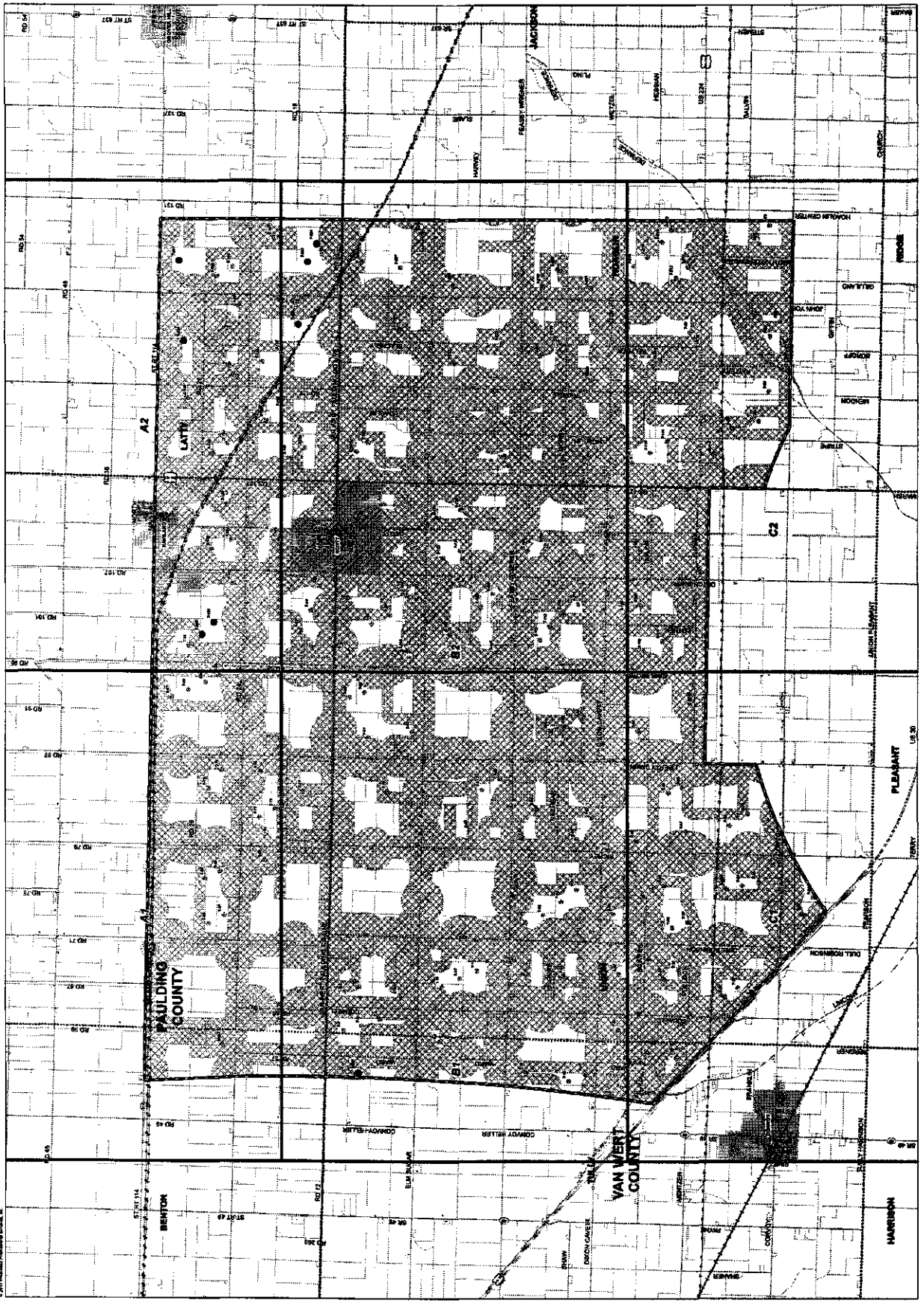


- Legend**
- 1:2,000 Scale CAD
  - Project Boundary
  - County Boundary
  - City Boundary
  - Township Boundary
  - Section Boundary
  - Highway
  - Railroad
  - Original Turbine Location
  - Assessing Turbine Location
  - Existing 138 kV Transmission Line
  - Existing 138 kV Transmission Line
  - Existing Roadway

West Virginia Department of Transportation  
Division of Highways  
201 North Capitol Street, Suite 100  
Martinsburg, West Virginia 26150  
Phone: 304.271.3000  
Fax: 304.271.3001  
www.transportation.wv.gov



**FIGURE A04-1**  
**Blue Creek Wind Farm Area**  
**Constraint Map**  
Map Panel Index  
Created: March 27, 2011









Legend

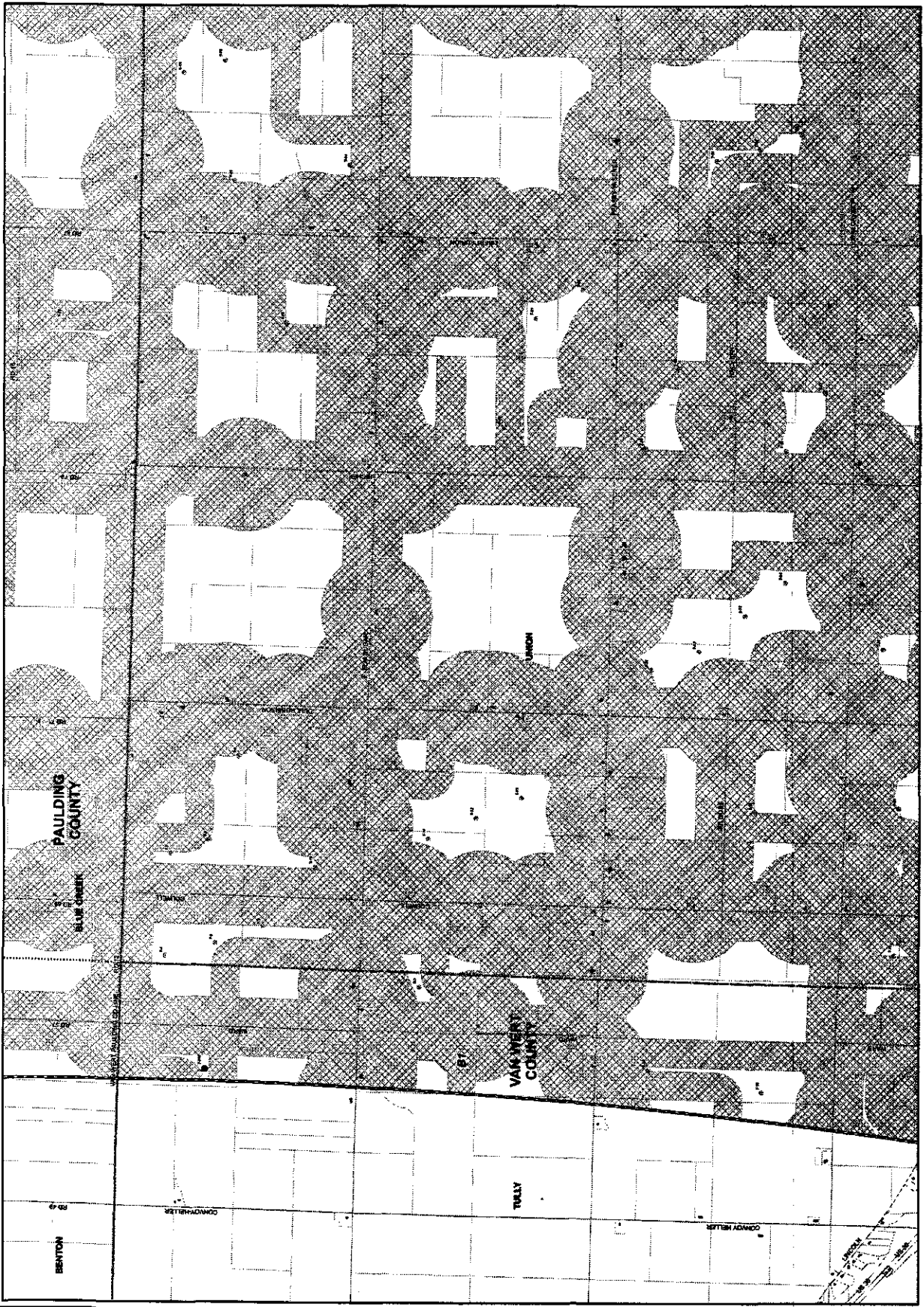
- 1:50,000 Scale Contour
- County Boundary
- City Boundary
- Thematic Boundary
- Trails
- Water
- Highway
- Proposed Turbine Location
- Existing 100' Wetlands Line
- Existing 100' Wetlands Line
- Existing Boundary

Map prepared by the Georgia Department of Transportation, Office of Planning and Research, in cooperation with the Georgia Department of Natural Resources, Office of Wetlands Management, and the Georgia Department of Agriculture, Office of Forestry. The map was prepared for the Georgia Department of Transportation, Office of Planning and Research, in cooperation with the Georgia Department of Natural Resources, Office of Wetlands Management, and the Georgia Department of Agriculture, Office of Forestry. The map was prepared for the Georgia Department of Transportation, Office of Planning and Research, in cooperation with the Georgia Department of Natural Resources, Office of Wetlands Management, and the Georgia Department of Agriculture, Office of Forestry.

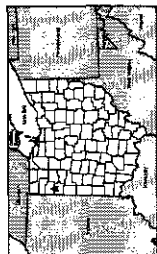


400  
FEET

**FIGURE A004-1**  
**Blue Creek Wind Farm Area**  
**Constraint Map**  
Panel B1 - 3 of 6  
Created: March 21, 2011







- Legend**
- 1:12,000 Scale Grid
  - Project Boundary
  - County Boundary
  - City Boundary
  - Township Boundary
  - Section Boundary
  - Section
  - Proposed Project
  - Relined
  - Original Turbine Location
  - Amended Turbine Location
  - Existing 69 kV Transmission Line
  - Existing 138 kV Transmission Line
  - Existing Roadway

**NOTES:**

1. The project area is located within the unincorporated area of the City of Marietta, Georgia.

2. The project area is located within the unincorporated area of the City of Marietta, Georgia.

3. The project area is located within the unincorporated area of the City of Marietta, Georgia.

4. The project area is located within the unincorporated area of the City of Marietta, Georgia.

5. The project area is located within the unincorporated area of the City of Marietta, Georgia.

6. The project area is located within the unincorporated area of the City of Marietta, Georgia.

7. The project area is located within the unincorporated area of the City of Marietta, Georgia.

8. The project area is located within the unincorporated area of the City of Marietta, Georgia.

9. The project area is located within the unincorporated area of the City of Marietta, Georgia.

10. The project area is located within the unincorporated area of the City of Marietta, Georgia.



**FIGURE A04-1**  
**Blue Creek Wind Farm Area**  
**Constraint Map**  
Panel B2 - 4 of 6  
Created: March 21, 2011









**(A)    PROJECT AREA SITE**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(1)    Geography and Topography**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except that Figure 5-1 has been modified to show the additional eight turbines and associated facilities.

**(2)    Aerial Photography**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except that Figure 5-2 has been modified to show the additional eight turbines and associated facilities.

**(3)    Site Mapping**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except that Figure 5-3 has been modified to show the additional eight turbines and associated facilities.

**(4)    Geology and Seismology**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except that Figure 5-4 and 5-5 has been modified to show the additional eight turbines and associated facilities.

**(a) Site Geology**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Geologic Hazards**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- Figures 5-6 and 5-7 have been modified to show the additional eight turbines and associated facilities.
- The Applicant submitted the results of turbine-specific geotechnical studies conducted in spring 2010 and the final geotechnical report to the OPSB on July 2010. Appendix L provides supplementary analysis conducted for the eight additional turbines.

**(c) Soil Suitability**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- The Stormwater Pollution Prevention Plan (SWPPP) will be amended and amended pages will be provided to OPSB and OEPA. In addition, the revised SWPPP will be available onsite during construction.

**(5) Hydrology and Wind**

**(a) Water Budgets**

**(i) Surface Water Resources**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(ii) Groundwater Resources**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except that Figure 5-8 has been modified to show the additional eight turbines and associated facilities.

**(iii) Construction Water Usage**

Water use during construction of the Facility will entail such operations as dust suppression and road watering. The Applicant's General Contractor is purchasing concrete from a local supplier and will not be constructing a temporary concrete batch plant for producing concrete required during construction as previously identified in the March 31, 2010 Supplement.

**(iv) Operation Water Usage**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Floods and High Winds**

**(i) Floods**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except that Figure 5-9 has been modified to show the additional eight turbines and associated facilities.

**(ii) Winds**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(c) Maps**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(B) LAYOUT AND CONSTRUCTION**

This section describes the layout and construction of the Facility.

**(1) Project Area Site Activities**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except that Figure 5-10 has been modified to show the additional eight turbines and associated facilities.

**(a) Wind Turbine Foundation**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- Figure 5-10 has been updated to remove the potential locations of the concrete batch plant. The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant will not be constructing a temporary concrete batch plant for producing concrete required during construction.
- The crane pad includes an area of 100 feet by 75 feet. At restoration the pad base will remain level with permanent gravel around the turbine. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified an area of 40 feet by 60 feet. [Application, 5-21]

**(b) Underground Electric Collection System**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following: [Application, 5-22]

- The underground collection system will require varying widths of temporary right-of-way (ROW) depending upon the number of collection lines in the trench:
  - 1 Collector = 20 feet
  - 2 Collectors = 30 feet
  - 3 Collectors = 40 feet

The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified a 20-foot ROW.

**(c) Aboveground Collection Lines**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(d) Substations**

The Applicant has been able to reduce the number of collector substations required (from two to one) through electrical system layout efficiencies. The proposed voltage transmission process requires one collector substation that connects to the Project collection substation, which in turn connects to the interconnection substation.

**(e) O&M Building**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(f) Test Borings and Cone Penetrating Test**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The Applicant will submit the results of turbine-specific geotechnical studies and the final geotechnical report to the OPSB before construction. Appendix L provides additional analysis conducted for the eight additional turbines.

**(g) Removal of Vegetation [Application, 5-25 to 26]**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

It is anticipated that 66.5 acres of vegetation (66.5 acres of cultivated crops, zero acres of pasture, and zero acres of deciduous forest) will be temporarily removed during construction of the eight additional turbines covered by this Amendment; and of that, 5.4 acres (5.4 acres of cultivated crops and zero acres of deciduous forest) will be removed permanently. A tree clearing plan is being developed and will be submitted to OPSB prior to construction.

**(h) Grading and Drainage**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(i) Access Roads [Application, 5-27 to 5-28]**

Road building will include about 54.7 miles of one-time pass temporary crane paths with only minor grading to maintain the necessary slope for safe transportation. Only limited post-construction restoration would be required. After construction is complete, permanent access roads will be utilized for maintenance activities. The 42.9 miles of permanent access roads will be up to 20 feet wide (including 16-foot wide access road and 4-foot wide area for stormwater drainage).

**(j) Removal and Disposal of Debris**

No text changes from the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 have occurred in this section.



**(k) Post-Construction Reclamation**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(2) Layout**

Figure 5-10 provides a map that shows the various elements of the Facility.

**(a) Wind-Powered Electric Generation Turbines [Application, 5-29]**

Figure A05-10 provides the location of the proposed 160 G-90 wind-powered electric generating turbines at the scale of 1:12,000.

**(b) Transformers and Collection Lines [Application, 5-29]**

The proposed Facility will require approximately 97.7 miles of underground and 7.8 miles of aboveground 34.5 kV collection system and approximately 1.8 miles of aboveground 115 kV collection line. Figure 5-10 provides the location of the collection lines.

**(c) Construction Laydown Areas**

No text changes from the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 have occurred in this section..

**(d) Transmission Lines**

No text changes from the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 have occurred in this section.

**(e) Substations**

The Applicant has been able to reduce the number of collector substations required (from two to one) through electrical system layout efficiencies. The proposed voltage transmission process requires one collector substation that connects to the Project collection substation, which in turn connects to the interconnection substation.

**(f) Transportation Facilities and Access Roads [Application, 5-30]**

A total of 42.9 miles of access roads will be required for the Facility. Figure 5-10 provides the location of the access roads used during construction and maintenance activities.

**(g) Security Facilities**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(h) Grade Elevations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(i) Other Pertinent Installations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Structures**

No text changes have occurred in this section (Sections 3(a) through 3(e)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(4) Plans for Construction**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(5) Future Plans**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(C) EQUIPMENT [APPLICATION, 5-35]**

As previously discussed, the equipment to be used for the Project area will include the following.

- 160 wind turbine generators<sup>1</sup>;
- An electrical collection system using 34.5 kV underground and aboveground collection lines;
- Some 115 kV aboveground collection lines;
- One 34.5 kV to 115 kV collector substation;
- One 115 kV to 345 kV substation
- One interconnection substation;
- Up to two permanent met towers and a SODAR facility; and
- An O&M building.

The following sections provide a description for each Facility component.

---

<sup>1</sup> Within this Application, specific locations for 160 turbines and other related Facility components are identified. The queue position for the proposed development has a maximum potential output of 350 MW or 175 2.0 MW turbines.

**(1) Wind Powered Generation Equipment****(a) Wind Energy Turbines**

No text changes have occurred in this section (Sections (a)(i) through (a)(iv)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Electrical Components**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(i) 34.5 kV Electric Collection System**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following: [Application, 5-38]

- Approximately 97.7 miles of underground collector lines and approximately 7.8 miles of aboveground 34.5 kV collector lines will be required for the Facility. The March 31, 2010 filing identified 103.6 and 5.4 miles respectively. There is no change in miles of aboveground 34.5 kV collector lines.

**(ii) 115 kV Electric Line [Application, 5-38]**

- In locations where more than one set of aboveground 34.5 kV lines are needed, a small substation will be constructed to transform the electricity to 115 kV. By doing so, this will allow the use of only one set of poles. Approximately 1.8 miles of aboveground collection lines at 115 kV will be required.

**(iii) Substations [Application, 5-39]**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The Applicant has been able to reduce the number of collector substations required (from two to one) through electrical system layout efficiencies. The Applicant would like to clarify that the proposed voltage transformation process requires one collector substation that connects to the Project collection sub, which in turn connects to the interconnection sub.

**(2) Safety Equipment**

No text changes have occurred in this section (Sections 2(a) through 2(c)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Any Other Major Equipment**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(a) O&M Building**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Met Tower(s)**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(c) SODAR Unit**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

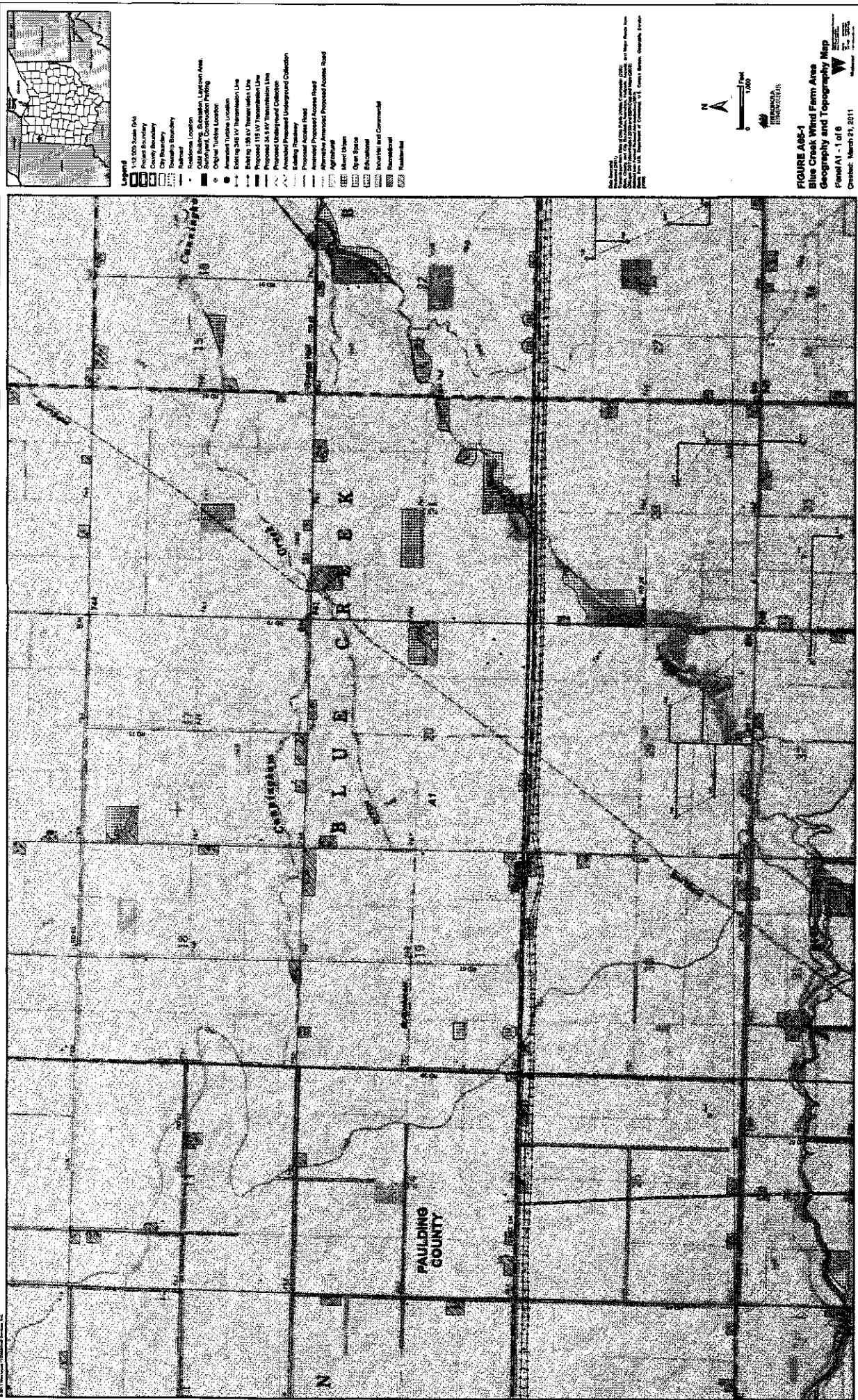
**(d) Temporary Concrete Batch Plant [Application, 5-47]**

The Applicant's General Contractor will purchase all concrete from a local supplier. The Applicant will not be constructing a temporary concrete batch plant for producing concrete required during construction. In the March 31, 2010 Supplement, the Applicant was considering constructing a temporary batch plant at one of two locations.

**(D) REGIONAL ELECTRIC POWER SYSTEMS**

No text changes have occurred in this section (Section D(1) through D(2) ) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.





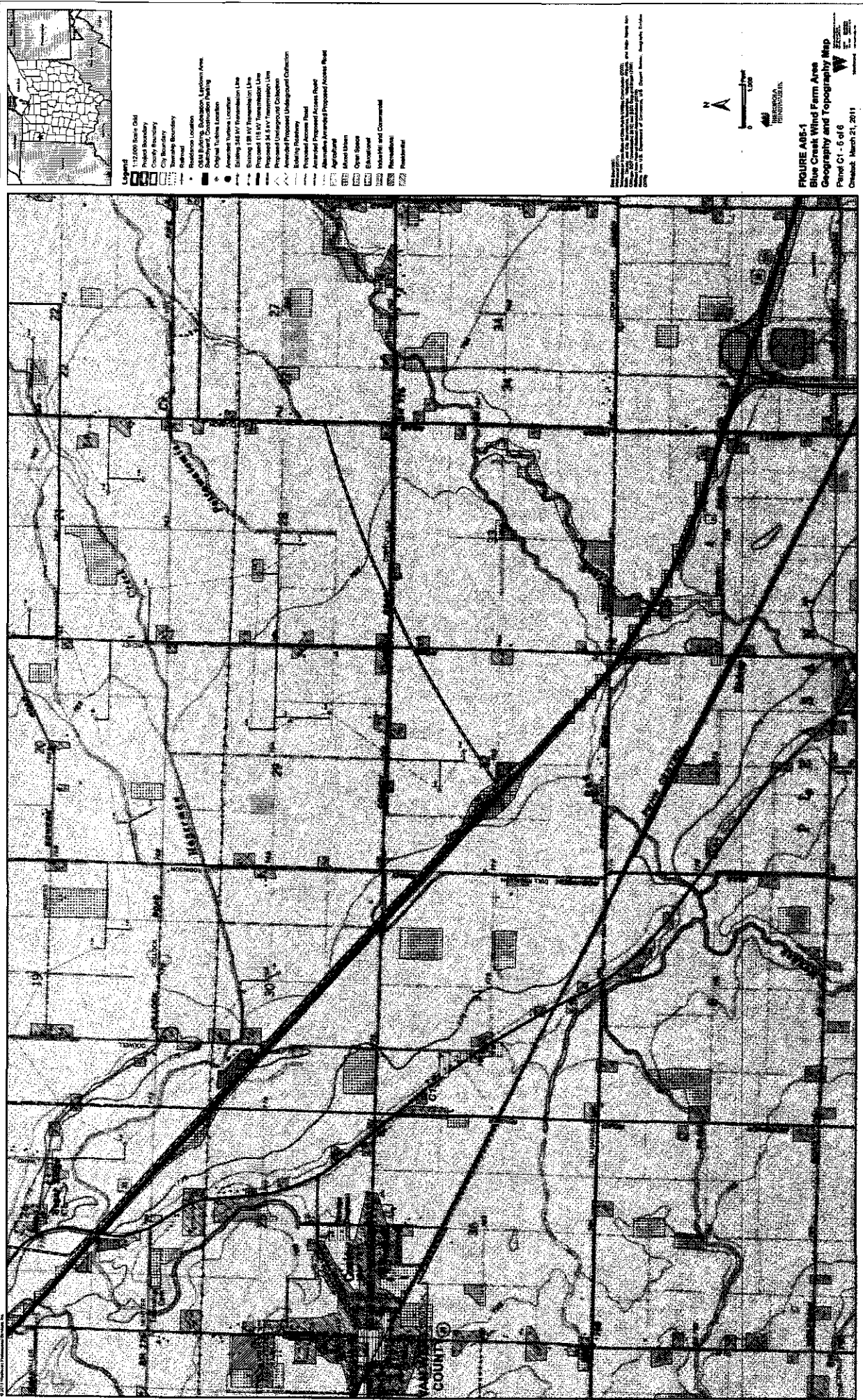




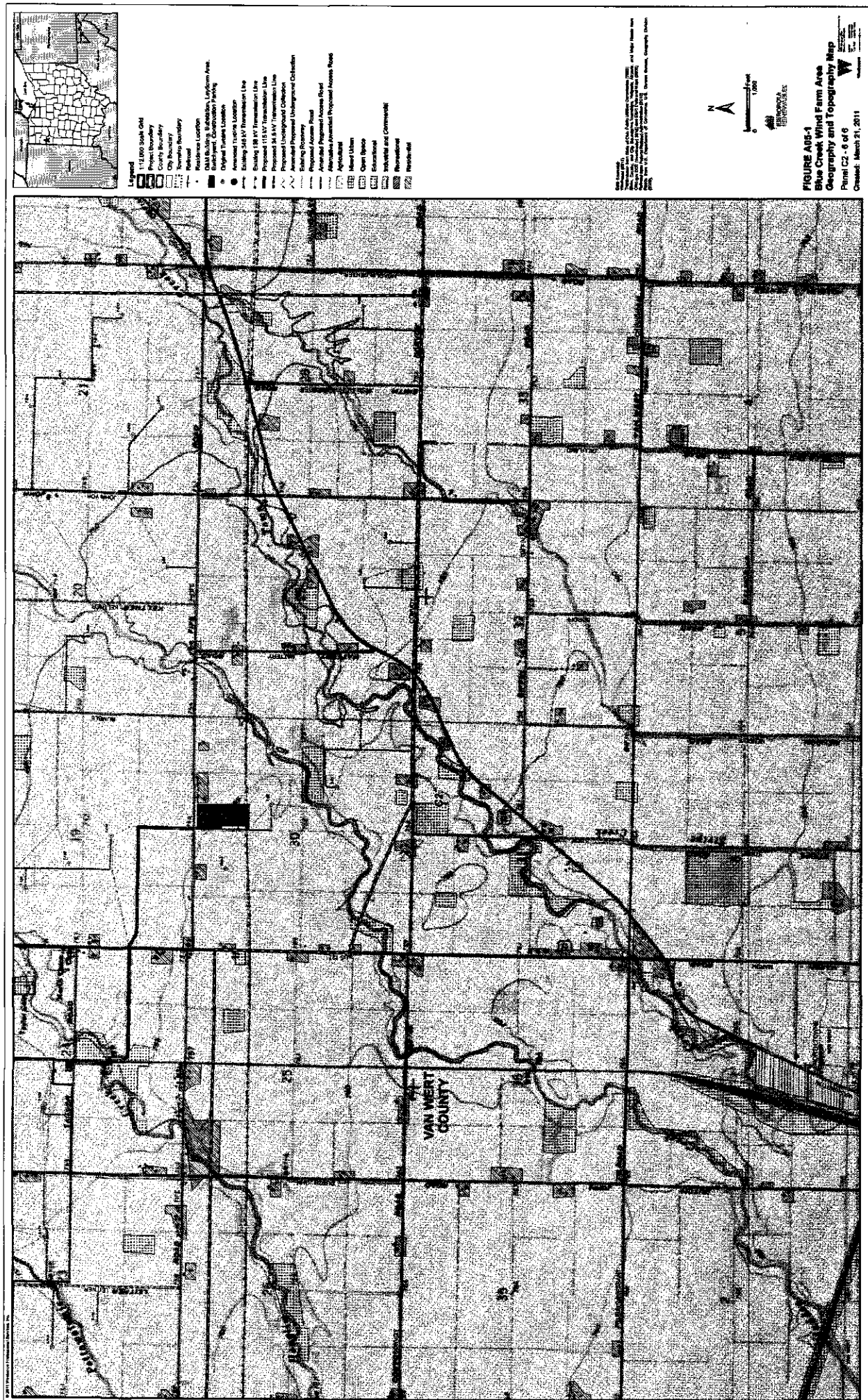




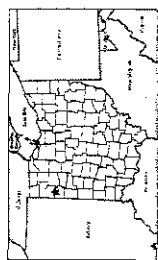






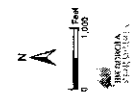






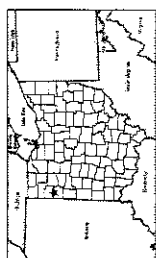
- Legend**
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  - County Boundary
  - City Boundary
  - Township Boundary
  - Railroad
  - QMM Building, Substation, Laydown Area
  - Substation, Construction Parking
  - Onroad Turbine Location
  - Onroad Turbine Location
  - Existing 345 kV Transmission Line
  - Existing 138 kV Transmission Line
  - Proposed 115 kV Transmission Line
  - Proposed 345 kV Transmission Line
  - Proposed Underground Collection
  - Existing Roadway
  - Proposed Access Road
  - Proposed Proposed Access Road
  - Alternative/Amended Proposed Access Road

Blue Creek Wind Farm  
 Project Boundary  
 County Boundary  
 City Boundary  
 Township Boundary  
 Railroad  
 QMM Building, Substation, Laydown Area  
 Substation, Construction Parking  
 Onroad Turbine Location  
 Onroad Turbine Location  
 Existing 345 kV Transmission Line  
 Existing 138 kV Transmission Line  
 Proposed 115 kV Transmission Line  
 Proposed 345 kV Transmission Line  
 Proposed Underground Collection  
 Existing Roadway  
 Proposed Access Road  
 Proposed Proposed Access Road  
 Alternative/Amended Proposed Access Road



**FIGURE A05-2**  
**Blue Creek Wind Farm Area**  
**Aerial Photography Map**  
 Panel A1 - 1 of 8  
 Created: March 21, 2011





**Legend**

- 1:12,000 Scale Grid
- Project Boundary
- County Boundary
- City Boundary
- Planning Boundary
- GAH Building, Relocation, Layover Area
- Shut-in, Construction Parking
- Amended Turbine Location
- Original Turbine Location
- Existing 138 kV Transmission Line
- Proposed 138 kV Transmission Line
- Proposed 115 kV Transmission Line
- Proposed 115 kV Transmission Line
- Proposed Underground Collection
- Amended Proposed Underground Collection
- Existing Roadway
- Proposed Access Road
- Amended Proposed Access Road
- Alternative Amended Proposed Access Road

Map Date: 03/21/2011  
 Map Title: Blue Creek Wind Farm Area  
 Map Scale: 1:12,000  
 Map Author: [illegible]  
 Map Reviewer: [illegible]  
 Map Project: [illegible]  
 Map Status: [illegible]

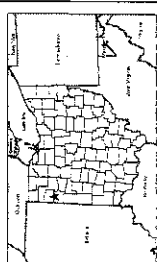


**FIGURE A05-2**  
**Blue Creek Wind Farm Area**  
**Aerial Photography Map**  
 Panel A2 - 2 of 6  
 Created: March 21, 2011

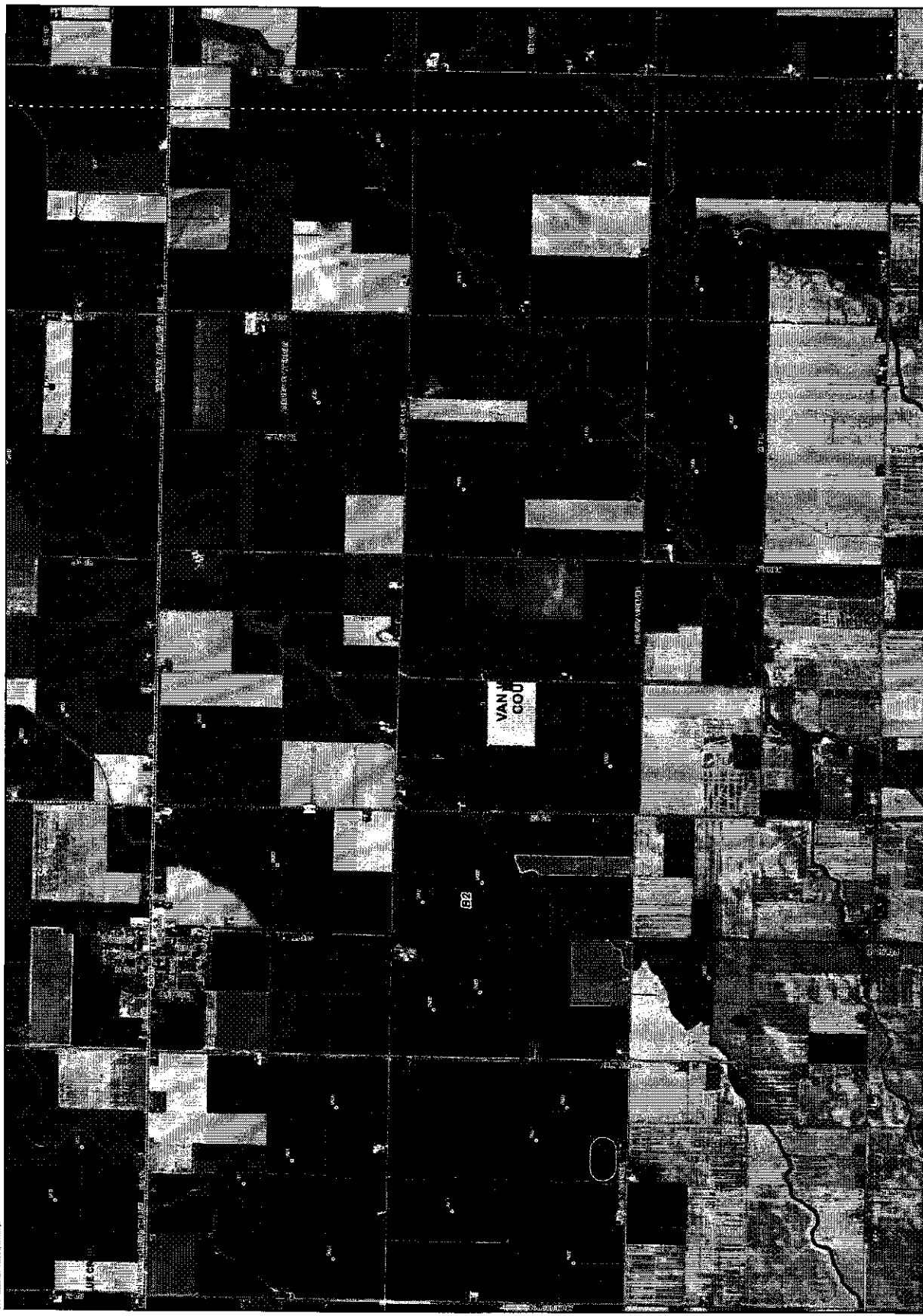








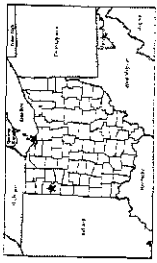
- Legend**
- 12,000 Scale Grid
  - Project Boundary
  - County Boundary
  - City Boundary
  - Neighborhood Boundary
  - Railroad
  - QAM Building, Substation, Laydown Area, Substation, Construction Parking
  - Original Turbine Location
  - Amended Turbine Location
  - Existing 138 kV Transmission Line
  - Proposed 138 kV Transmission Line
  - Proposed 115 kV Transmission Line
  - Proposed 94.5 kV Transmission Line
  - Proposed Underground Collection
  - Amended Proposed Underground Collection
  - Existing Roadway
  - Proposed Access Road
  - Amended Proposed Access Road
  - Alternative Amended Proposed Access Road



DATE: 03/21/2011  
 PROJECT: Blue Creek Wind Farm  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]  
 SCALE: 1:10,000  
 SHEET: 1 OF 1

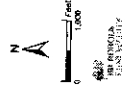


**FIGURE A05-2**  
**Blue Creek Wind Farm Area**  
**Aerial Photography Map**  
 Panel B2 - 4 of 6  
 Created: March 21, 2011



**Legend**

- 1:12,000 Scale D40
- Project Boundary
- County Boundary
- City Boundary
- Investigator Boundary
- Railroad
- OSM Building, Substation, Laydown Area
- Access Road
- Original Tractor Location
- Access Road Location
- Existing 138 kV Transmission Line
- Proposed 138 kV Transmission Line
- Proposed 115 kV Transmission Line
- Proposed 69 kV Transmission Line
- Proposed Underground Collection
- Proposed Tractor
- Proposed Access Road
- Proposed 138 kV Access Road
- Alternative Proposed 138 kV Access Road

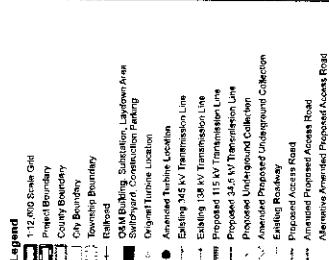


**FIGURE A05-2**  
**Blue Creek Wind Farm Area**  
**Aerial Photography Map**  
 Panel C1 - 5 of 6

Created: March 21, 2011

DATA SOURCES:  
 Aerial Photography: 2007  
 Topographic Data: 2007  
 County Boundary: 2007  
 City Boundary: 2007  
 Railroad: 2007  
 Access Road: 2007  
 Tractor Location: 2007  
 Project Boundary: 2007  
 Investigator Boundary: 2007  
 OSMB Building, Substation, Laydown Area: 2007  
 Access Road: 2007  
 Original Tractor Location: 2007  
 Existing 138 kV Transmission Line: 2007  
 Proposed 138 kV Transmission Line: 2007  
 Proposed 115 kV Transmission Line: 2007  
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 Proposed Access Road: 2007  
 Proposed 138 kV Access Road: 2007  
 Alternative Proposed 138 kV Access Road: 2007

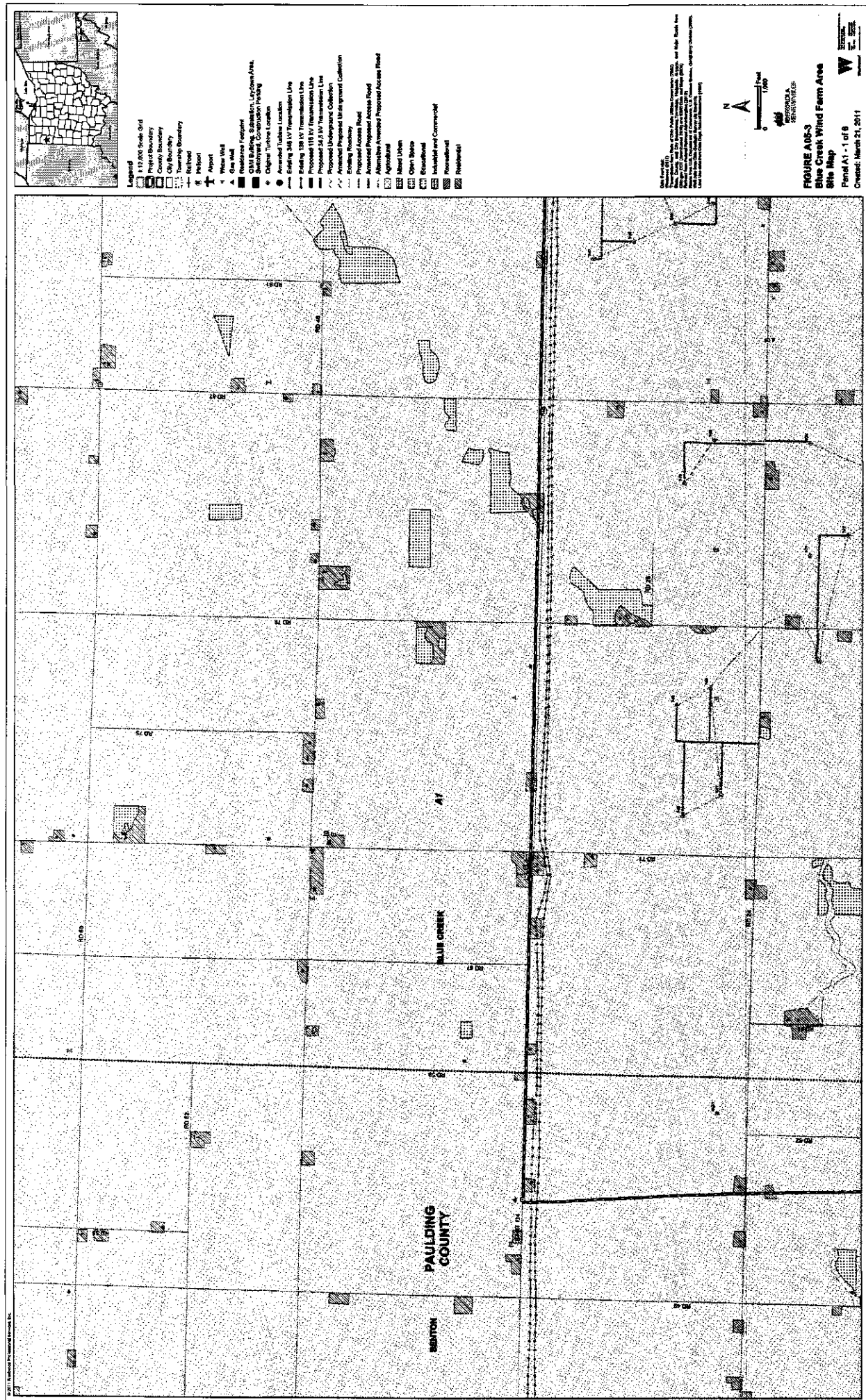




**FIGURE A05-2**  
**Blue Creek Wind Farm Area**  
**Aerial Photography Map**  
**Panel C2 - 6 of 6**  
Created: March 21, 2011

Panel C2 - 6 of 6  
Created: March 21, 2011





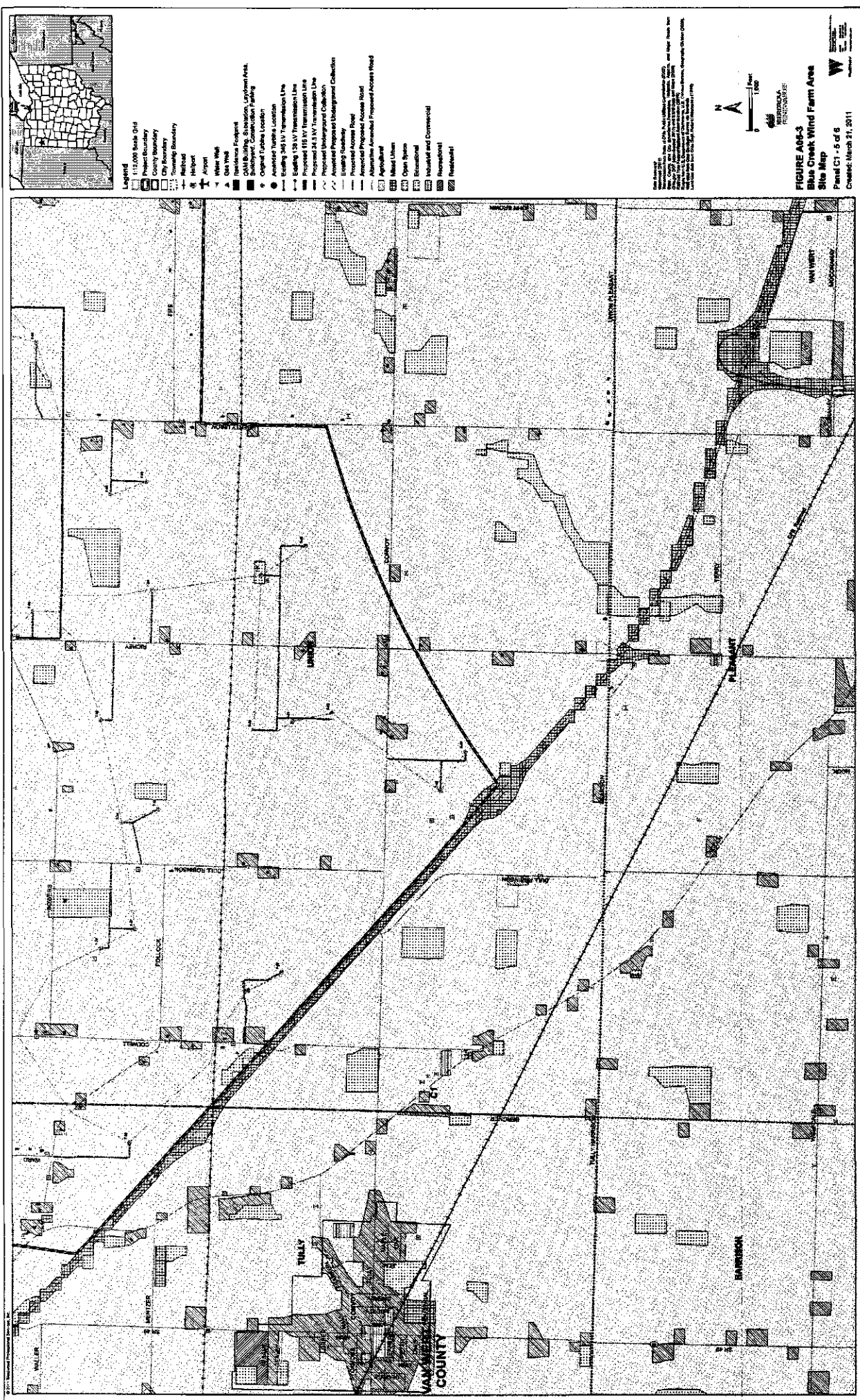


















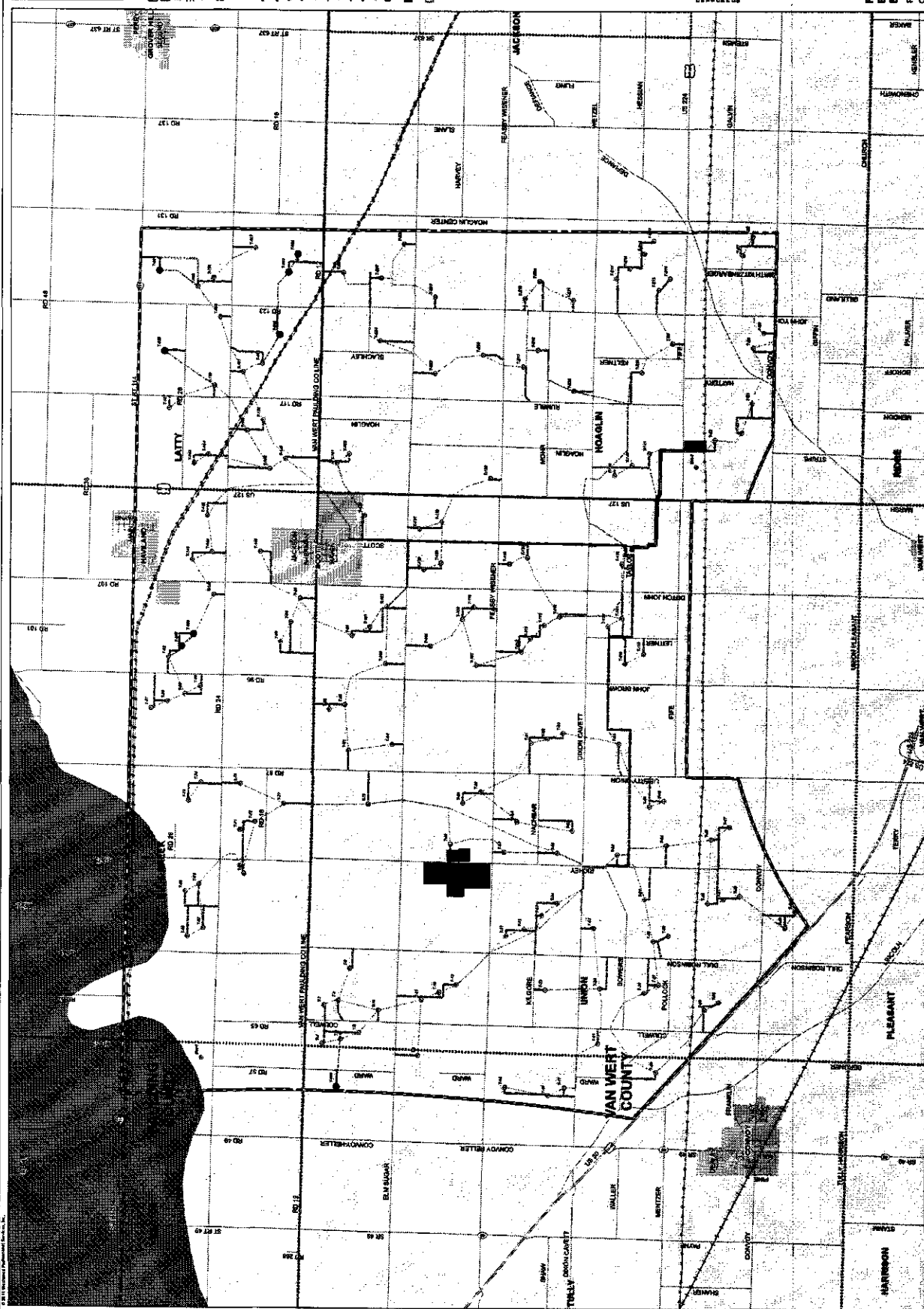


- Legend**
- Project Boundary
  - County Boundary
  - City Boundary
  - Township Boundary
  - Railroad
  - QJM Building, Substation, Laydown Area
  - Switchyard, Construction Parking
  - Original Turbine Location
  - Amended Turbine Location
  - Existing 345 kV Transmission Line
  - Existing 138 kV Transmission Line
  - Proposed 138 kV Transmission Line
  - Proposed 115 kV Transmission Line
  - Proposed 69 kV Transmission Line
  - Proposed Underground Collection
  - Amended Proposed Underground Collection
  - Existing Roadway
  - Proposed Access Road
  - Amended Proposed Access Road
  - Alternative Amended Proposed Access Road
  - Bedrock Type
  - Big Detroit River Group  
Granite, sandstone, and shale
  - St. Clair Group  
Sandstone, limestone, and shale
  - Shale, limestone, granite, and shale

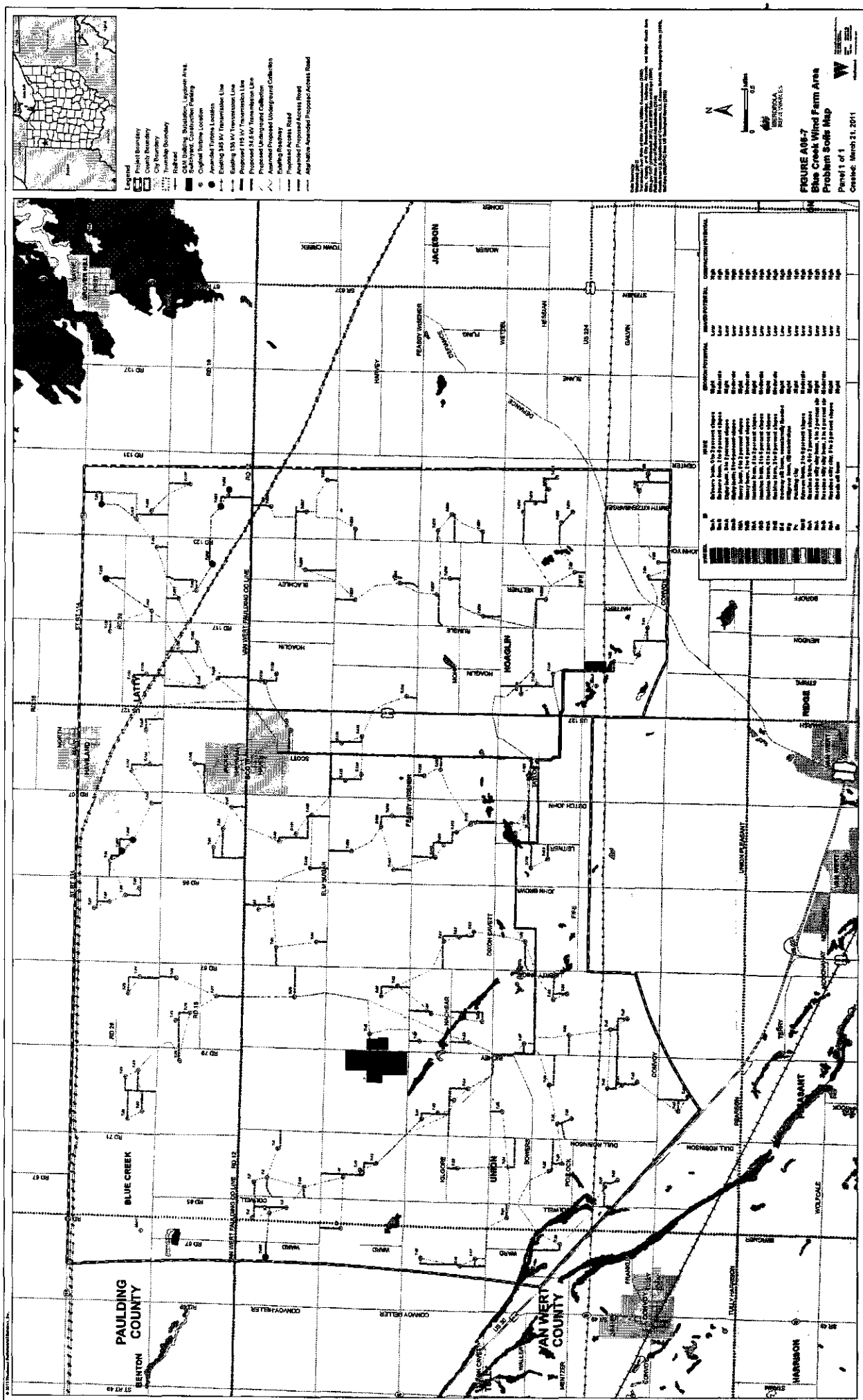
NOTES:  
1. This map was prepared by the Michigan Department of Transportation (MDOT) and the Michigan Department of Natural Resources (MDNR) for the purpose of showing the location of the proposed project and the existing infrastructure. It is not intended to be used for any other purpose.  
2. The map is based on the best available data and is not a guarantee of accuracy. It is the user's responsibility to verify the information shown on the map.  
3. The map is subject to change without notice. It is the user's responsibility to keep the map up to date.



**FIGURE A00-8**  
**Blue Creek Wind Farm Area**  
**Bedrock Geology**  
Panel 1 of 1  
Created: March 21, 2011









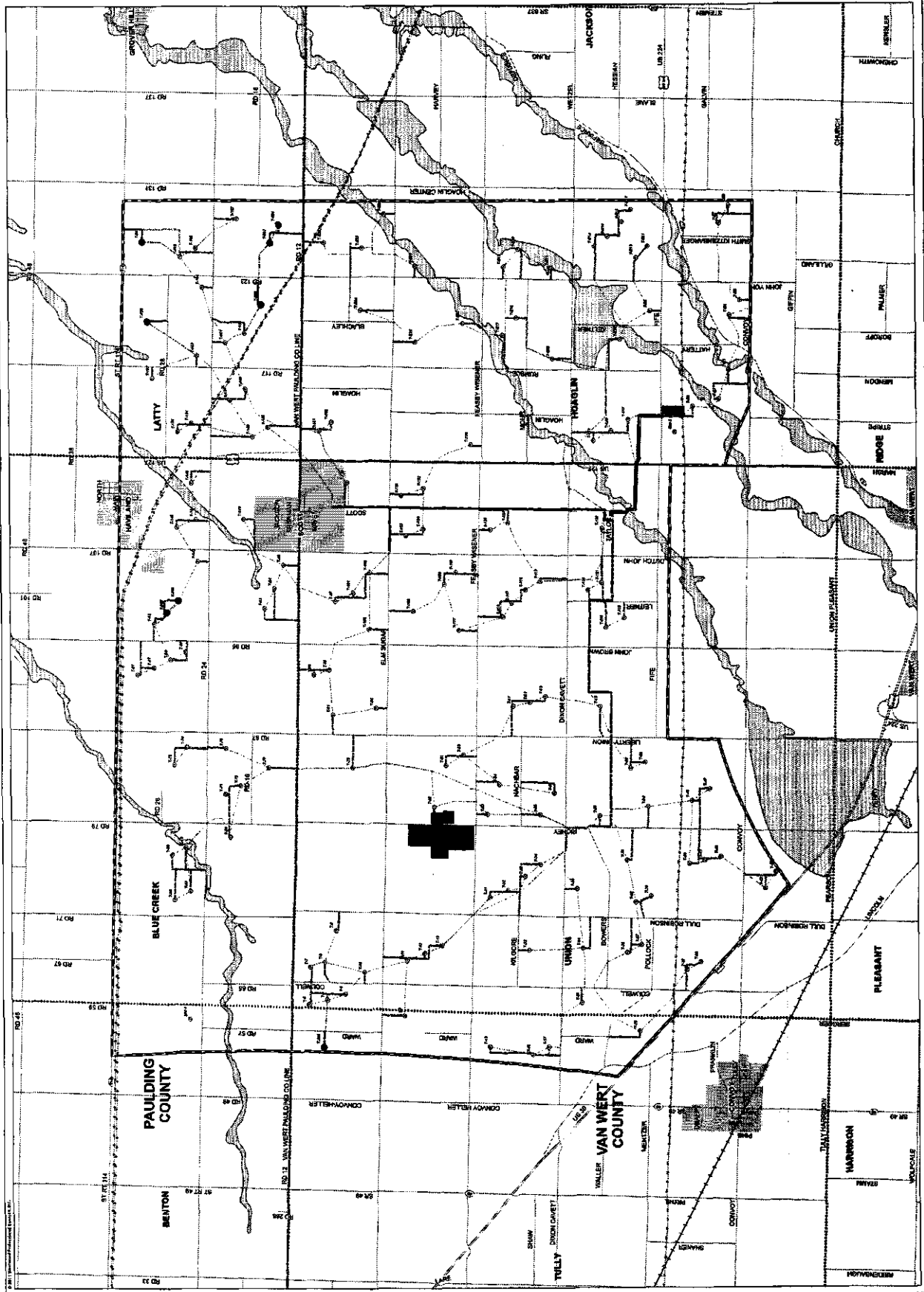




- Legend**
- County Boundary
  - City Boundary
  - Neighborhood Boundary
  - Relief
  - Original Tract Location
  - Amended Tract Location
  - Existing 240 KV Transmission Line
  - Existing 138 KV Transmission Line
  - Proposed 138 KV Transmission Line
  - Proposed 115 KV Transmission Line
  - Proposed Underground Collection Line
  - Existing Right-of-Way
  - Proposed Access Road
  - Amended Proposed Access Road
  - Proposed Floodplain (F000)

Scale: 1 inch = 1 mile  
North Arrow

**FIGURE A50-2**  
**Blue Creek Wind Farm Area**  
**Parcel 1 of 1**  
Created: March 21, 2011





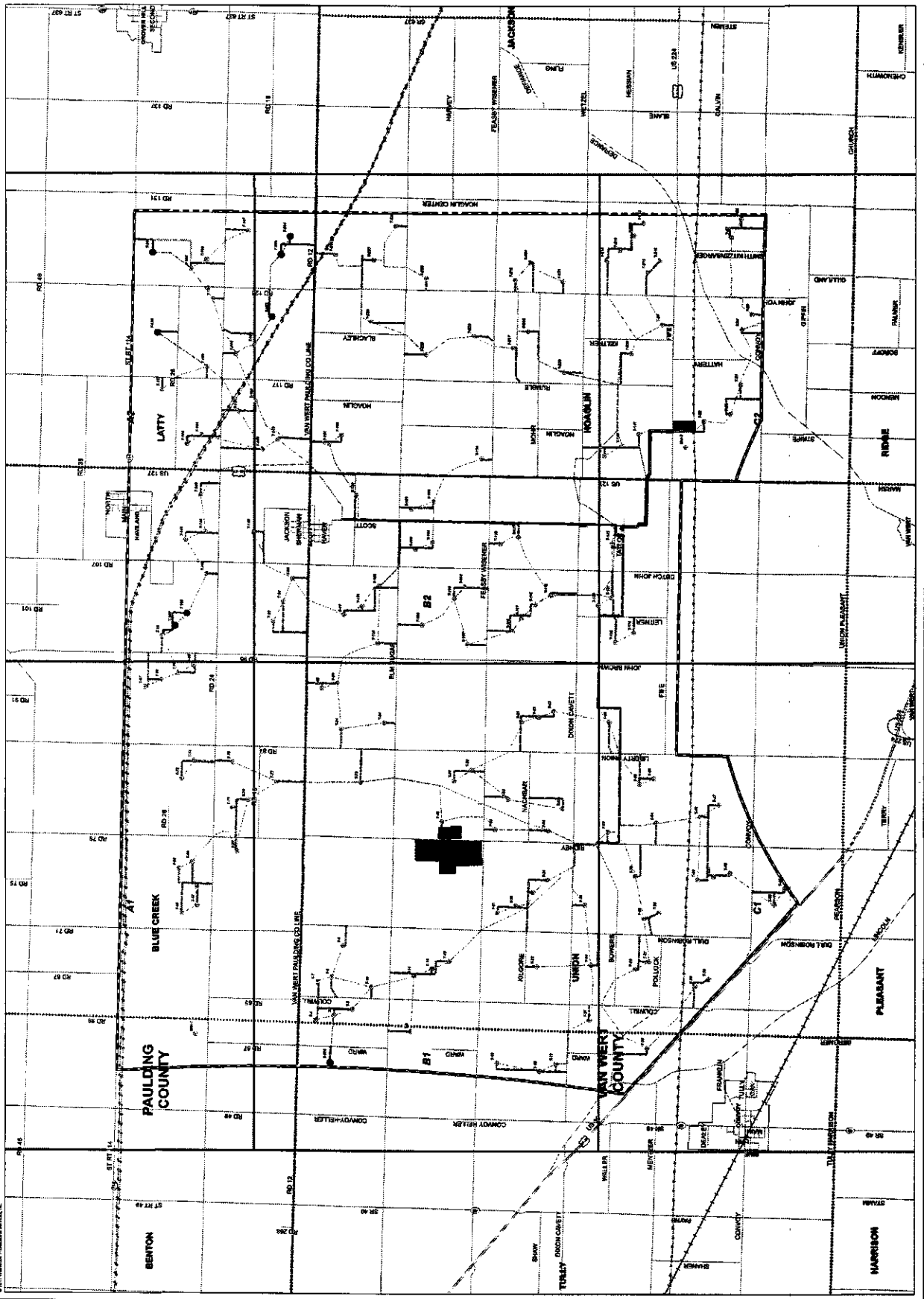
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- 1:12,000 Scale Grid
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  - County Boundary
  - City Boundary
  - Township Boundary
  - Railroad
  - Highway
  - Airport
  - QMW Building, Substation, Layover Area, Substation, Construction Parking
  - Original Turbine Location
  - Amended Turbine Location
  - Existing 345 kV Transmission Line
  - Existing 138 kV Transmission Line
  - Proposed 345 kV Transmission Line
  - Proposed 138 kV Transmission Line
  - Proposed Underground Collection
  - Proposed Underground Distribution
  - Proposed Access Road
  - Amended Proposed Access Road
  - Alternative Amended Proposed Access Road

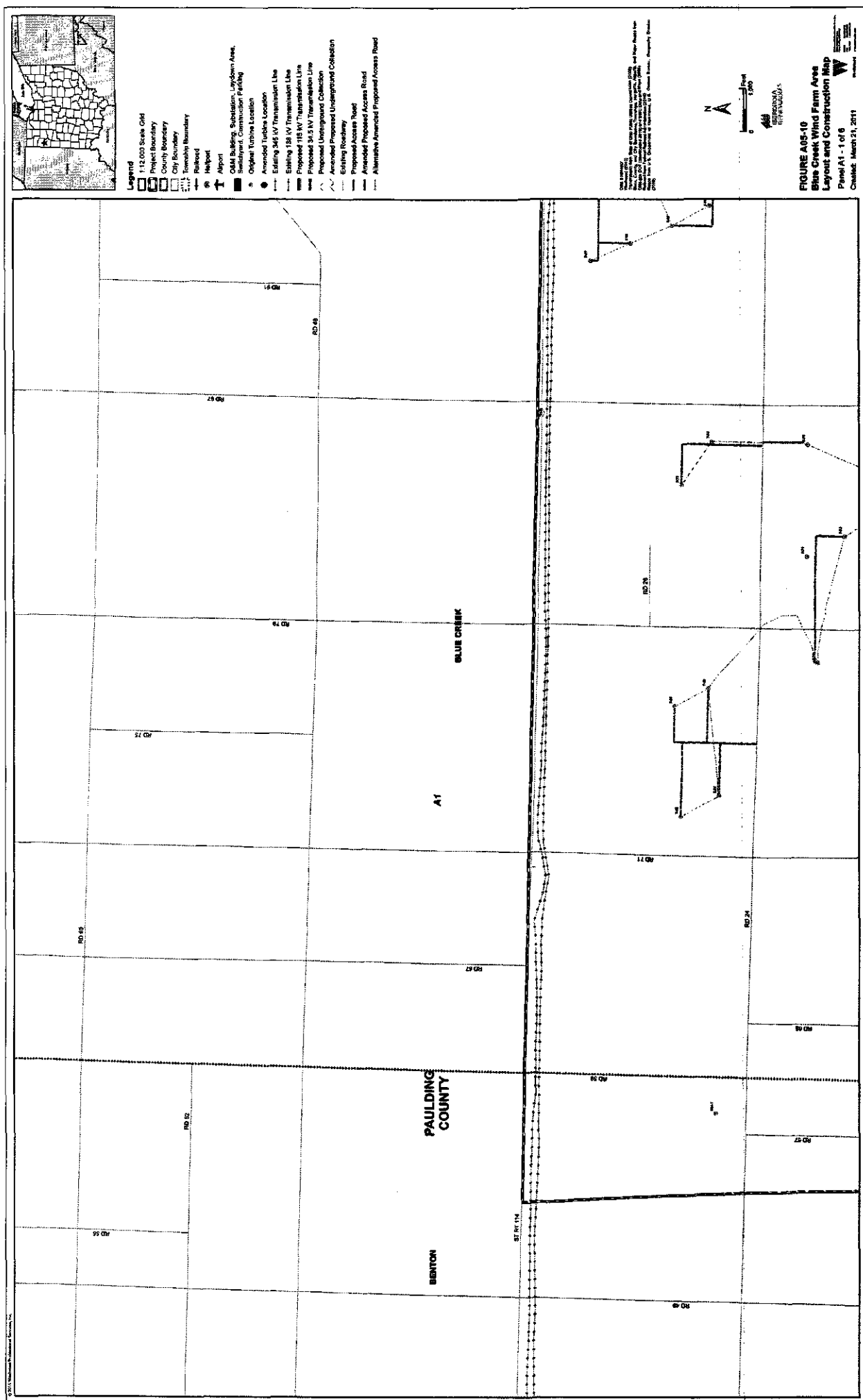
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0 100 200 Feet

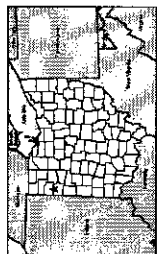
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**FIGURE A05-10**  
**Blue Creek Wind Farm Area**  
**Layout and Construction Map**  
Map Panel Index  
Created: March 27, 2011





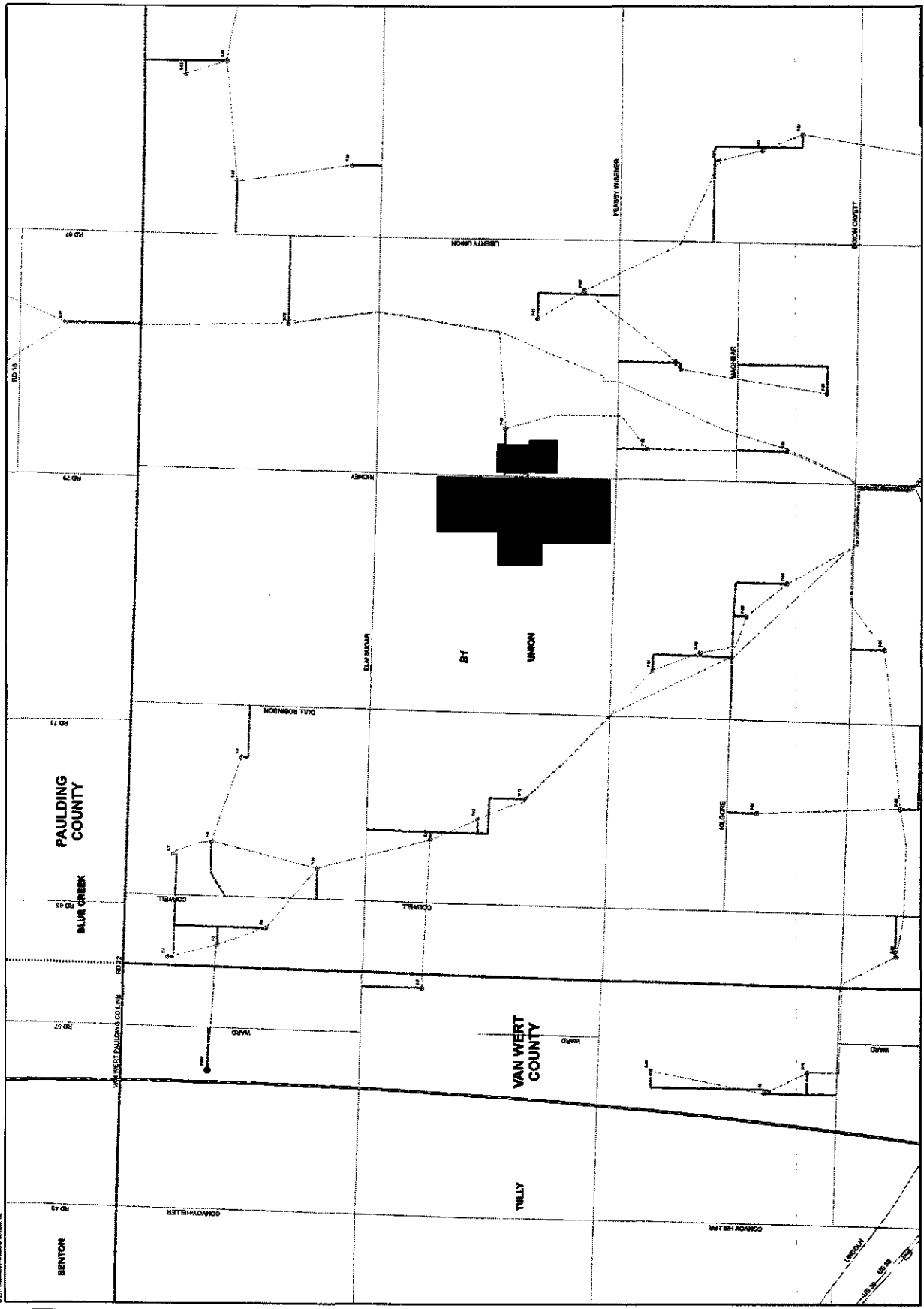


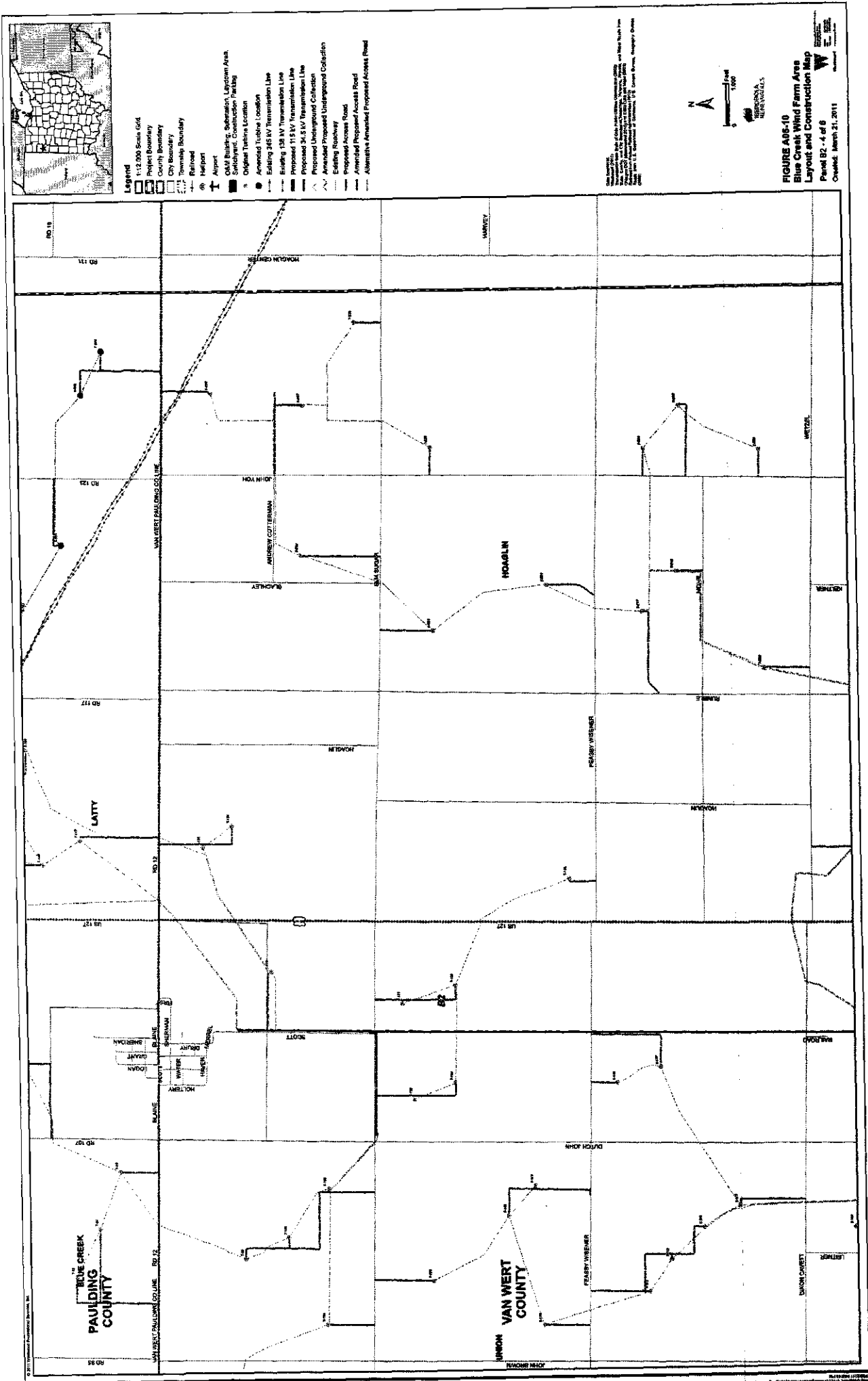


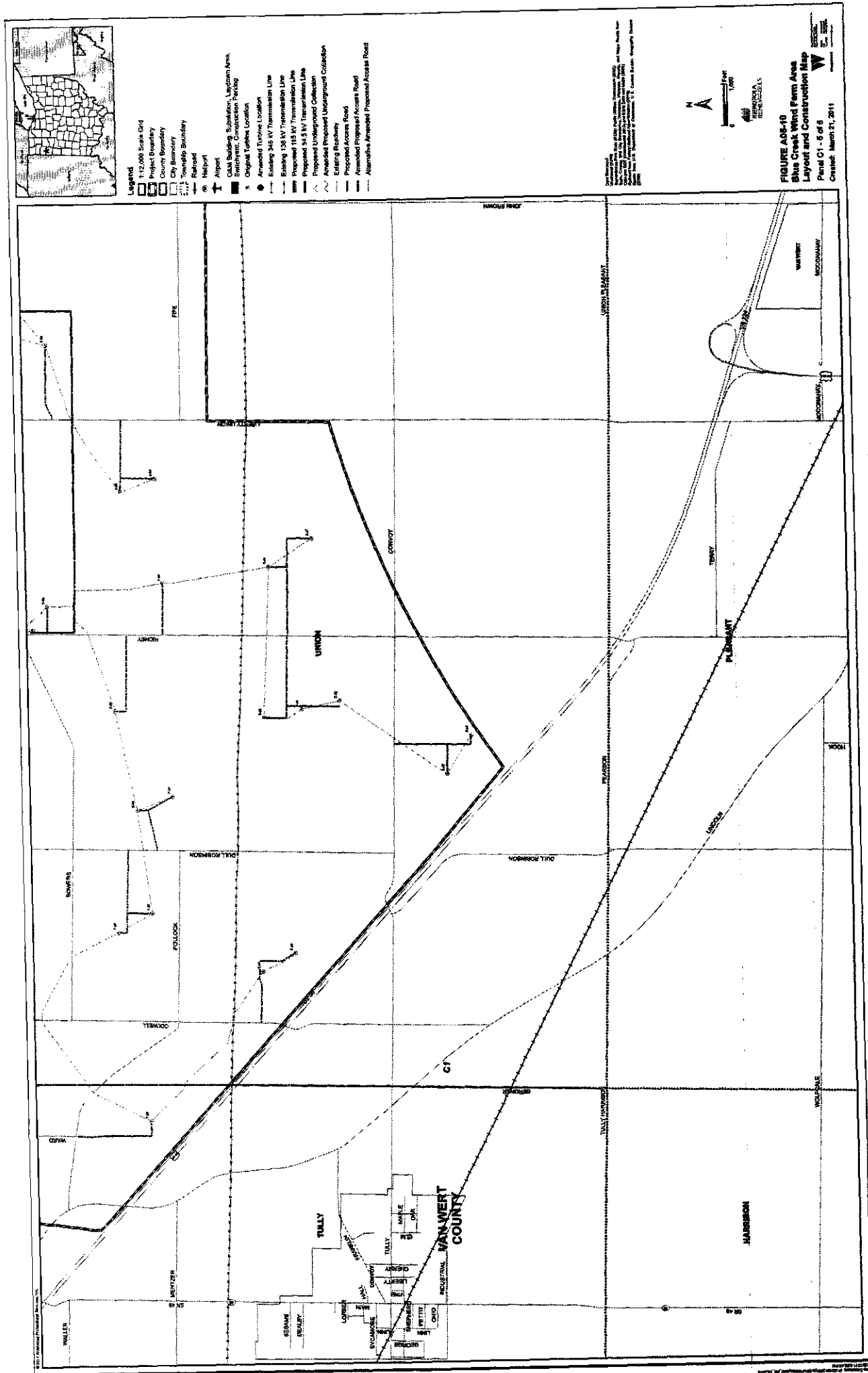
- Legend**
- 1:12,000 Scale Grid
  - Project Boundary
  - County Boundary
  - City Boundary
  - Township Boundary
  - Railroad
  - Highway
  - Water
  - OSM Building, Substation, Landmark Area, Substation, Construction Parking
  - Original Turbine Location
  - Proposed Turbine Location
  - Existing 345 kV Transmission Line
  - Existing 138 kV Transmission Line
  - Proposed 115 kV Transmission Line
  - Proposed 345 kV Transmission Line
  - Proposed Underground Collection
  - Proposed Overhead Collection
  - Proposed Access Road
  - Proposed Access Road
  - Alternative Proposed Access Road



**FIGURE A05-10**  
**Blue Creek Wind Farm Area**  
**Layout and Construction Map**  
 Panel B1 - 3 of 6  
 Created: March 27, 2011











## **4906-17-06      Financial Data**

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### **(A)    OWNERSHIP**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 except for the following:

- The OPSB Certificate for the Blue Creek Wind farm was transferred from Heartland Wind, LLC to Blue Creek Wind Farm, LLC on November 18, 2010.
- The Applicant's sole member and manager, Iberdrola Renewables, Inc. owns and operates approximately 5,000 MW of wind facilities and employs more than 850 people directly in the United States. The Applicant currently operates over 40 wind farms in 17 states and constructed 7 new projects in 2010. Ohio will be a new state for the Applicant.
- Most land to be used in the construction and operation of the Facility is privately owned by approximately 200 participating landowners. The applicant now owns approximately 28 acres of the project site, including the 8-acre area occupied by the 34.5 kV to 115 kV collection substation, and the 20-acre area occupied by the 115 kV to 345 kV collector substation, the interconnection substation, and the O&M building.

### **(B)    CAPITAL AND INTANGIBLE COSTS**

No text changes have occurred in this section (Sections B(1) through B(3)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(C) OPERATION AND MAINTENANCE EXPENSES**

No text changes have occurred in this section (Sections C(1) through C(3)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(D) DELAYS**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

## **4906-17-07      Environmental Data**

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### **(A)    GENERAL [APPLICATION, 7-1]**

This section provides environmental data regarding air, water, and solid waste in terms of site conditions, potential impacts from the Facility and proposed mitigation measures. Unlike traditional power plants that combust fossil fuel to generate electricity, the proposed Facility will not emit air pollutants, require water for cooling purposes, or require process wastewater to be discharged from the Facility. In addition, the Facility will not produce any solid combustion wastes as a by-product of its energy production process. Therefore, the Applicant's proposed Facility will avoid major impacts associated with decreased air quality, water consumption, thermal pollution, and ash landfills.

The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not considering the construction of a temporary concrete batch plant for producing concrete as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

### **(B)    AIR**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not considering the construction of a temporary concrete batch plant for producing concrete as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(1) Preconstruction****(a) Ambient Air Quality**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Applicable State/Federal Air Quality Regulations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not considering the construction of a temporary concrete batch plant for producing concrete as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.
- Table 7-2 is no longer applicable since the Applicant will not be constructing or operating a concrete batch plant.

**(c) List of Required Permits**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not considering the construction of a temporary concrete batch plant for producing concrete as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. Therefore, permits

associated with the temporary concrete batch plant will no longer be necessary.

**(d) Compliance Plans**

No text changes have occurred in this section (Sections (d)(i)(a) through (d)(i)(g)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not considering the construction of a temporary concrete batch plant for producing concrete as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. Therefore, compliance plans associated with the temporary concrete batch plant will no longer be necessary.

**(e) Batch Plant Monitoring, Recordkeeping, and Reporting**

The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant will not be constructing a concrete batch plant required for construction as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. Therefore, monitoring, recordkeeping and reporting associated with the temporary concrete batch plant will no longer be necessary.

**(i) (d)(2) Unpaved Roadways and Parking Areas Compliance**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**a) Emission Limits**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**b) Compliance with Emission Limits – Plant Design**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**c) Visible Emissions Requirements**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**d) Compliance with Visible Emission Requirements –  
Operating Procedures**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not considering the construction of a temporary concrete batch plant for producing concrete as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. Therefore, compliance with visible emission requirements associated with the concrete batch plant will no longer be necessary.

**e) Compliance Monitoring and Testing**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not considering the construction of a temporary concrete batch plant for producing concrete as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. Therefore, compliance monitoring and testing associated with the concrete batch plant will no longer be necessary.

**(ii) Unpaved Roads Monitoring, Recordkeeping, and Reporting**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 except for the following:

- The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not considering the construction of a temporary concrete batch plant for producing concrete as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. Therefore, monitoring, recordkeeping, and reporting associated with the concrete batch plant truck traffic will no longer be necessary.

**(2) Construction**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Operation**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(C) WATER**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(1) Surface Water**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(2) Groundwater**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Preconstruction**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.



**(4) Construction**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(a) Permits**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The Applicant's General Contractor will be purchasing concrete from a local supplier. The Applicant will not be constructing a batch plant as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. Therefore, permits associated with the concrete batch plant will no longer be necessary.
- The SWPPP will be amended and amended pages will be provided to OPSB and OEPA. In addition, the revised SWPPP will be available onsite during construction.

**(b) Aquatic Discharges**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following: [Application, 7-21]

- The Applicant's General Contractor will be purchasing concrete from a local supplier. The Applicant will not be constructing a batch plant as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. Therefore, aquatic discharges associated with the concrete batch plant will no longer be necessary.

- During construction, approximately 1,484.2 acres will be disturbed in the approximately 24,900-acre Project area. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 1,264.4 acres being disturbed.
- When constructed, the Facility will cover approximately 166.3 acres of impervious surface, including turbine foundations, access roads, substations, and an O&M building footprint. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 233.0 acres being disturbed.

**(c) Mitigation Plans**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The SWPPP will be amended and amended pages will be provided to OPSB and OEPA. In addition, the revised SWPPP will be available onsite during construction.

**(d) Changes in Flow Patterns and Erosion**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(5) Operation**

No text changes have occurred in this section (Sections 5(a) and 5(b)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(D) SOLID WASTE**

This section describes the solid waste impacts anticipated during preconstruction, construction, and operation of the Facility.

**(1) Preconstruction****(a) Debris and Solid Waste**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The current tree clearing plan will be amended prior to construction.
- Construction of the eight additional turbines will require the clearing or disturbance of 66.5 acres of predominantly agricultural vegetation.

**(2) Construction****(a) Debris and Solid Waste Generated**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- Facility construction would require clearing or disturbance of 1,484.2 acres of vegetation, none of which is forested acreage. The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 identified 1,264.4 and 19.6 acres respectively. [Application, 7-25]

**(b) Storage and Disposal Methods**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Operations**

No text changes have occurred in this section (Sections 3(a) and 3 (b)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(4) Licenses and Permits**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except for the following:

- The Applicant's General Contractor will be purchasing concrete from a local supplier. The Applicant will not be constructing a batch plant as identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. Therefore, permits associated with the concrete batch plant will no longer be necessary.

**(A) HEALTH AND SAFETY****(1) Demographic Characteristics**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(2) Noise**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(a) Construction Noise Levels**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(i) Blasting Activities**

Blasting will be used at specific areas of the site where shallow bedrock is present. The Applicant will amend the current blasting plan, should site-specific conditions warrant blasting. Procedures for handling blasting activities would be consistent with the current blasting plan, previously approved by OPSB.

**(ii) Operation of Earthmoving Equipment**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(iii) Driving of Piles**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(iv) Erection of Structures**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(v) Truck Traffic**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(vi) Equipment Installation**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Operational Noise Levels**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following to be added at the end of the section [Application, 8-13]:

The amendment assessment studied the addition of eight Gamesa G90 wind turbines on 328-foot (100 meter) tall towers for a total of 160 wind turbines, and the associated electrical substations.

For a wind project, the noise level at a particular location is primarily determined by the wind speed at the turbines and the distance from the closest turbine. For

example, when the winds are calm the turbines emit very little noise as compared with stronger wind conditions when the turbines generate their highest levels of noise. As such, the projects sound emissions may vary throughout the day and night.

Standard acoustical engineering methods were used in the Applicant's noise analysis. The sound propagation factors used in this analysis have been adopted from ISO 9613-2, *Acoustics—Sound Attenuation During Propagation Outdoors, Part 2: General Method of Calculation* (ISO, 1993) and VDI 2714, *Outdoor Sound Propagation* (VDI, 1988). Hard ground conditions ( $G=0$ ) of ISO 9613-2 have been assumed. Atmospheric absorption for conditions of 10 degrees Celsius ( $^{\circ}\text{C}$ ) (50 degrees Fahrenheit [ $^{\circ}\text{F}$ ]) and 70 percent relative humidity (conditions that favor propagation) was computed in accordance with ISO 9613-1, *Acoustics—Sound Attenuation During Propagation Outdoors, Part 1: Calculation of the Absorption of Sound by the Atmosphere* (ISO, 1993).

Each Project turbine was considered to be a Gamesa G90 which has an overall sound power level of 106 dBA. This overall sound power level is expected to represent the maximum turbine sound level determined in accordance with IEC61400-11, *Wind Turbine Generator Systems—Part 11: Acoustic Noise Measurement Techniques* (IEC, 2006). Four substation transformers each with a maximum sound power level of 100 dBA were also included in the analysis.

It is useful to understand the difference between a sound pressure level (or noise level) and a sound power level. A sound power level (commonly abbreviated as PWL or  $L_w$ ) is analogous to the wattage of a light bulb; it is a measure of the acoustical energy emitted by the source and is, therefore, independent of distance. A sound pressure level (commonly abbreviated as SPL or  $L_p$ ) is analogous to the brightness or intensity of light experienced at a specific distance from a source. Sound pressure level is measured directly with a sound-level meter. Sound pressure levels always should be specified with a location or distance from the noise source. Sound power level data are used in acoustic models to predict

sound pressure levels. This is because sound power levels take into account the size of the acoustical source and account for the total acoustical energy emitted by the source.

There has been some confusion regarding the presence of significant levels of low frequency noise from modern utility scale upwind turbines. High levels of low frequency noise can be associated with simple-cycle combustion turbines or natural gas compressor stations. High levels of low frequency noise were common in earlier downwind wind turbines. However, the levels of low frequency noise emitted from modern upwind turbines is significantly less than from other sources. The swishing noise associated with the rotation of turbine blades is often mistaken for low frequency noise. The frequency content of the swish is typically within the 500 to 1,000 Hertz range, which is entirely within the audible range and appropriately characterized by the A-weighting.

For wind turbines, the measurement of low frequency noise is complicated by the presence of wind and the resulting wind-induced noise (self-noise) through microphone windscreens. Recent wind tunnel testing of various windscreens (Hessler, 2008; Hessler, 2009) concludes that: “any casual measurement of sound using a standard windscreen in a windy field will yield ostensibly high levels of low frequency or infrasonic noise—whether a wind turbine is present or not. Such measurements, taken at face value, may be one of the reasons wind turbines are widely, but mistakenly, believed to be significant sources of low frequency noise.”

Appendix T presents the predicted cumulative level from all turbines and associated substations operating at the maximum sound power level. The figures in Appendix T present the predicted operational noise levels at identified residential structures, schools, hospitals, nursing homes or assisted living and health-care facilities, religious institutions, and public libraries. A summary of predicted sound levels is provided as Table A-4 under Appendix T. This table



replaces Table 8-5 provided in earlier submittals to the OPSB. The tables in Appendix T present the model results and coordinates for receptors and sources.

**(c) Location of Noise Sensitive Areas**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except that Figure 8-2 has been updated to present the eight additional turbines and associated infrastructure in the current layout.

**(d) Mitigation of Noise Emissions**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following to be added at the end of the section [Application, 8-14]:

- The Applicant would like to clarify that the Project will consist of up to 160 Gamesa G90 wind turbines. The Applicant would like to clarify that they have expanded the Good Neighbor Program.

**(3) Water**

**(a) Impact to Public and Private Water Supplies**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Construction Water Impacts [Application, 8-17, replacement]**

The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not planning the construction of a temporary concrete batch plant for producing concrete as was identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public

Need on August 23, 2010. Water use during construction of the Facility would include dust suppression and road watering. Construction water demands for the site will be temporary. Portable restroom facilities will be used for construction workers; therefore, they will not require water.

**(c) Operation Water Impacts**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(4) Ice Throw**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(5) Blade Shear**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(6) Shadow Flicker**

**(a) Shadow Flicker Analysis**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following at the end of the section [Application, 8-23]:

- A revised shadow flicker analysis was performed in March 2011 for the eight additional turbines (assuming G-90 wind turbines on 328-foot [100 meter] tall towers) to evaluate the extent of potential shadow flicker experienced at each

residence and primary transportation corridor near these new turbines. These results are included in the revised shadow flicker analysis and report presented in Appendix K.

**(b) Shadow Flicker Results**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following to be added at the end of the section before Table A8-6 [Application, 8-23]:

- The revised shadow flicker analysis performed in March 2011 resulted in predicted shadow flicker effects over 30 hours per year at 11 residences near the eight new turbines. Table A8-6 and Appendix K provide the updated shadow flicker documentation.

**TABLE A8-6 [ADDITION TO TABLE 8-6, APPLICATION, 8-24 AND 8-25]**  
Predicted Shadow Flicker

Residence ID	Total Predicted Shadow Flicker (hours/yr)	Wind Turbine Generators Contributing to Flicker	Distance to Closest Contributing Wind Turbine Generator (m)	Longitude	Latitude	Proposed Mitigation*
213	41:39	113, 115, 116, 127	540	-84.592277	40.953887	Good Neighbor Agreement
224	39:27	113, 115, 126, 127	489	-84.591893	40.957494	Curtailment during specific periods of WTG 126
340	38:40	79, 81	391	-84.630675	40.983172	Good Neighbor Agreement
1096	34:06	E13, E15, E16	381	-84.513873	40.937288	Good Neighbor Agreement
327	33:44	99, 101, 103	402	-84.592169	40.980546	Good Neighbor Agreement
96	31:47	59, 60	420	-84.630040	40.934097	Curtailment during specific periods of WTG 59
471	31:12	146, 153, 154	430	-84.572273	41.009407	Good Neighbor Agreement
470	31:07	68, 69	421	-84.649930	41.007911	Good Neighbor Agreement

TABLE A8-6 [ADDITION TO TABLE 8-6 , APPLICATION, 8-24 AND 8-25]  
Predicted Shadow Flicker

Residence ID	Total Predicted Shadow Flicker (hours/yr)	Wind Turbine Generators Contributing to Flicker	Distance to Closest Contributing Wind Turbine Generator (m)	Longitude	Latitude	Proposed Mitigation*
445	31:05	70, 72	365	-84.649169	41.002327	Good Neighbor Agreement
88	31:00	64	374	-84.648311	40.931505	Good Neighbor Agreement
427	30:11	EXP902, EXP903, EXP904	540	-84.533958	40.995106	Good Neighbor Agreement

\* See Appendix K for updated Shadow Flicker analysis.

### (c) Mitigation Measures

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

## (B) ECOLOGICAL IMPACT

### (1) Project Site Information

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following at the end of the section [Application, 8-27]:

- Site visits to the Project area to characterize habitats and identify wetlands and waterbodies were performed during September and October 2009, March 2010, and March to May 2011. Figure 8-3, the ecological map for the Project area, has been updated to show the eight additional turbines in a revised layout.

### (a) Mapping

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public

Need on August 23, 2010, except that Figure 8-3 has be updated to shown the eight new turbines in the an updated layout.

**(b) Vegetative Survey**

No federal or state plant species of interest were observed within a quarter mile from the Project Area boundary. Appendix U provides a comprehensive list of plant species identified during field surveys conducted from September 2009 to December 2010. In March 2011 wetland delineations were completed for the eight additional turbines.

**(i) Upland Habitats**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(ii) Wetland Habitats**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following at the end of the section [Application, 8-34]:

- The Applicant performed additional wetland delineation for the eight additional turbines and support components during March 2011. A revised Wetland/Waterbody Delineation Report will be submitted to the OPSB upon completion of the investigation and coordination with the USACE and OEPA.

**(c) Animal Life Survey**

No text changes have occurred in this section (Sections (c)(i) through (c)(v)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(d) Summary of Ecological Studies**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010 except for the following:

- The Applicant retained Dr. Michael Hoggarth to perform a desktop assessment of streams to determine whether planned stream crossings associated with the eight additional turbines had the potential to affect mussels. The facilities associated with the eight additional turbines will cross wetland ditches and one small, intermittent stream ditch. The assessment concluded that none of these streams or wetlands would support mussels.

**(e) Major Species List**

No text changes have occurred in this section (sections (e)(i) through (e)(iv)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(2) Construction**

**(a) Impact of Construction**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following to be added at the end of the section [Application, 8-48]:

- The Applicant performed additional wetland delineation for eight additional turbines and support components in March 2011. A Revised Wetland Delineation Report will be submitted to the OPSB upon completion of the investigation and coordination with USACE and OEPA.

**(i) Upland Habitat**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- The total area of hedgerows and other natural vegetation that would be affected by the eight new turbines are estimated to be less than one tenth acre..

**(ii) Wetlands and Waterbodies**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- Additional wetland and waterbody delineation studies have been performed for the project area including the eight additional turbines and adjacent areas in March 2011. Updated summary tables of all of the wetlands and waterbodies delineated to date in the project area are provided in Appendix V.
- Access roads to two of the additional eight turbines will cross Category 1 wetlands. No waterbodies will be affected by the additional access roads. No impacts will occur to Category 3 wetlands, exceptional warmwater habitats, or state resource waters.
- The applicant anticipates that the additional impacts from the additional eight turbines will be permissible under Nationwide Permit 12, under which the Blue Creek Wind Farm has previously been authorized. Blue Creek Wind LLC will submit amended construction documents to the U.S. Army Corps of Engineers, Buffalo District to confirm that the project still qualifies for authorization under NWP 12.

- It is the intent of the Applicant to keep total wetland impacts per location to less than 0.1 acre so under the USACE Nationwide permit program the Facility can be authorized without a mitigation requirement.

**(b) Impact of Construction on Major Species**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(c) Mitigation of Short and Long-term Construction Impacts**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Operation**

No text changes have occurred in this section (sections 3(a) through 3(d)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(C) ECONOMICS, LAND USE AND COMMUNITY DEVELOPMENT**

**(1) Land Uses**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(a) Land Use Map**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public



Need on August 23, 2010, except that Figures 8-4 and 8-5 have been updated to include the eight new turbines in the revised layout.

**(b) Residential Structures In Relation to the Boundary of the Proposed Facility**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- Residential structures were reviewed to determine if they will be located within either 1,000 feet or 100 feet of a Facility component, including turbine towers, underground and aboveground 34.5 kV collection lines, the 115 kV aboveground collection lines, project collector substation (which includes a substation and the O&M building), project collection substation, interconnection substation, and access roads. For this analysis, the centerline was used for all linear Facility components (electric collection system and access roads), center-points for the turbine towers, and the footprint for residences, substations, and O&M building. There are 154 residences within 1,000 feet of access roads or collection lines. A total of 22 residences within 100 feet of access roads or collection lines and include 20 in the approved Certificate and two associated with the eight new turbines. Revised Table A8-7 lists the residential structures within 100 feet of an access road or collection line. The table also provides the residence ID, tax lot ID, owner, latitude and longitude, and distance from the access road or collection line. No residences are within 1,200 feet of a proposed turbine.

**TABLE 8-7 [REPLACES TABLE 8-7 ON APPLICATION, 8-57]**  
Residential Structures within 100 feet of the Facility

Residence ID#	Tax Lot ID, Owner	Longitude, Latitude	Distance (feet)	Facility ID#	Facility Component	Turbine Layout
61	080122120100, James L & Phyllis L Rolsten JTS	-84.68302658, 40.92921748	47.89	202	Project Collector System	Original
91	080115760000, David A Shook	-84.68365006, 40.9315185	66.10	201	Project Collector System	Original

**TABLE 8-7 [REPLACES TABLE 8-7 ON APPLICATION, 8-57]**  
**Residential Structures within 100 feet of the Facility**

Residence ID#	Tax Lot ID, Owner	Longitude, Latitude	Distance (feet)	Facility ID#	Facility Component	Turbine Layout
106	080117240200, Brenda A Delong	-84.62935656, 40.93840038	77.12	293	Access Roads	Original
124	080117520100, Juanita L Hotmire (Niswander)	-84.59178509, 40.94179982	82.26	187	Project Collector System	Original
134	080118120100, Carl E & Christi L Short	-84.57886514, 40.94567108	84.44	195	Project Collector System	Original
148	080118240000, Erik R & Heather R Williams (JTS)	-84.58146044, 40.94614834	88.98	184	Project Collector System	Original
152	080116880100, Gene D & Vickie L Pool	-84.64832087, 40.94502761	93.29	207	Project Collector System	Original
159	080112400000, Kathleen Jo Brotherwood Liv Tr	-84.58161815, 40.94651787	50.09	184	Project Collector System	Original
169	150391620100, Nancy Mihm	-84.57181808, 40.94707391	43.52	195	Project Collector System	Original
182	080114720100, Marie A Nelson	-84.65223551, 40.94605631	85.68	211	Project Collector System	Original
198	080113080100, Richard L & Tonya R Jellison JTS	-84.59187911, 40.9503038	87.57	187	Project Collector System	Original
212	080114920200, Jason J Hoersten	-84.66709508, 40.95332616	55.01	390	Access Roads	Original
215	080114200100, Rex L & Nancy K Replogle	-84.63025096, 40.95482816	90.14	297	Access Roads	Original
234	080111840100, Robin Lynn Zinsmaster	-84.58245461, 40.96108018	91.00	220	Project Collector System	Original
258	010004680000, William J & Lorraine Collins	-84.69518612, 40.96073714	64.10	402	Access Roads	Original
284	080109720000, Arthur R Fiock	-84.6490924, 40.97290959	71.23	203	Project Collector System	Original
304	080108360100, Gary W & Janell M Dicke	-84.64832389, 40.9753111	39.17	207	Project Collector System	Original
321	080107040000, William Joseph Roop	-84.58259832, 40.98199099	71.87	220	Project Collector System	Original
386	0525-00300, Annexed to Village of Haviland	-84.59984443, 40.99002456	57.94	171	Project Collector System	Original
424	0536-00500, Karen M. Keipper	-84.59110522, 40.99724164	29.96	343	Access Roads	Original
431	24-32S-009-00 Terry L. Boroff, Sr.	-84.534452, 40.997335	67.20		Access Road	8 Amended Turbines
431	24-32S-009-00 Terry L. Boroff, Sr.	-84.534452, 40.997335	97.78		Project Collector System	8 Amended Turbines

**(c) Wind Turbine Structure Locations [Application, 8-58]**

As shown in Revised Table A8-8, no residences are within 1,000 feet of a wind turbine. In accordance with the Applicant policy, no residences will be within 1,200 feet of a wind turbine.

**TABLE A8-8 [REPLACES TABLE 8-8, APPLICATION, 8-58]**  
Residential Structures Near Facility Components

<b>Facility Component</b>	<b>Number of Structures within 100 feet of Facility Component</b>	<b>Number of Structures within 1,000 feet of Facility Component</b>
Wind Turbine	0	0
Access Roads	6	37
34.5 kV Collection Lines	16	109
115 kV Collection	0	8
<b>Total</b>	<b>22*</b>	<b>154*</b>

\* The total counts some residential structures more than once.

**(i) Distance from Base to Property Line**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(ii) Distance from Blade to Residential Structure**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(iii) Waiver of Minimum Setback**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(d) Impact of Proposed Facility**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- Approximately 1,484.2 acres of land would be temporarily affected and 166.3 acres of land permanently affected by construction of turbines and associated access roads (Table A8-9). As shown in Table A8-9, agricultural land uses account for 99.2 percent of the area that would be permanently affected if all of the 160 turbines detailed in this Amendment and associated facilities were constructed. (The December 21, 2009 filing identified agricultural land uses account for 97.4 percent of the area that would be permanently affected if all of the 167 turbines were constructed.) Lower intensity developed uses, or open space, would account for approximately 0.7 percent of the permanently impacted land uses.

TABLE A4-9 (REPLACES TABLE 8-9 ON APPLICATION, 6-00)  
Land Use Within the Project Area

Land Use Within the Project Area															
	Total Land Use			Original 152 Turbines				Additional 8 Turbines				Total 160 Turbines			
	Temporary	Percent of Total		Temporary	Percent of Total	Permanent	Percent of Total	Temporary	Percent of Total	Permanent	Percent of Total	Temporary	Percent of Total	Permanent	Percent of Total
Agricultural Land	38,601.1 acres	95.2		1,405.0 acres	99.11	158.0 acres	98.20	66.5 acres	99.85	5.4 acres	99.44	1,471.5 acres	99.14	163.4 acres	98.26
Cultivated Lands															
Deciduous Forest	717.6 acres	1.77		0.3 acres	0.02	0.3 acres	0.19	Zero	0	Zero	0	0.3 acres	0.02	0.3 acres	0.18
Developed, High Intensity	Zero	0		0.3 acres	0.02	Zero	0	Zero	0	Zero	0	0.3 acres	0.02	Zero	0
Developed, Low Intensity	1075.9 acres	2.65		10.3 acres	0.73	1.5 acres	0.93	0.1 acres	0.15	Zero	0	10.3 acres	0.70	1.5 acres	0.90
Pasture Land (Permanent)	93.6 acres	0.23		0.1 acres	0.01	0.1 acres	0.06	Zero	0	Zero	0	0.1 acres	0.01	0.1 acres	0.06
Shrub and Brush Rangeland	28.4 acres	0.07		0.9 acres	0.06	0.5 acres	0.31	Zero	0	Zero	0	0.9 acres	0.06	0.5 acres	0.30
Lakes and Ponds	30.1 acres	0.07		0.8 acres	0.06	0.5 acres	0.31	Zero	0	Zero	0	0.8 acres	0.05	0.5 acres	0.30
Total	40,548.7 acres	100		1,417.7 acres	100	180.9 acres	100	66.6 acres	100	5.4 acres	100	1,484.2 acres	100	166.3 acres	100

Note: Percentage values have been rounded, so totals are approximately 100 percent.

**(e) Identification of Structures to be Removed or Relocated**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(f) Plans for Future Use**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(g) Concurrent or Secondary Uses**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(2) Economics**

No text changes have occurred in this section (Sections 2(a) through 2(d)) of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Public Services and Facilities**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(a) Sewerage and Sewer Treatment**

**Construction and Operations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Water**

**Construction**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following at the end of the paragraph [Application, 8-64]:

- The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not considering the construction of a temporary concrete batch plant for producing concrete as was previously identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**Operations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(c) Solid Waste Management**

**Construction and Operations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(d) Police Protection**

**Construction and Operations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(e) Fire Protection and Emergency Response**

**Construction and Operations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(f) Health Care**

**Construction and Operations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(g) Schools**

**Construction and Operations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.



**(4) Impact on Regional Development**

**(a) Description**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(i) Housing**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(ii) Commercial and Industrial Development**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- The Applicant's General Contractor is purchasing concrete from a local supplier. The Applicant is not planning the construction of a temporary concrete batch plant for producing concrete as was identified in the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. Therefore, development associated with the temporary batch plant will no longer be necessary.

**(iii) Transportation System Development**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Compatibility with Regional Plans**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(D) CULTURAL IMPACT****(1) Landmarks of Cultural Significance**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- Additional archaeological investigations were performed for eight additional turbines and associated infrastructure areas during March 2011. No archeological artifacts were recovered during the survey. Therefore, no historic properties, as defined in 36 CFR 800.16(l), will be impacted by the proposed project in the Amendment areas. Figure 8-5 has been revised to reflect the eight additional turbines. Appendix Z summarizes the findings of these investigations. A report for incorporating impacts for the additional eight turbines will be submitted to OPSB upon completion of the survey and consultations with the Ohio Historical Society (OHS).

**(a) Archeological Investigation**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- Additional archaeological investigations were performed during March 2011 for the eight additional turbines and associated infrastructure areas. Appendix Z summarizes the findings of these investigations. A report for incorporating impacts for the additional eight turbines will be submitted to OPSB upon completion of the survey and consultations with OHS.

**(b) Architectural Investigation**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. The eight new turbines are situated within the previously studied project boundary and will not require any additional survey.

**(i) Built Resources**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(ii) Historic Districts**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(iii) Rural Schools**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(iv) Agricultural Properties**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(v) Individual Properties**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(2) Estimated Impacts on Landmarks**

**(a) Archeological Resources**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- The Archaeological report has been updated and is included as Appendix Z.

**(b) Built Resources**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Consideration of Landmarks**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(4) Mapping Landmarks**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- Figure 8-4 has been updated to include the eight new turbines and associated support infrastructure.

**(5) Recreational Areas**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(6) Visual Impacts**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. The eight new turbines are intermingled with other turbines within the original Project Area boundary.

**(E) PUBLIC RESPONSIBILITY**

**(1) Public Information Program**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010. A public hearing was held on July 8, 2010 at Lincoln View Local School. With the initiation of construction on the first 152 turbines, Blue Creek has continued its efforts with community involvement by attending regular meetings with local officials, a continued local presence with the office at 126 East Main Street in Van Wert, and keeping a fulltime "landowner liaison" on contract to respond to whatever questions or concerns arise.

**(2) Liability Insurance**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Evaluation of Interference with Radio and Television**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(a) Microwave**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Radio**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(c) Television**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(d) Cellular and Personal Communication Systems**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(4) Evaluation of Interference with Military Radar**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(5) Evaluation of Impact to Roads and Bridges**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- Appendix CC information has been updated to include transportation routes related to the eight new turbines.

**(6) Plan for Decommissioning**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(F) AGRICULTURAL DISTRICT IMPACT****(1) Agricultural District Mapping**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(2) Impact Assessment on Agricultural Land**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

- The Facility would disturb some agricultural land temporarily (1,484.2 acres) and occupy some agricultural land permanently (166.3 acres). (The Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, identified that the Facility would disturb some agricultural land temporarily (1,237.3 acres) and occupy some agricultural land permanently [213.2 acres]) [First paragraph, Application, 8-96].

- The Applicant would like to clarify the total acreage of temporary and permanent impact to agricultural land: 1,099.0 acres of temporary impact and 140.6 acres of permanent impact would occur in Van Wert County, and 385.2 acres of temporary impact and 25.7 acres of permanent impact would occur in Paulding County. Of the acres of impact to agricultural land, 55.6 acres of temporary impact and 3.0 acres of permanent impact would occur within a designated agricultural district in Van Wert County. Of the acres of impact to agricultural land, 31.3 acres of temporary impact and 2.8 acres of permanent impact would be within a designated agricultural district in Paulding County.

**(a) Field Operations**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(b) Irrigation**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(c) Field Drainage Systems**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.

**(3) Mitigation for Agricultural Land Impacts**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010.



**(4) Agricultural Land Viability Assessment**

No text changes have occurred in this section of the Blue Creek Application approved by OPSB for a Certificate of Environmental Compatibility and Public Need on August 23, 2010, except the following:

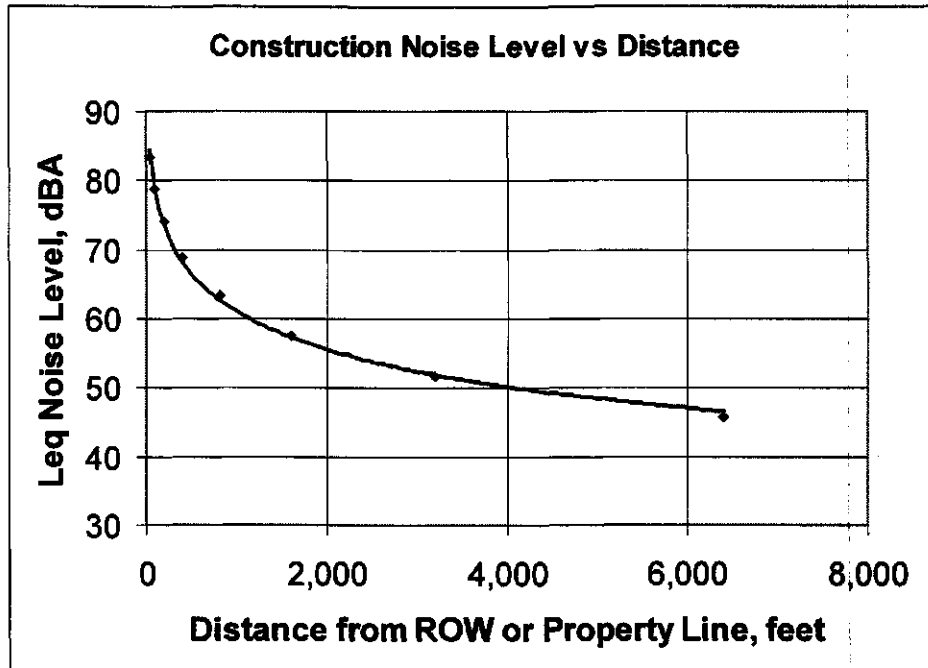
- The temporary and permanent impact of the construction and operation of the Facility on the viability of agricultural land has been revised and is quantified in Table A8-13.

**TABLE A8-13 [REVISED, APPLICATION, 8-101]-**  
 Temporary and Permanent Impacts on the Viability of Agricultural Land

Agricultural Land	Original 152 Turbines		Additional 8 Turbines		Total 160 Turbines	
	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Total Agricultural Land	1,405.1 acres	158.1 acres	66.5 acres	5.4 acres	1,471.6 acres	163.5 acres
Cultivated Lands	1,405.0 acres	158.0 acres	66.5 acres	5.4 acres	1,471.5 acres	163.4 acres
Pasture Land (Permanent)	0.1 acres	0.1 acres	Zero*	Zero	0.1 acres	0.1 acres
Managed Wood Lots	Zero	Zero	Zero	Zero	Zero	Zero
Orchards	Zero	Zero	Zero	Zero	Zero	Zero
Nurseries	Zero	Zero	Zero	Zero	Zero	Zero
Livestock and Poultry Confinement Areas	Zero	Zero	Zero	Zero	Zero	Zero
Agricultural Related Structures	Zero	Zero	Zero	Zero	Zero	Zero

\* Actual total is 0.02 acres. Rounded to Zero for presentation

FIGURE A08-1  
Estimated Construction Noise Levels



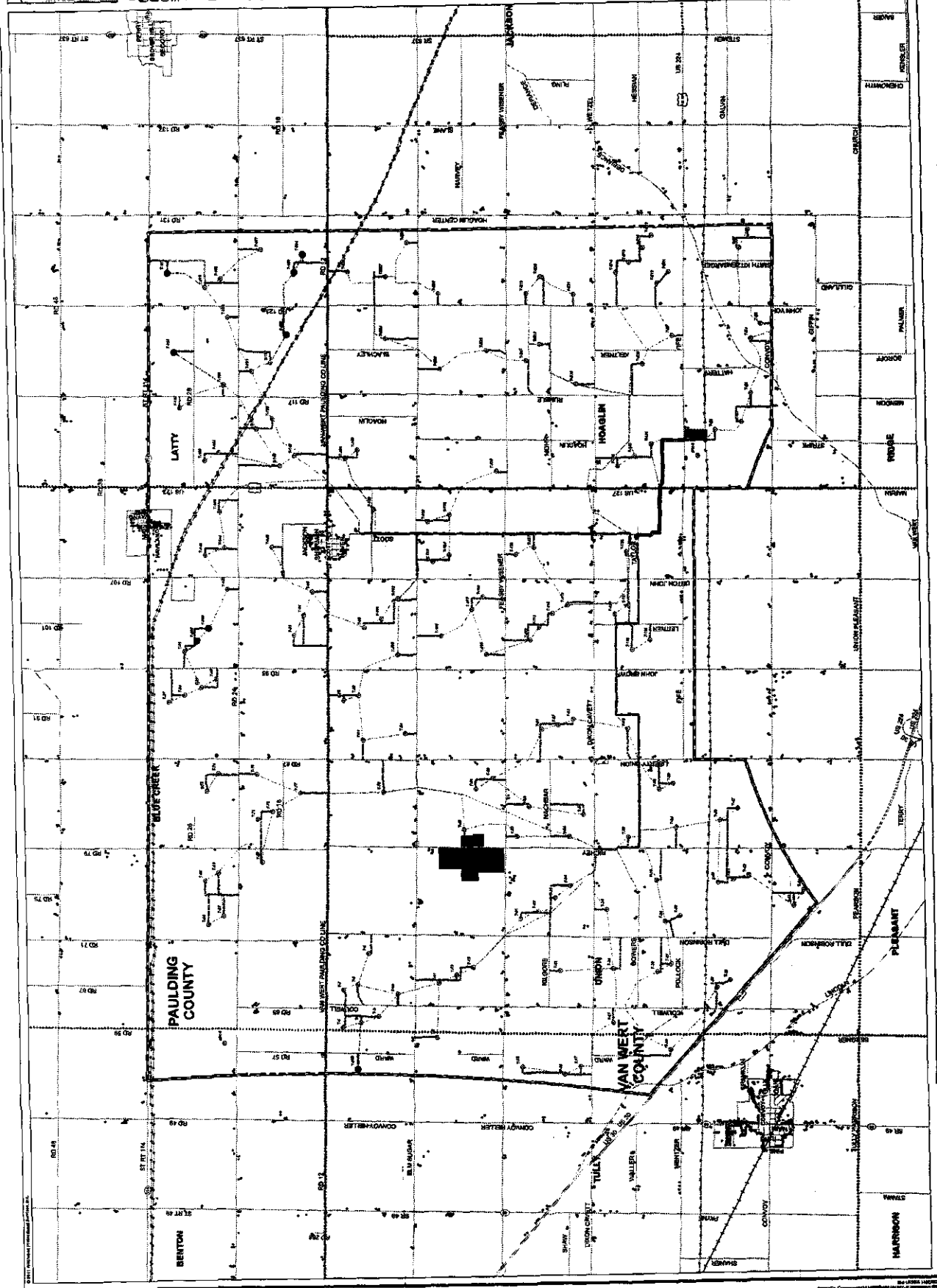


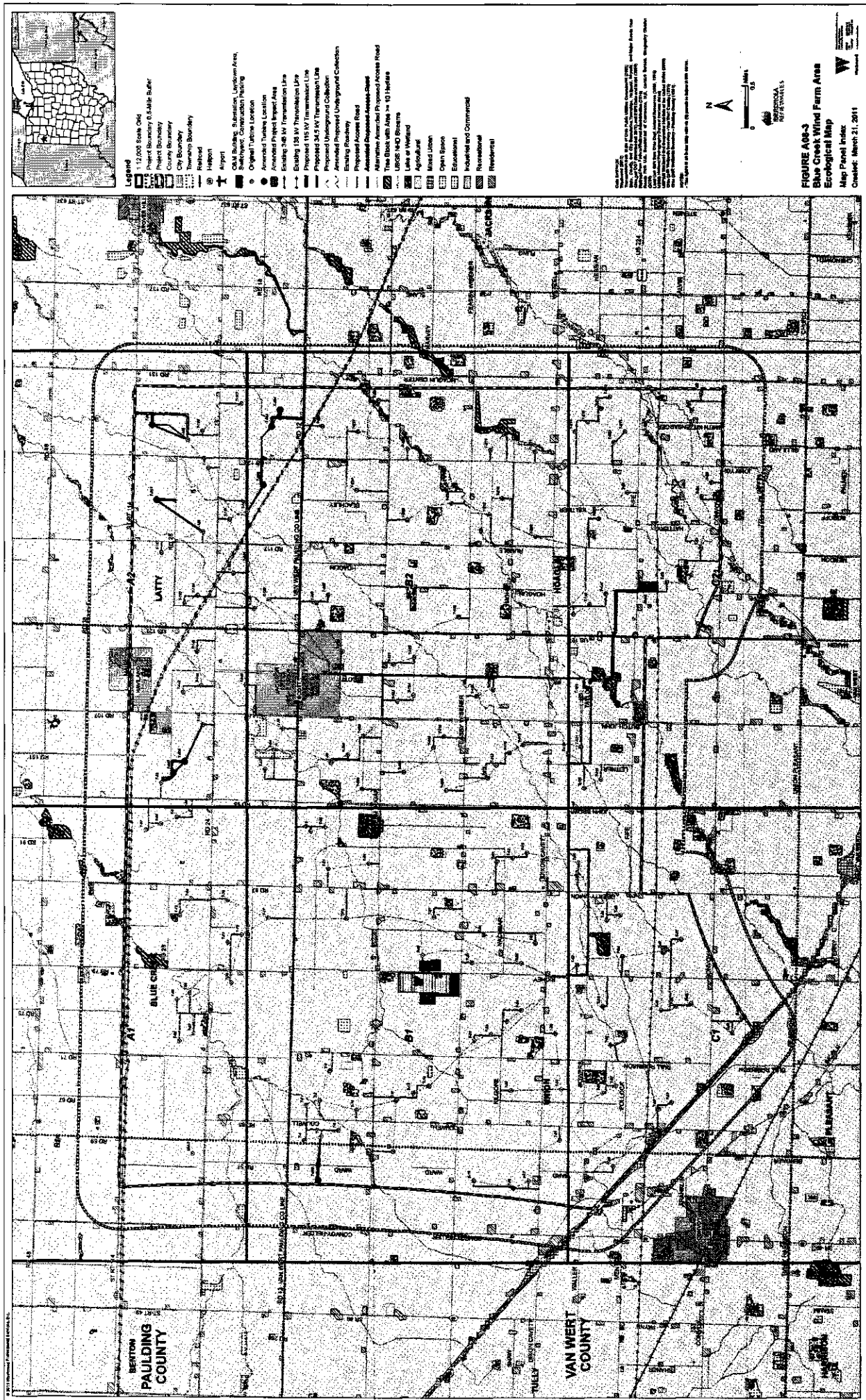
**Legend**

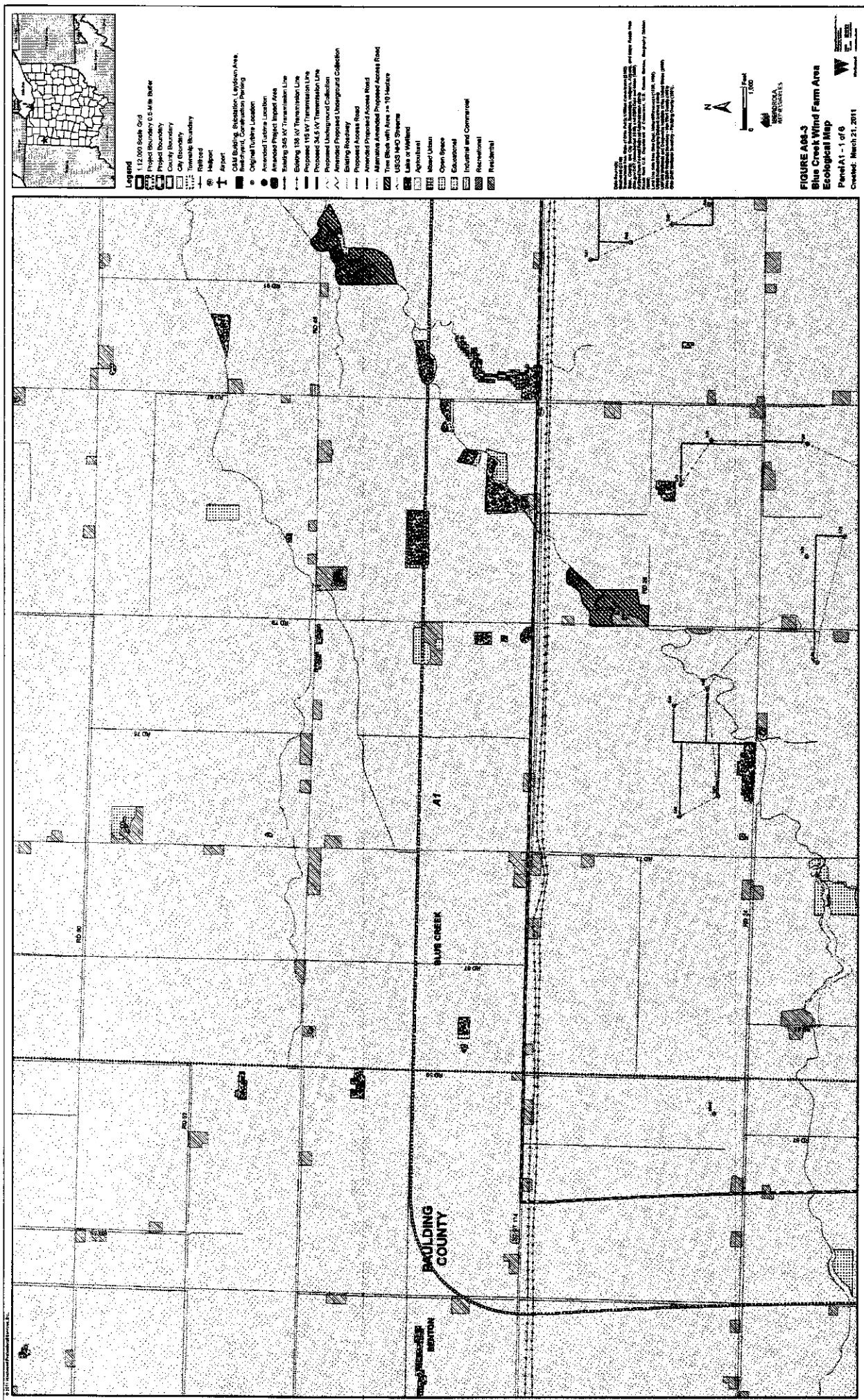
- Project Boundary
- County Boundary
- City Boundary
- Unincorporated Area Boundary
- Residence Location
- QAM Building, Substation, Laydown Area
- Backyard, Construction Parking
- Original Turbine Location
- Amended Turbine Location
- Existing 345 kV Transmission Line
- Existing 138 kV Transmission Line
- Proposed 115 kV Transmission Line
- Proposed 345 kV Transmission Line
- Proposed Underground Collection
- Existing Roadway
- Proposed Access Road
- Amended Proposed Access Road
- Alternative Amended Proposed Access Road
- Sound Sensitive Boundary
- Health Care, Amended Lining
- Religious Institutions
- Sound

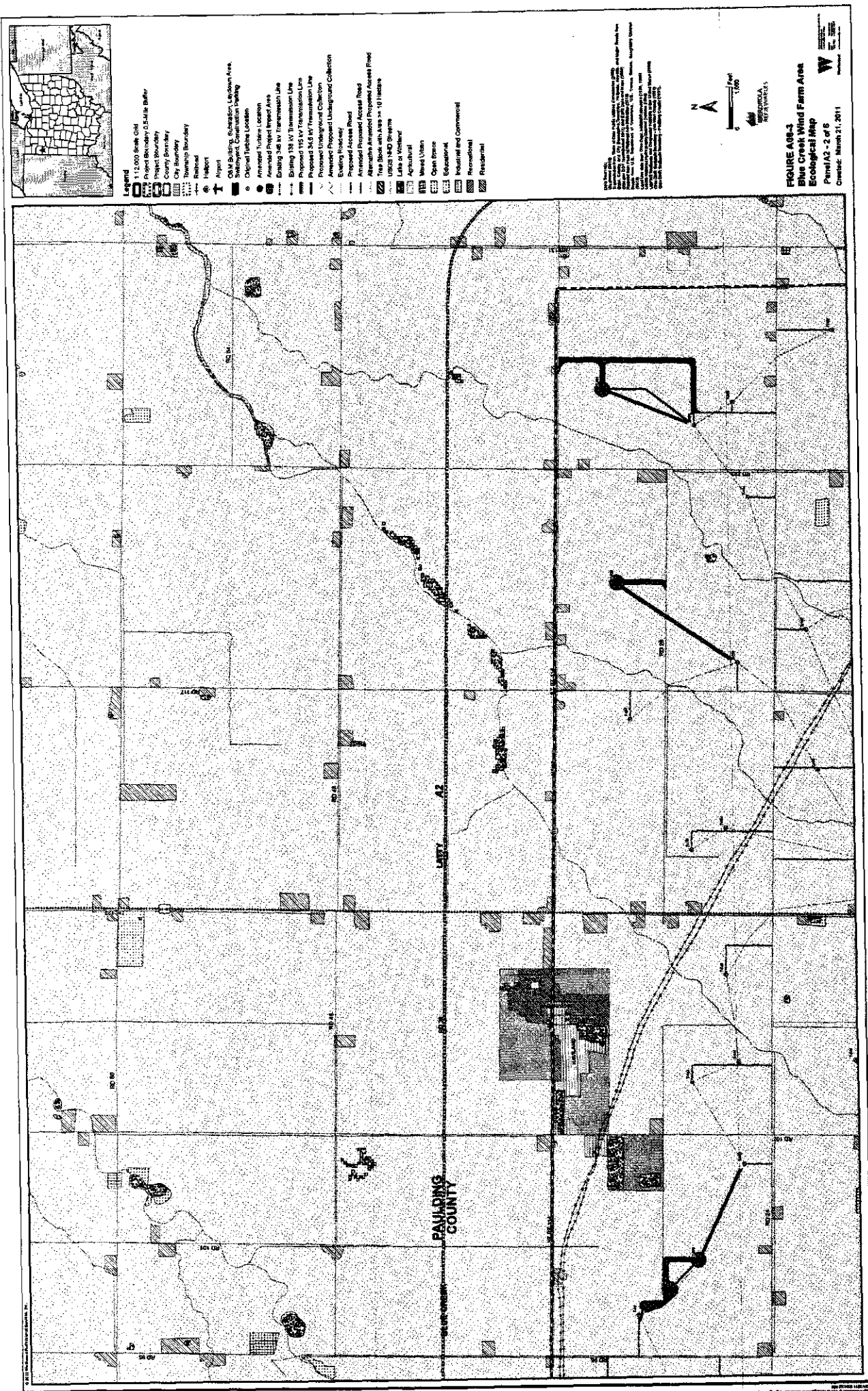
Scale: 1 inch = 1 mile  
North Arrow

FIGURE A05-2  
Blue Creek Wind Farm Area  
Sound Sensitive Resources Map  
Panel 1 of 1  
Created: March 21, 2011





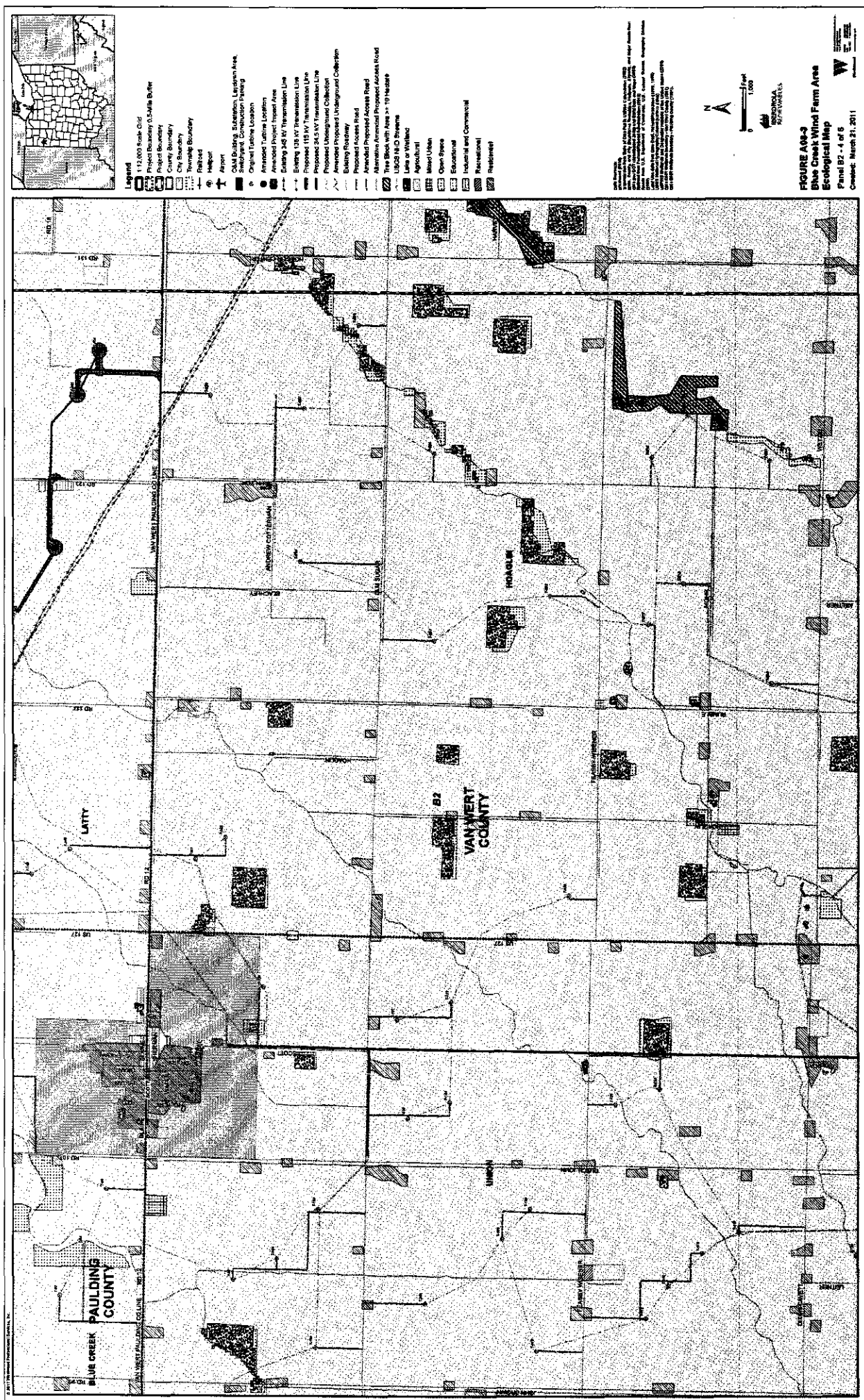


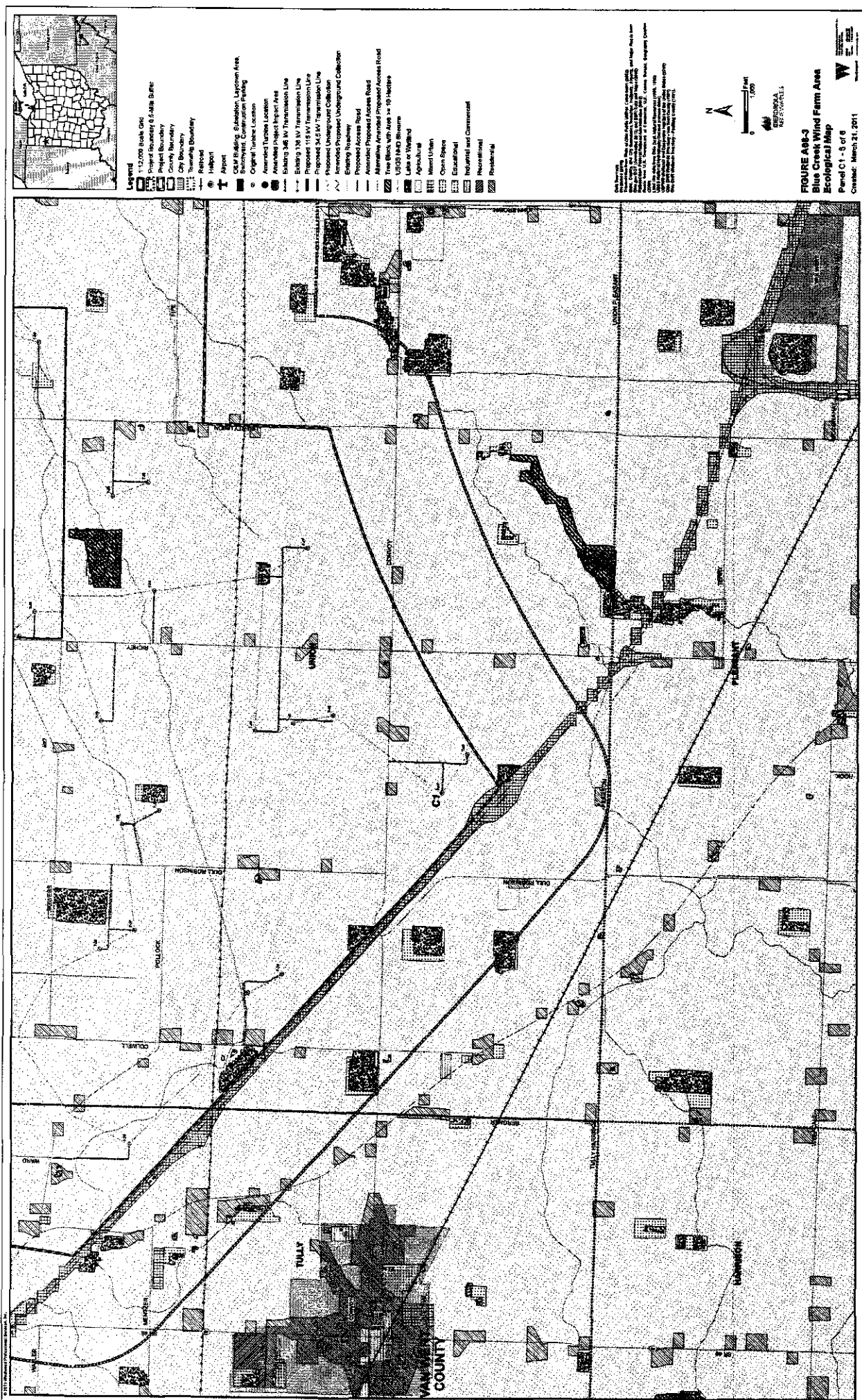


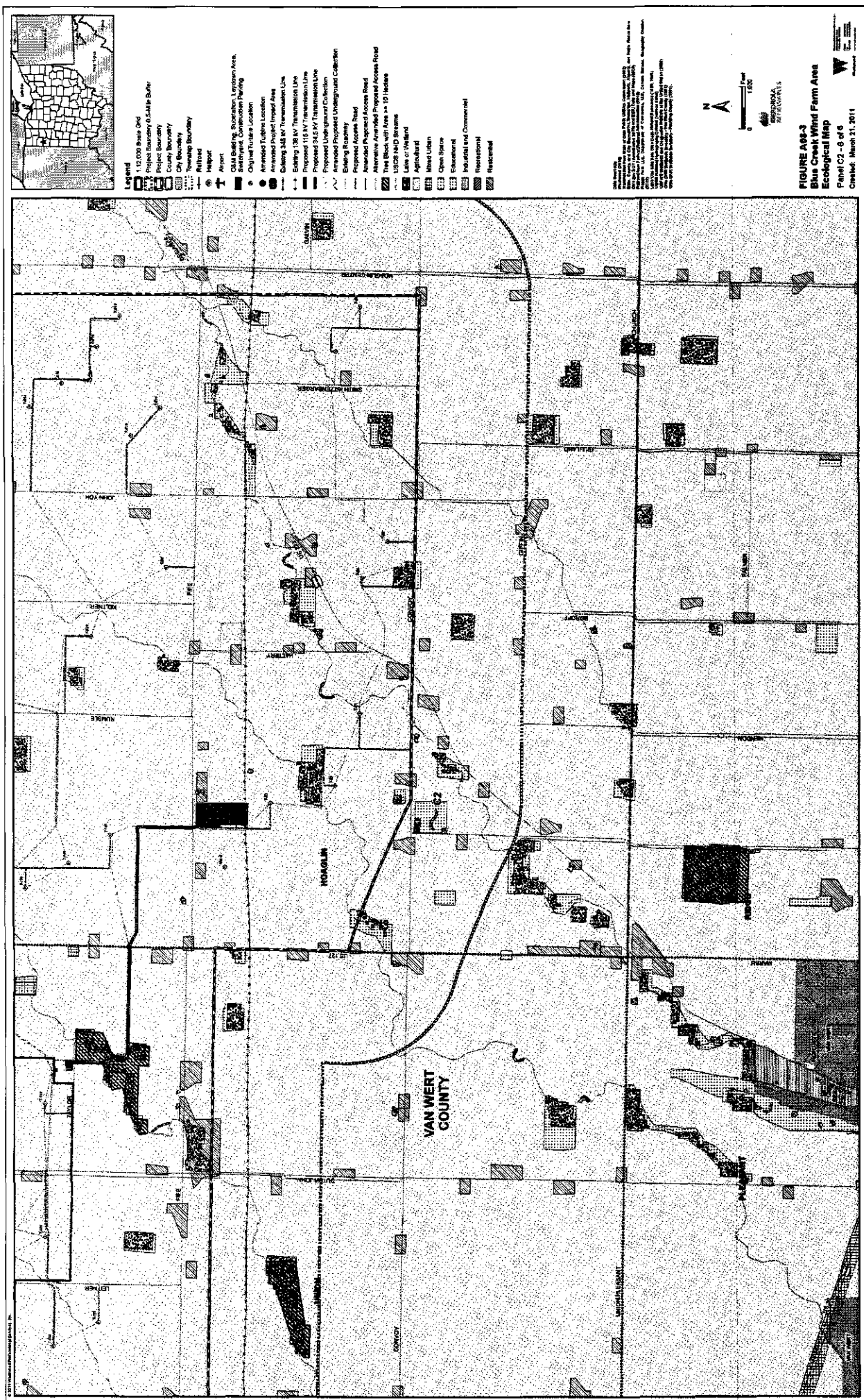
**FIGURE A08-3**  
**Blue Creek Wind Farm Area**  
**Ecological Map**  
Panel A2 - 2 of 6  
Created: March 21, 2011

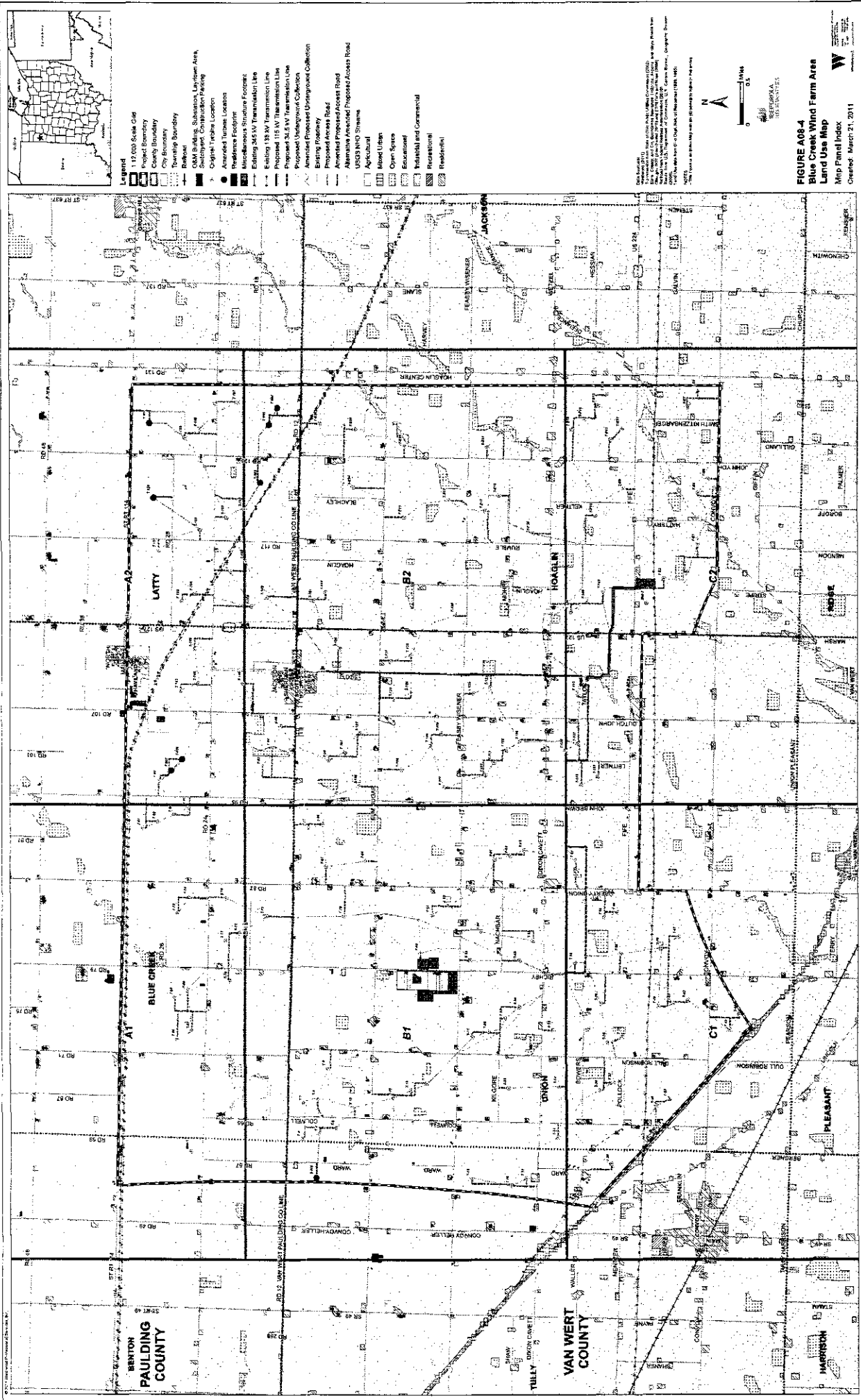












**Legend**

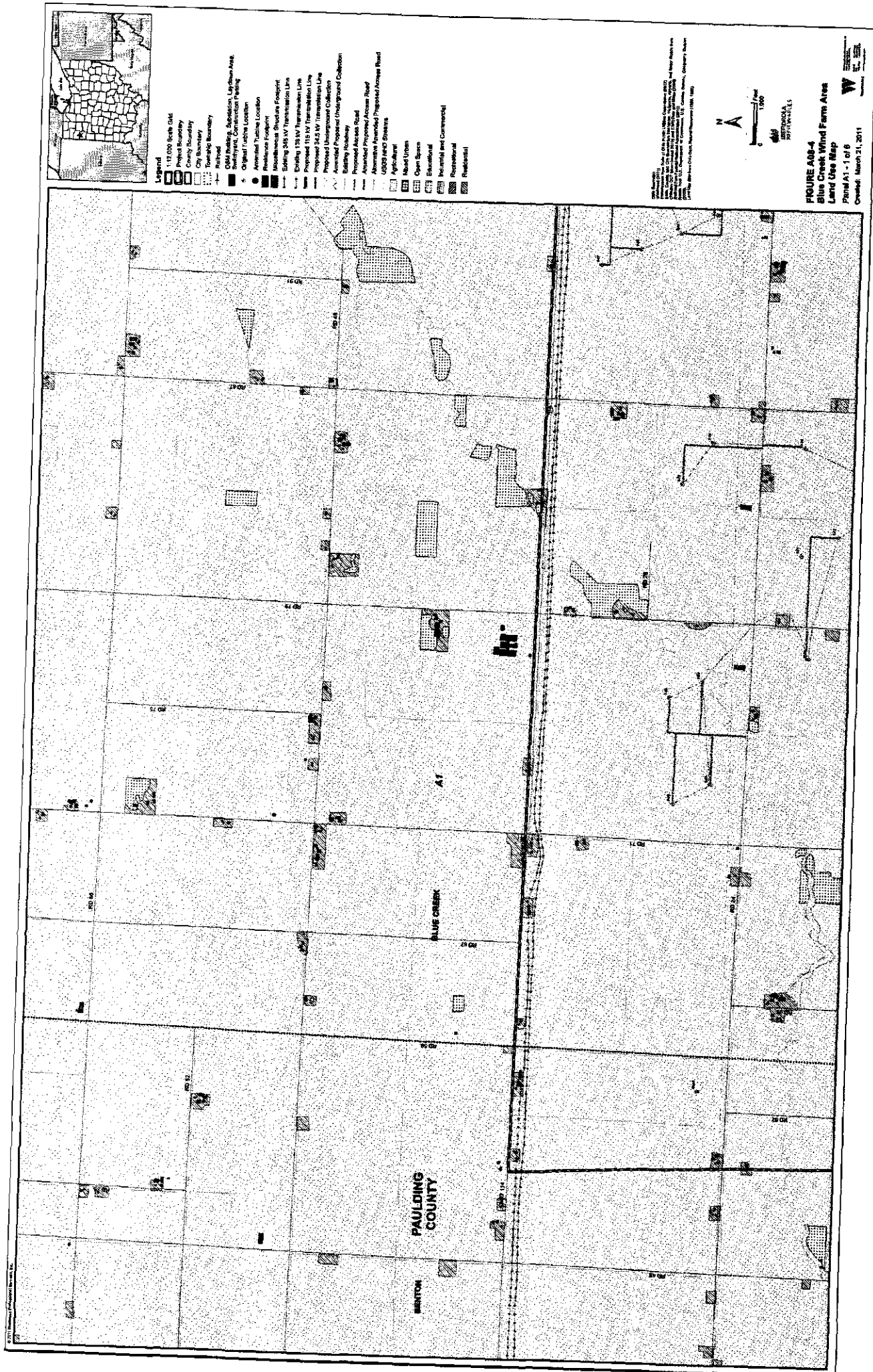
- 1:10,000 Scale Grid
- Project Boundary
- County Boundary
- City Boundary
- Township Boundary
- Relief
- 1500' Buffer, Substation, Layover Area, Utility
- Original Tract Location
- Approved Tract Location
- Preference Footprint
- Microbusiness Structure Footprint
- Existing 24.5 kV Transmission Line
- Existing 138 kV Transmission Line
- Proposed 138 kV Transmission Line
- Proposed 34.5 kV Transmission Line
- Proposed Underground Collection
- Approved Proposed Underground Collection
- Existing Footprint
- Proposed Access Road
- Approved Proposed Access Road
- Approved Proposed Access Road
- US 224 Right of Way
- Agricultural
- Urban Uses
- Open Space
- Education
- Industrial and Commercial
- Recreational
- Residential

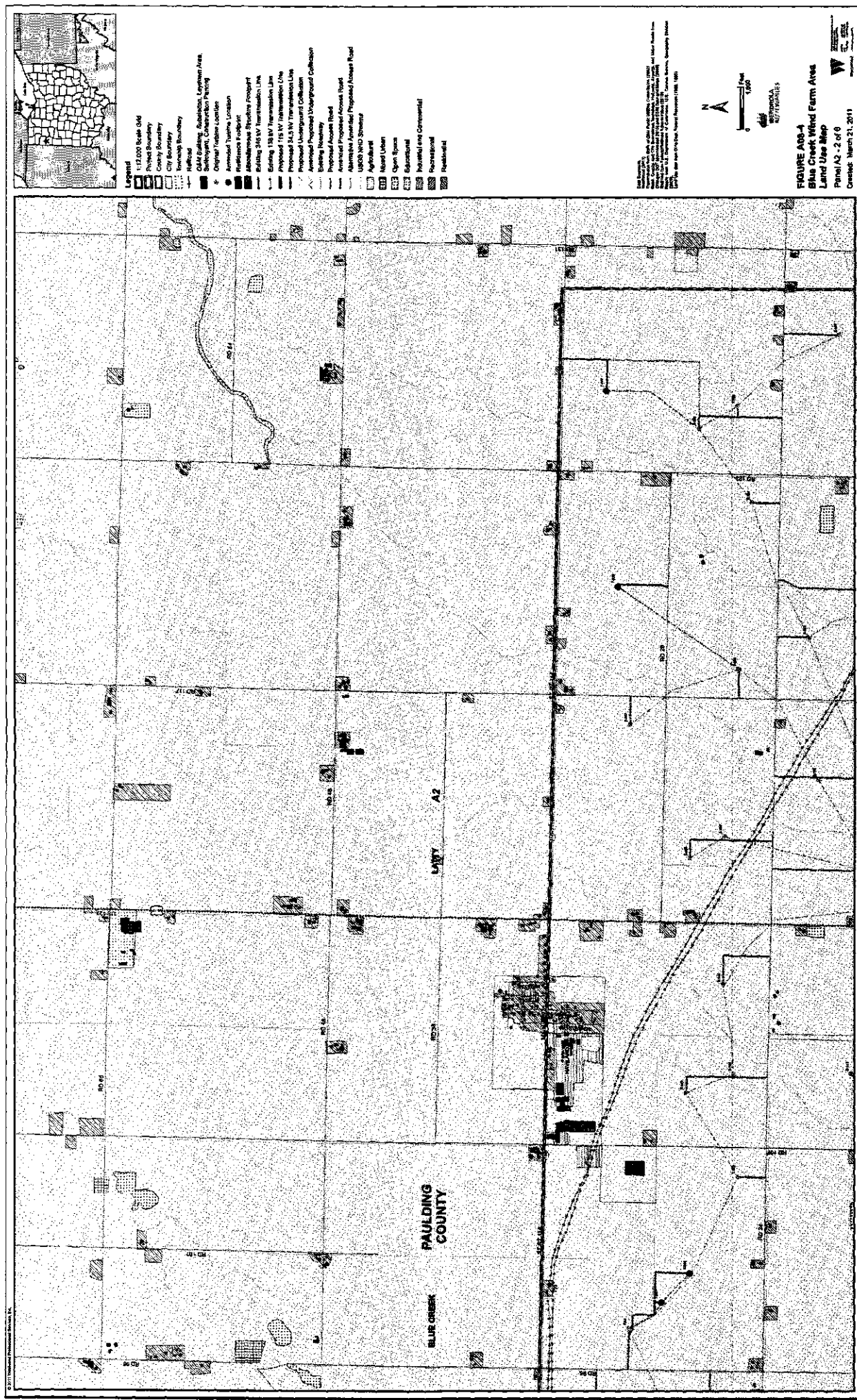


**FIGURE A08.4**  
**Blue Creek Wind Farm Area**  
**Land Use Map**  
Map Panel Index  
Created: March 21, 2011











Legend

1:12,000 Scale GSI

Project Boundary

County Boundary

City Boundary

Township Boundary

Water

Substation Location

Original Turbine Location

Proposed Turbine Location

Residence Footprint

Manufacture Structure Footprint

Existing 138 kV Transmission Line

Proposed 138 kV Transmission Line

Proposed 54.8 kV Transmission Line

Proposed Underground Collection

Existing Roadway

Proposed Roadway

Proposed Access Road

Alternative Proposed Access Road

USGS Wetland

Agricultural

Forest

Open Space

Barren

Barren and Commercial

Recreational

Residential

N

0 100 200 Feet

Scale

North Arrow

Scale

Scale

Scale

Scale

Scale

Scale

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Scale

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FIGURE A09-4  
Blue Creek Wind Farm Area  
Land Use Map

Panel B1 - 3 of 6

Created: March 21, 2011

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W

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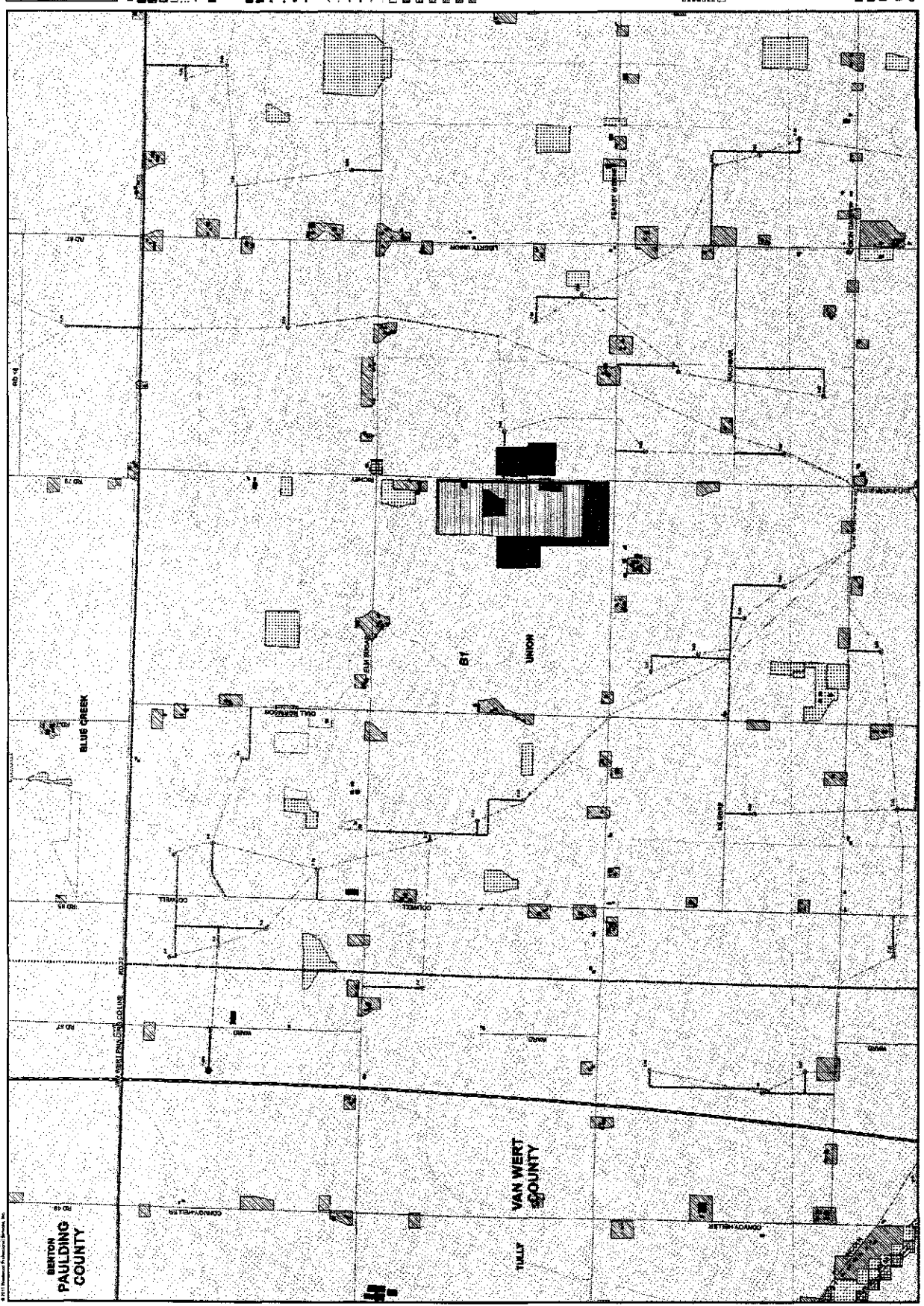
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BRITTON PAULDING COUNTY

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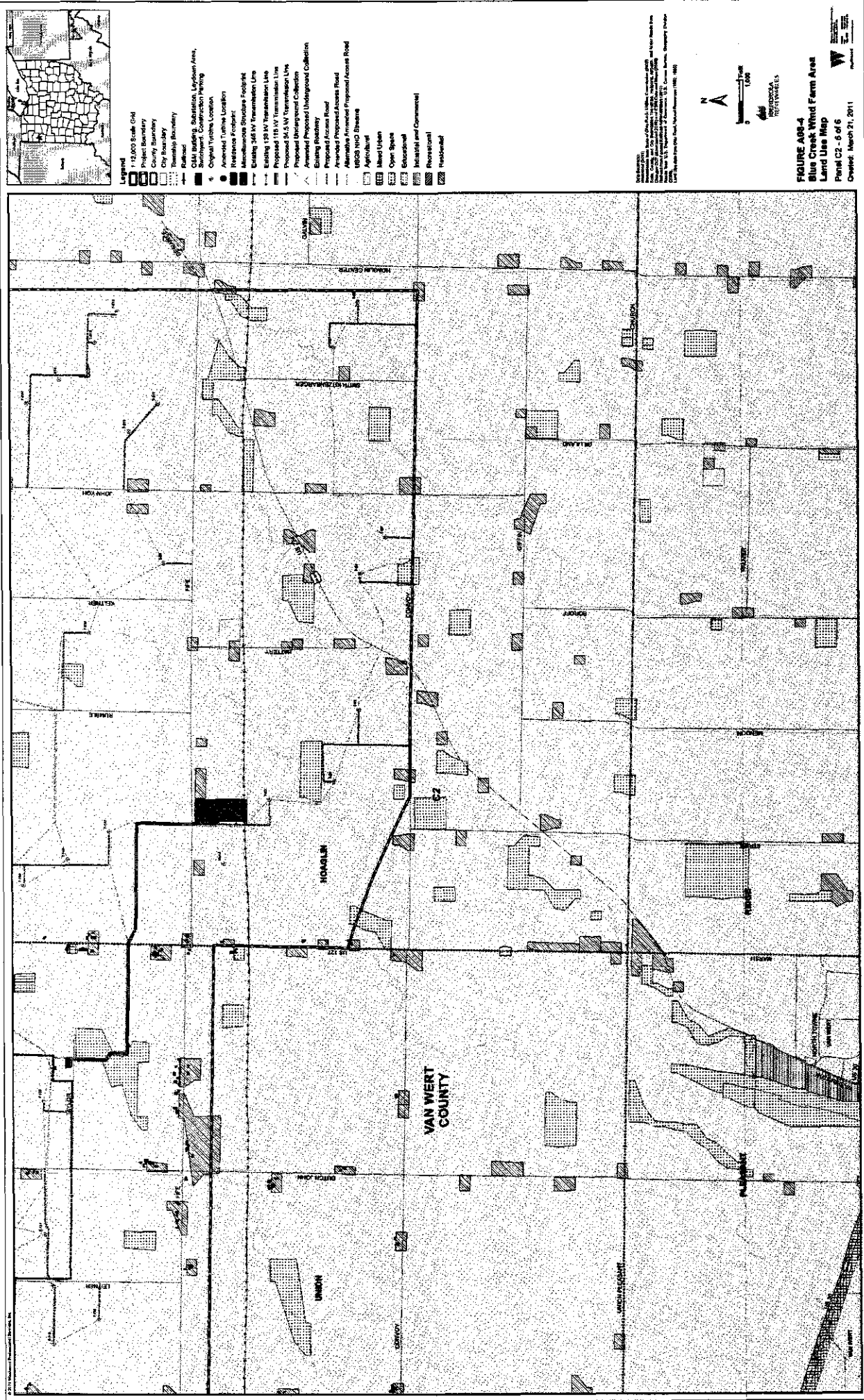
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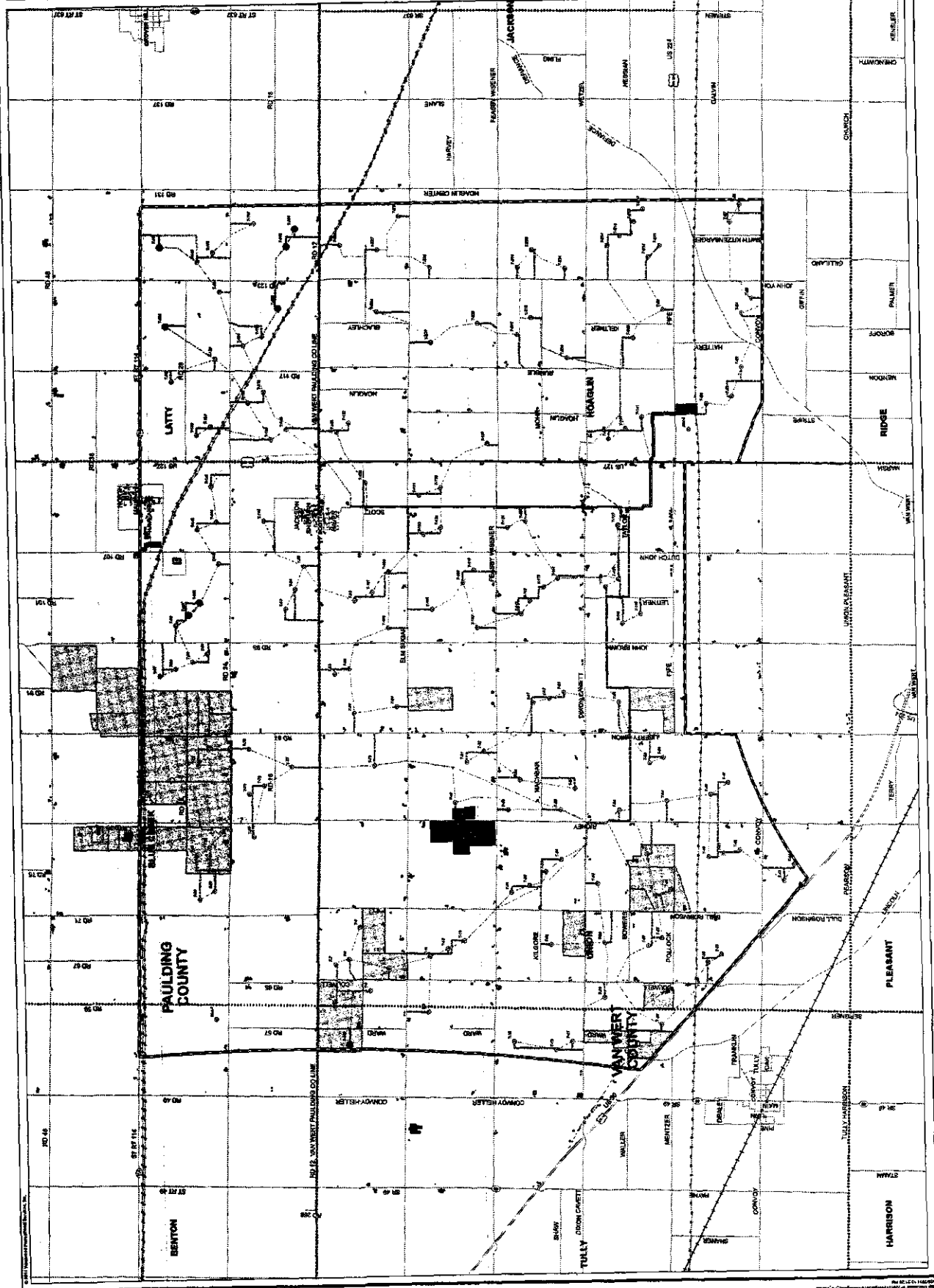




- Legend**
- Project Boundary
  - City Boundary
  - Township Boundary
  - Railroad
  - Highway
  - Other Structures Footprint
  - Other Building, Substation, Laydown Area, Switchyard, Construction Paving
  - Original Turbine Location
  - Amended Turbine Location
  - Existing 345 kV Transmission Line
  - Existing 138 kV Transmission Line
  - Proposed 345 kV Transmission Line
  - Proposed 138 kV Transmission Line
  - Proposed Underground Collection
  - Amended Proposed Underground Collection
  - Existing Roadway
  - Proposed Access Road
  - Amended Proposed Access Road
  - Alternative Amended Proposed Access Road
  - Agricultural District Parcel



**FIGURE A08-6**  
**Blue Creek Wind Farm Area**  
**Agricultural District Properties Map**  
Panel 1 of 1  
Created: March 21, 2011



## REFERENCES

*The references have not changed from the original filing. Therefore, they are not included in this amendment.*

### **Appendix I – Federal Aviation Administration Studies**

*Updates for the eight additional turbines and associated infrastructure were sent to Federal Aviation Administration on March 10, 2011. FAA approval letters for the additional turbines are included in this appendix.*



Federal Aviation Administration  
Air Traffic Airspace Branch, ASW-520  
2601 Meacham Boulevard  
Fort Worth, TX 76137

Aeronautical Study No.  
2011-WTE-2977-OE

Issued Date: 03/24/2011

Tina Bartunek  
IBERDROLA RENEWABLES  
1125 NW Couch St  
Portland, OR 97209

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine 901
Location:	Scott, OH
Latitude:	41-00-58.13N NAD 83
Longitude:	84-31-38.29W
Heights:	485 feet above ground level (AGL) 1215 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

       At least 10 days prior to start of construction (7460-2, Part I)  
  X   Within 5 days after the construction reaches its greatest height (7460-2, Part II)

This determination expires on 09/24/2012 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO

SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

Additional wind turbines or met towers proposed in the future may cause a cumulative effect on the national airspace system. This determination is based, in part, on the foregoing description which includes specific coordinates and heights. Any changes in coordinates will void this determination. Any future construction or alteration requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

If we can be of further assistance, please contact our office at (404) 305-7081. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2011-WTE-2977-OE.

**Signature Control No: 138427210-139359925**

Michael Blaich  
Specialist

( DNE -WT )





Federal Aviation Administration  
Air Traffic Airspace Branch, ASW-520  
2601 Meacham Boulevard  
Fort Worth, TX 76137

Aeronautical Study No.  
2011-WTE-2978-OE

Issued Date: 03/24/2011

Tina Bartunek  
IBERDROLA RENEWABLES  
1125 NW Couch St  
Portland, OR 97209

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine 902
Location:	Scott, OH
Latitude:	40-59-47.94N NAD 83
Longitude:	84-32-24.15W
Heights:	485 feet above ground level (AGL) 1220 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint only - Chapters 12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

       At least 10 days prior to start of construction (7460-2, Part I)  
  X   Within 5 days after the construction reaches its greatest height (7460-2, Part II)

This determination expires on 09/24/2012 unless:

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- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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If we can be of further assistance, please contact our office at (404) 305-7081. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2011-WTE-2978-OE.

**Signature Control No: 138427212-139360924**  
Michael Blaich  
Specialist

( DNE -WT )



Federal Aviation Administration  
Air Traffic Airspace Branch, ASW-520  
2601 Meacham Boulevard  
Fort Worth, TX 76137

Aeronautical Study No.  
2011-WTE-2979-OE

Issued Date: 03/24/2011

Tina Bartunek  
IBERDROLA RENEWABLES  
1125 NW Couch St  
Portland, OR 97209

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine 903
Location:	Scott, OH
Latitude:	40-59-43.44N NAD 83
Longitude:	84-31-36.98W
Heights:	485 feet above ground level (AGL) 1215 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint only - Chapters 12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

☐ At least 10 days prior to start of construction (7460-2, Part I)  
☒ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

This determination expires on 09/24/2012 unless:

- (a) extended, revised or terminated by the issuing office.
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If we can be of further assistance, please contact our office at (404) 305-7081. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2011-WTE-2979-OE.

**Signature Control No: 138427214-139360921**

Michael Blaich

Specialist

( DNE -WT )



Federal Aviation Administration  
Air Traffic Airspace Branch, ASW-520  
2601 Meacham Boulevard  
Fort Worth, TX 76137

Aeronautical Study No.  
2011-WTE-2980-OE

Issued Date: 03/24/2011

Tina Bartunek  
IBERDROLA RENEWABLES  
1125 NW Couch St  
Portland, OR 97209

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine 905
Location:	Scott, OH
Latitude:	41-00-58.44N NAD 83
Longitude:	84-36-32.42W
Heights:	485 feet above ground level (AGL) 1225 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint only - Chapters 12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

☐ At least 10 days prior to start of construction (7460-2, Part I)  
☒ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

This determination expires on 09/24/2012 unless:

- (a) extended, revised or terminated by the issuing office.
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If we can be of further assistance, please contact our office at (404) 305-7081. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2011-WTE-2980-OE.

**Signature Control No: 138427216-139360923**  
Michael Blaich  
Specialist

( DNE -WT )



Federal Aviation Administration  
Air Traffic Airspace Branch, ASW-520  
2601 Meacham Boulevard  
Fort Worth, TX 76137

Aeronautical Study No.  
2011-WTE-2981-OE

Issued Date: 03/24/2011

Tina Bartunek  
IBERDROLA RENEWABLES  
1125 NW Couch St  
Portland, OR 97209

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine 906
Location:	Scott, OH
Latitude:	41-00-33.26N NAD 83
Longitude:	84-36-10.32W
Heights:	485 feet above ground level (AGL) 1225 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

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☒ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

This determination expires on 09/24/2012 unless:

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If we can be of further assistance, please contact our office at (404) 305-7081. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2011-WTE-2981-OE.

**Signature Control No: 138427218-139359924**  
Michael Blaich  
Specialist

( DNE -WT )





Federal Aviation Administration  
Air Traffic Airspace Branch, ASW-520  
2601 Meacham Boulevard  
Fort Worth, TX 76137

Aeronautical Study No.  
2011-WTE-2982-OE

Issued Date: 03/24/2011

Tina Bartunek  
IBERDROLA RENEWABLES  
1125 NW Couch St  
Portland, OR 97209

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine 907
Location:	Scott, OH
Latitude:	41-00-39.85N NAD 83
Longitude:	84-36-19.67W
Heights:	485 feet above ground level (AGL) 1225 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint only - Chapters 12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

- ☐ At least 10 days prior to start of construction (7460-2, Part I)  
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If we can be of further assistance, please contact our office at (404) 305-7081. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2011-WTE-2982-OE.

**Signature Control No: 138427220-139360918**  
Michael Blaich  
Specialist

( DNE -WT )



Federal Aviation Administration  
Air Traffic Airspace Branch, ASW-520  
2601 Meacham Boulevard  
Fort Worth, TX 76137

Aeronautical Study No.  
2011-WTE-2983-OE

Issued Date: 03/24/2011

Tina Bartunek  
IBERDROLA RENEWABLES  
1125 NW Couch St  
Portland, OR 97209

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine 908
Location:	Scott, OH
Latitude:	40-59-03.45N NAD 83
Longitude:	84-41-46.76W
Heights:	485 feet above ground level (AGL) 1245 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

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If we can be of further assistance, please contact our office at (404) 305-7081. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2011-WTE-2983-OE.

**Signature Control No: 138427222-139359931**  
Michael Blaich  
Specialist

( DNE -WT )



Federal Aviation Administration  
Air Traffic Airspace Branch, ASW-520  
2601 Meacham Boulevard  
Fort Worth, TX 76137

Aeronautical Study No.  
2011-WTE-2996-OE

Issued Date: 03/24/2011

Tina Bartunek  
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**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine 925
Location:	Scott, OH
Latitude:	41-00-54.30N NAD 83
Longitude:	84-32-38.70W
Heights:	485 feet above ground level (AGL) 1215 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4, 12 & 13 (Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

☐ At least 10 days prior to start of construction (7460-2, Part I)  
☒ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

This determination expires on 09/24/2012 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO

SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

Additional wind turbines or met towers proposed in the future may cause a cumulative effect on the national airspace system. This determination is based, in part, on the foregoing description which includes specific coordinates and heights . Any changes in coordinates will void this determination. Any future construction or alteration requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

If we can be of further assistance, please contact our office at (404) 305-7081. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2011-WTE-2996-OE.

**Signature Control No: 138427248-139359930**  
Michael Blaich  
Specialist

( DNE -WT )

## **Appendix K – Shadow Flicker Analysis Report**

*The final shadow flicker report for the eight additional turbines and support structures is presented in this Appendix.*

## SHADOW FLICKER ANALYSIS

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Blue Creek Wind Farm  
Van Wert and Paulding Counties, OH



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April 7, 2010  
Revised April 4, 2011



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## 1.0 INTRODUCTION AND SUMMARY

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The Blue Creek Wind Project is an up to a 320 megawatt (MW) wind power generation facility proposed for Van Wert and Paulding Counties, Ohio. The wind turbines will be located within the townships of Blue Creek and Latty in Paulding County, and within the townships of Hoaglin, Tully, and Union in Van Wert County. Epsilon Associates, Inc. (Epsilon) has been retained by Blue Creek Wind Farm to conduct a shadow flicker analysis for the proposed wind turbines. Blue Creek Wind Farm is a limited liability company whose sole member and manager is Iberdrola Renewables. This report presents the hours per year of shadow flicker predicted in the area surrounding the wind farm resulting from the operation of the Project, and compares them to applicable guidelines.

The Project will have the following characteristics:

- ◆ 160 wind turbine generators (WTGs),
- ◆ Gamesa Model G90 2.0 MW WTGs (G-90),
- ◆ Hub height of 100 meters and a rotor diameter of 90 meters, and
- ◆ Cut-in wind speed of 3 m/s and cut-out wind speed of 25 m/s.

The current 152 turbines in construction were approved by Ohio Power Siting Board Staff on February 10, 2011 and eight additional turbines are being amended to the project for a total of 160 wind turbines and 643 residences that were analyzed for shadow flicker impacts. Eleven (11) residential locations are predicted to experience more than 30 hours of shadow flicker per year while the remaining 632 locations will be less than 30 hours of shadow flicker per year. 30 hours per year is the guideline limit applied for this Project. Blue Creek Wind Farm will address shadow flicker predicted to be above 30 hours of per year at the 11 homes through curtailment of specific wind turbines and Good Neighbor Agreements.

## 2.0 SHADOW FLICKER

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Shadow flicker is the term used to describe an intermittent change in the intensity of light in a given area resulting from the operation of a wind turbine. Indoors, an observer experiences repeated changes in the brightness of the room as shadows cast from the wind turbine blades pass by the windows briefly as the blades rotate. A similar effect can be experienced outdoors, if the observer is within the region where the rotating shadows are being cast. In either case, the wind turbine must be operating and the sun must be present to generate shadow flicker. A stationary wind turbine would only generate a stationary shadow similar to any other structure.

Based on the current design and operation of typical modern wind turbines, shadow flicker impacts are generally an annoyance issue and not a health effects concern. Significant periods of shadow flicker can result in annoyance, but shadow flicker does not cause epileptic seizures according to the American Wind Energy Association (AWEA) which references the Epilepsy Foundation (AWEA, 2010).

### 3.0 REGULATIONS AND GUIDELINES

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The Ohio Power Siting Board (OPSB) has adopted wind rules under their Application for Certificates for Electric Generating Wind Facilities. Chapter 4906-17-08(A)(6) of these rules require the potential impact from shadow flicker at adjacent residential structures and primary roads be evaluated. Any plans to minimize potential impacts (if warranted) should also be presented. Although these rules do not include specific impact limits with respect to shadow flicker, it is expected that the OPSB will impose a condition of not to exceed 30 hours per year of shadow flicker at a residence.

The effects of shadow flicker diminish, thus reducing the amount of annoyance, as the distance from the wind turbine increases (Osten and Pahlke, 1998). To-date, the U.S. has no regulations or guidelines regarding the maximum radial distance from a wind turbine to which shadow flicker should be analyzed. Other areas of the world, particularly Europe, have established such guidelines. The Irish Wind Energy Association (IWEA) suggests that a radial distance equivalent to ten times the rotor diameter be used to predict the potential effects of shadow flicker (IWEA, 2008). This analysis followed the OPSB guidance of analyzing impacts within 1000 meters of a wind turbine. Impacts at receptors at greater distances were not calculated in this analysis.

Epsilon was unable to identify any federal, state, or county shadow flicker regulations applicable to this Project. Although there are no shadow flicker regulations with specific limits directly applicable to this Project, this issue has been regulated in other areas. According to the Danish Wind Industry Association, a German court has ruled that 30 hours of actual shadow flicker per year was acceptable at a neighbor's property (DWIA, 2003). In addition, a 30 hour per year limit has been adopted by multiple communities in the United States. Therefore, 30 hours per year of shadow flicker was used as the evaluation level for this analysis.

## 4.0 SHADOW FLICKER ANALYSIS

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### 4.1 Modeling Methodology

The shadow flicker impacts were modeled using a software package, WindPRO version 2.6.1.252 (EMD International A/S, 2009). WindPRO is a software suite used for assessing potential environmental impacts from wind turbines. Worst-case shadow flicker impacts in the area surrounding the wind turbines were calculated based on data inputs including: location of the wind turbines, location of all residences within 3,280 feet (1000 meters) of a wind turbine, wind turbine dimensions, and terrain data. Based on these data, the model was able to incorporate the appropriate sun angle and maximum daily sunlight for this latitude into the calculations. The WindPRO shadow flicker module can be further refined by incorporating sunshine probabilities and wind turbine operational estimates by wind direction over the course of a year. The values for this further refinement are presented in this section.

The shadow flicker analysis evaluates the wind turbine layout provided by Blue Creek Wind Farm on March 22, 2011. The locations of nearby residences were provided by Blue Creek Wind Farm. Based on a review of the aerial imagery of the area, Epsilon supplemented this dataset with additional residential locations. A base elevation was assigned to each wind turbine and residence based on contour data from the Ohio Department of Natural Resources which is derived from USGS 1:24,000 7.5' topographic quadrangles. Figure 4-1 shows the location of the wind turbines and residences included in this analysis.

For this shadow flicker analysis a Project boundary was defined by connecting the outer most wind turbines of the Project (see Figure 4-1). All residences within this boundary and within 1000 meters of the boundary were included in the modeling. There were 643 residences that met the 1000 meter criteria and were included in the shadow flicker analysis. Individual windows with specific orientations "realistic" were not modeled. Instead every residence was assumed to have windows facing all directions ("greenhouse" mode) which yields conservative results. In the model a switch was enabled limiting calculations to 1000 meters from a wind turbine. Therefore, impacts at residences greater than 1000 meters from a wind turbine were zero. In addition, shadow flicker impacts were calculated only when the angle of the sun was at least 3° above the horizon.

Monthly sunshine probability values were input for each month from January to December. These numbers were provided by Blue Creek Wind Farm and were obtained from actual historical data for the National Weather Service (NWS) airport station in Fort Wayne, Indiana. Eleven years of data were used to smooth out any year to year variability. Table 4-1 shows percentage of sunshine hours by month used in the shadow flicker modeling. These values are the percentages that the sun is expected to be shining during daylight hours. Potential daylight hours were determined by WindPRO for this site based on latitude.

The number of hours the wind turbines are expected to operate for the 16 cardinal wind directions was input into the model. These data were provided by Blue Creek Wind Farm and are based on actual wind speed and direction data collected by the on-site meteorological tower over a period of January 1, 2008 – December 31, 2009. Wind speeds below 3 m/s and above 25 m/s were excluded to account for times when the wind turbines would not be operational. The resulting values (hours of operation for each sector per year) were used by WindPRO to estimate the “wind direction” and “operation time” reduction factors. This analysis assumed that the wind turbines could operate over 93% of the time (8199 hours per year). Table 4-2 shows the percent frequency distribution for the 16 wind directions and their corresponding number of hours per wind direction used in the shadow flicker modeling. These percentages are on an annual basis.

## 4.2 Results

Following the modeling methodology outlined in section 4.1, WindPRO was used to calculate shadow flicker at the 643 residences. The results for the entire wind farm are shown graphically in Figures 4-3 to Figure 4-13. For purposes of clarity, the entire wind farm was broken into eleven (11) “tiles” so the graphics could fit using a reasonable scale. Figure 4-2 is an index map showing the location of each of the eleven tiles. Appendix A presents the results for all 643 residences sorted from highest hours/year of shadow flicker to lowest. Appendix B presents the same data sorted by residence ID number for ease in cross-referencing a particular location on Figures 4-3 to 4-13.

Eleven (11) of the 643 residences were predicted to have total annual impacts over 30 hours per year. Table 4-3 presents the shadow flicker results for these 11 residences. Included in the table are the arbitrary residence ID, predicted hours/year of shadow flicker, contributing WTCs, distance to closest contributing WTC, address/owner of residence, coordinates, and participation status of the residence. The worst-case impact at a residence was predicted to be 41 hours, 39 minutes of shadow flicker per year. Appendix C contains a graphical calendar printout from WindPRO for each of the 11 locations predicted to be above 30 hours/year. The graph shows the time of day (EST) and the month(s) of the year when shadow flicker may occur for a given turbine(s). The two gray lines indicate sunrise and sunset throughout the course of the year.

## 4.3 Discussion

The data generated by WindPRO provides a conservative assessment of potential shadow flicker for several reasons. The model was run in “greenhouse” mode where the residence faced all directions. There may be structures and/or vegetation lying between a residence and a wind turbine to block shadows created by the rotating blades. These are termed “obstacles” by WindPRO and were excluded from the analysis. In addition, any existing window treatments such as awnings, shades, or blinds on a window facing a wind turbine were not included to reduce potential shadow flicker at a residence. In general, the predicted duration of shadow flicker was below the 30 hours per year guideline limit at the majority of modeled residences.

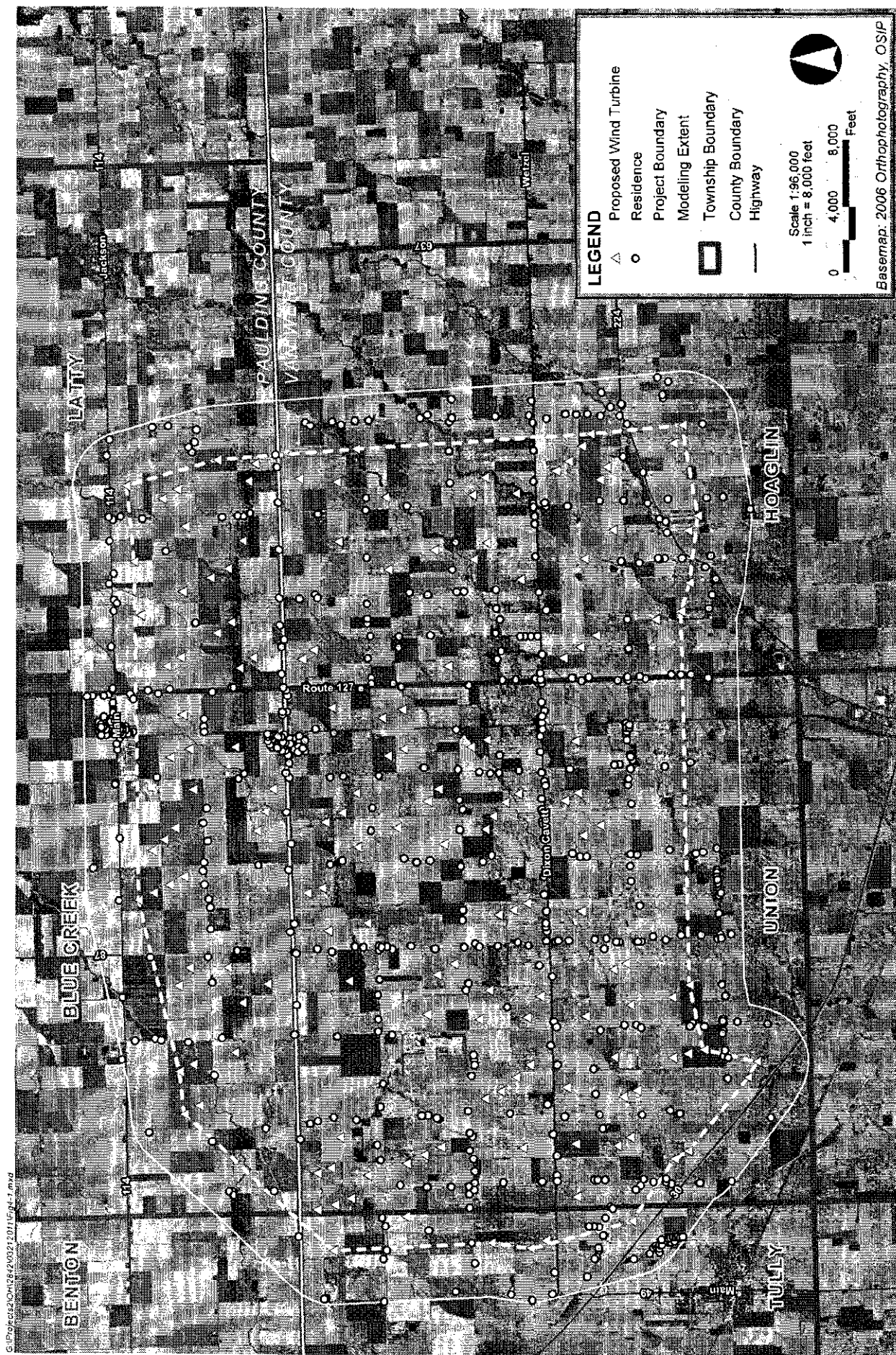




Table 4-1      Monthly Percent of Possible Sunshine – Blue Creek Shadow Flicker

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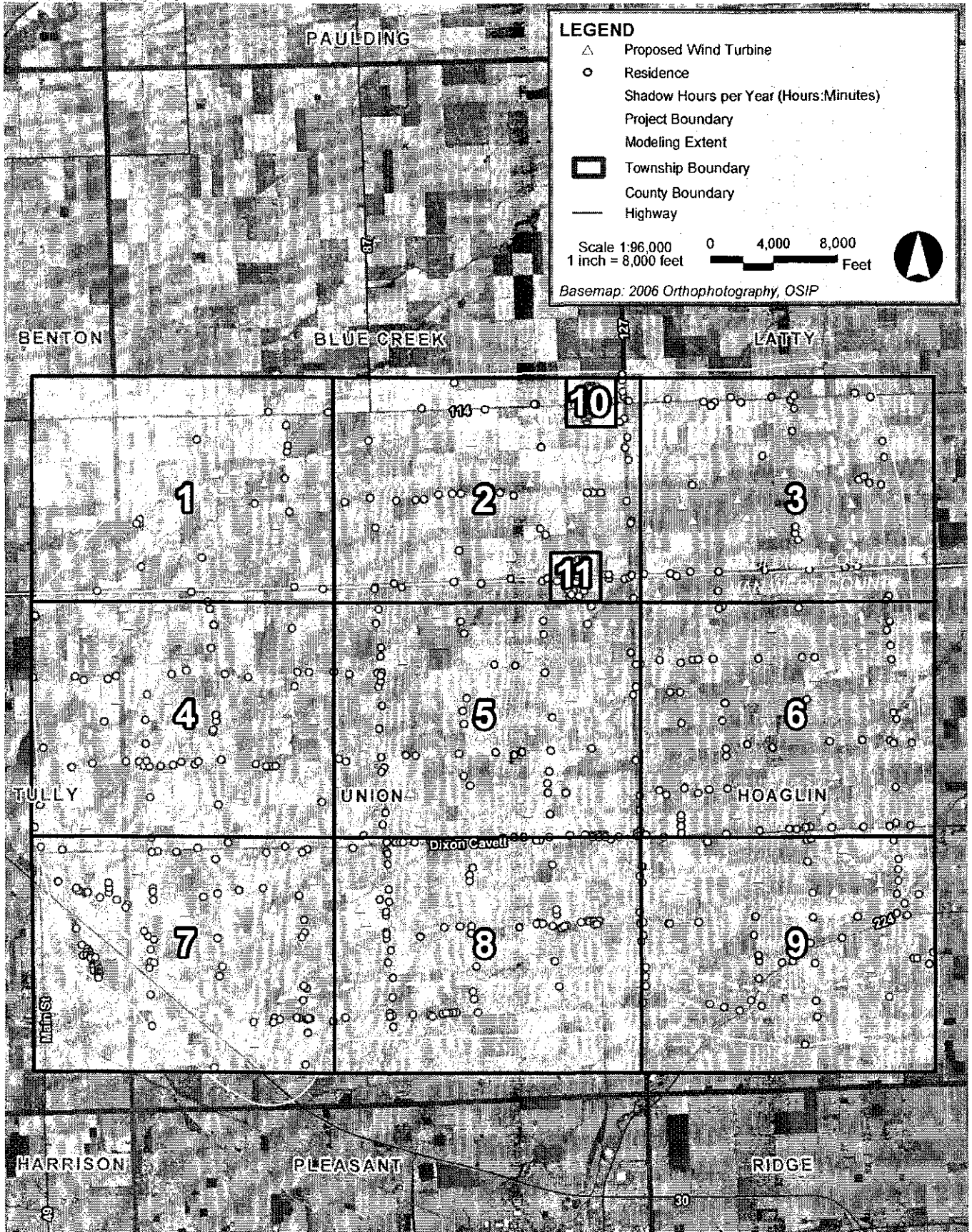
Month	Possible Sunshine
January	40%
February	42%
March	49%
April	59%
May	59%
June	62%
July	59%
August	55%
September	56%
October	46%
November	46%
December	40%
Annual Average	51%

Source: National Weather Service data, Fort Wayne, IN. Period of record = 01/1998 – 12/2009.

Table 4-2 Joint Frequency Distribution of Operational Wind Directions – Blue Creek Shadow Flicker

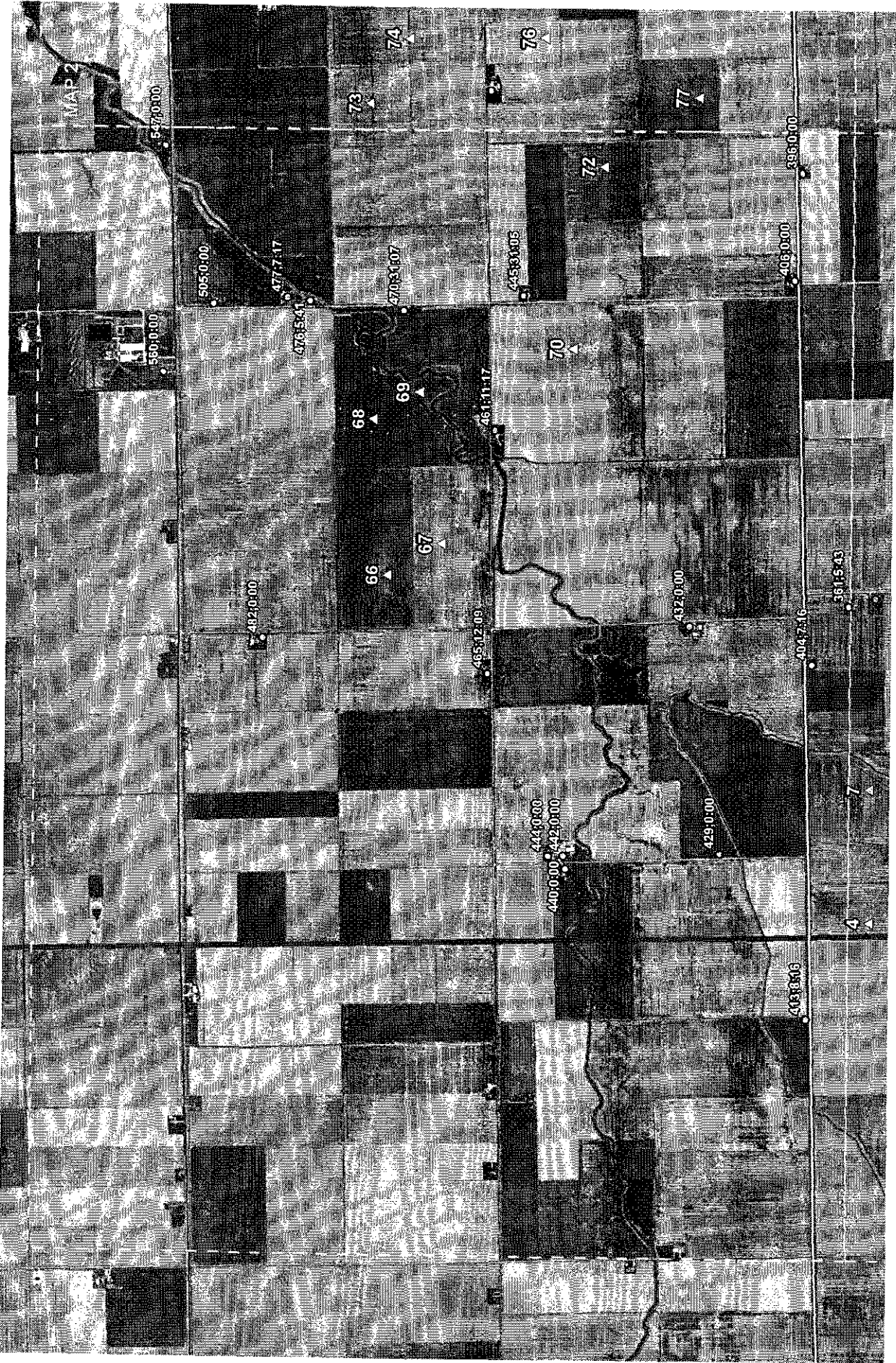
Wind Sector	Percent Frequency Operational Hours	Operational Hours
N	2.8	245
NNE	2.9	254
NE	4.0	350
ENE	6.4	561
E	5.3	464
ESE	3.8	333
SE	2.7	237
SSE	3.3	289
S	6.7	587
SSW	9.5	832
SW	8.3	727
WSW	10.6	929
W	10.7	937
WNW	6.6	578
NW	5.6	491
NNW	4.4	385
Annual	93.6%	8199

Source: Blue Creek Wind Farm on-site meteorological tower (period of record = 1/1/2008 – 12/31/2009).



Blue Creek Wind Farm Paulding and Van Wert Counties, Ohio

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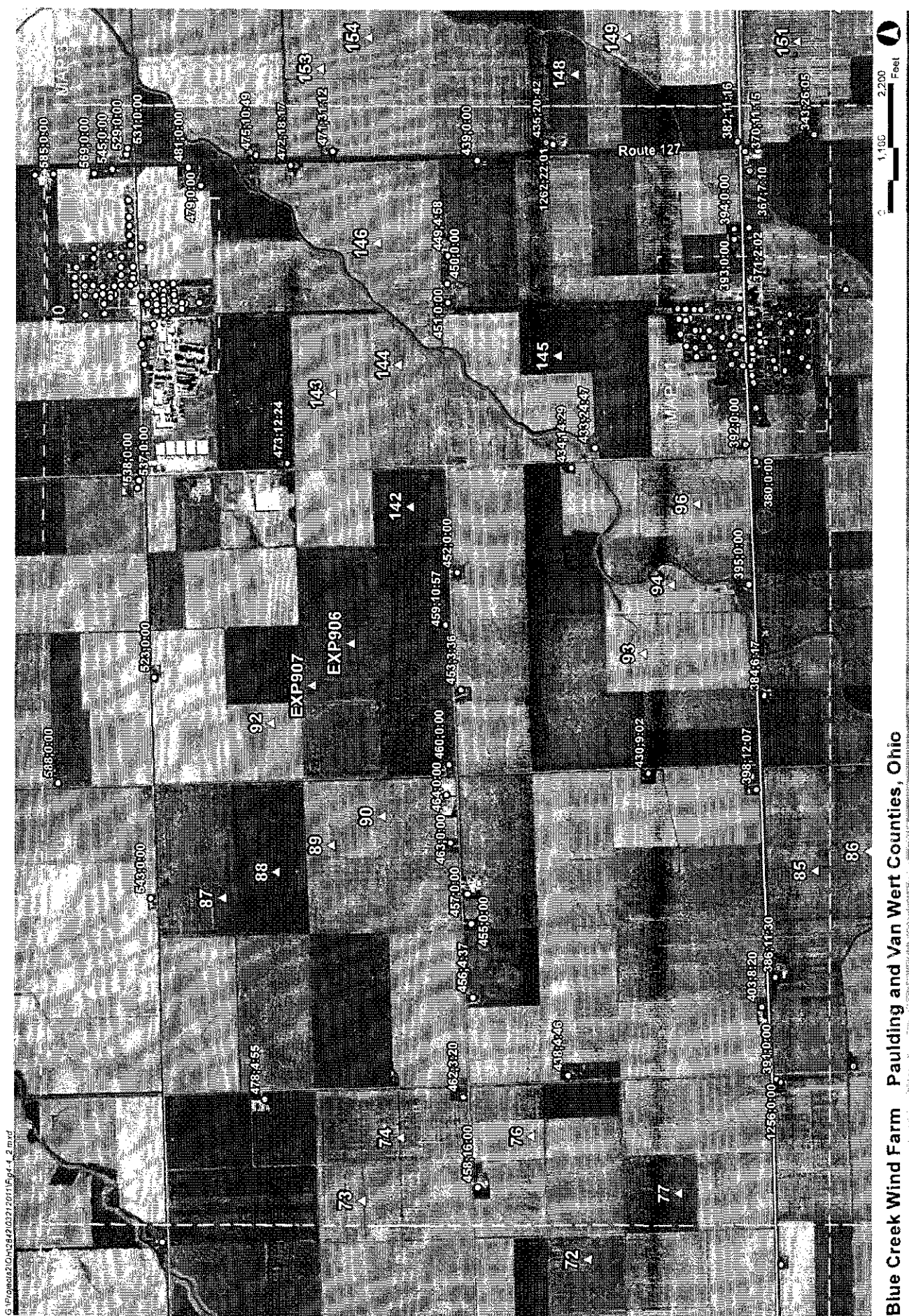


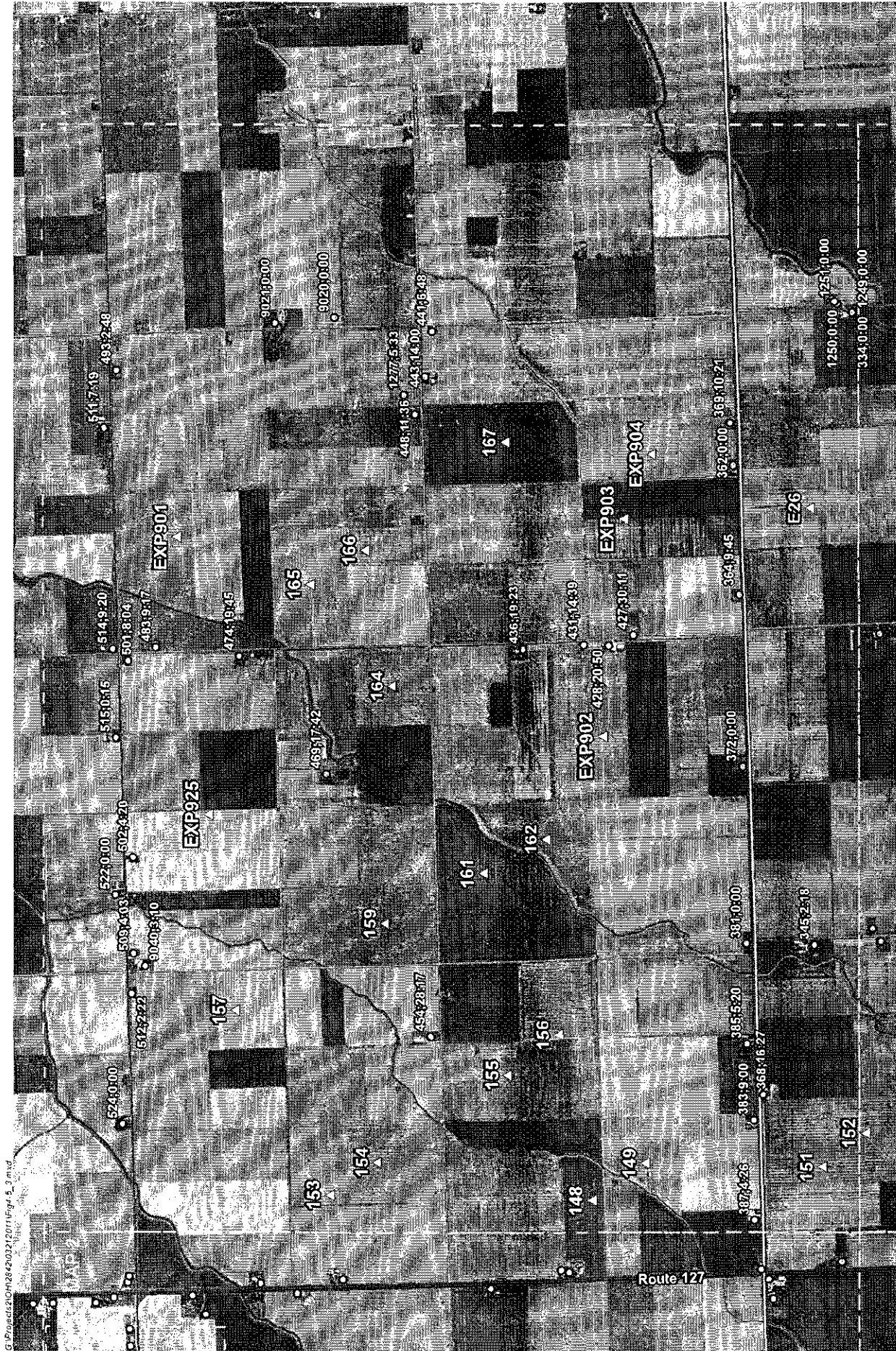
Blue Creek Wind Farm Paulding and Van Wert Counties, Ohio

**psilon**  
ANALYTICS, LLC

**Figure 4-3**  
Shadow Flicker Analysis Results - Map 1 of 11







Blue Creek Wind Farm Paulding and Van Wert Counties, Ohio

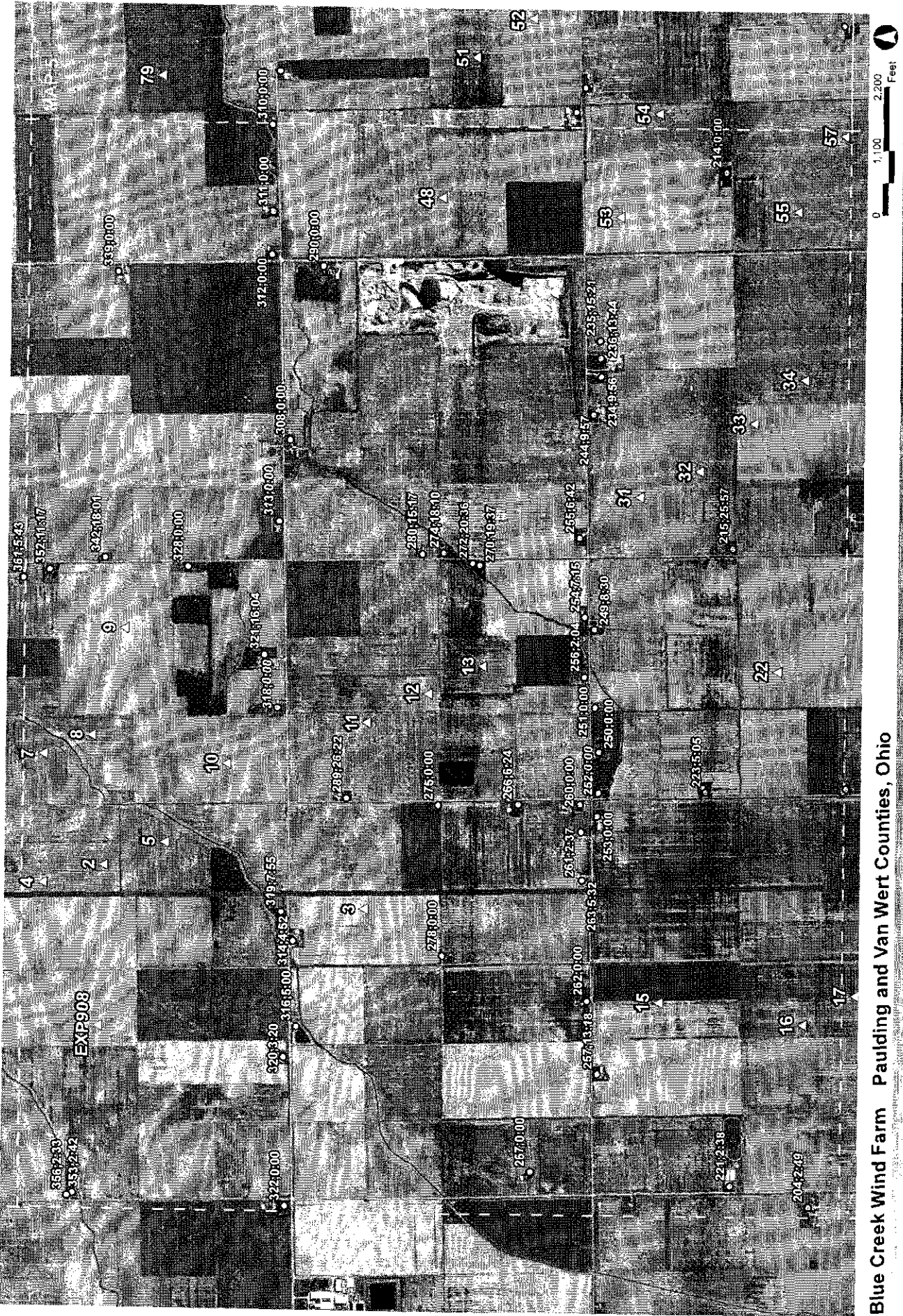


Figure 4-5

Shadow Flicker Analysis Results - Map 3 of 11



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Blue Creek Wind Farm Paulding and Van Wert Counties, Ohio

**Epsilon**  
LAND SERVICES, LLC

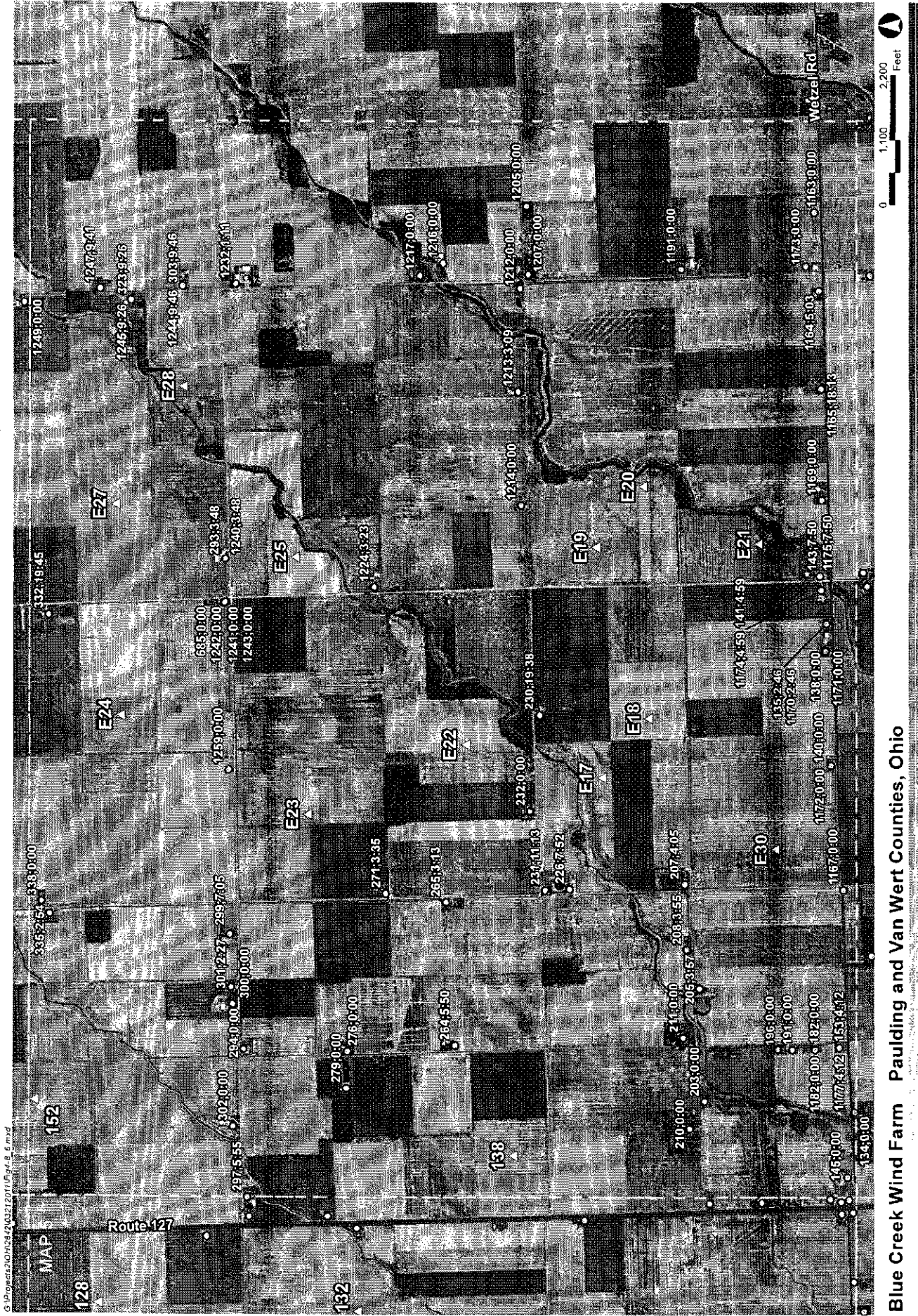
Figure 4-6  
Shadow Flicker Analysis Results - Map 4 of 11



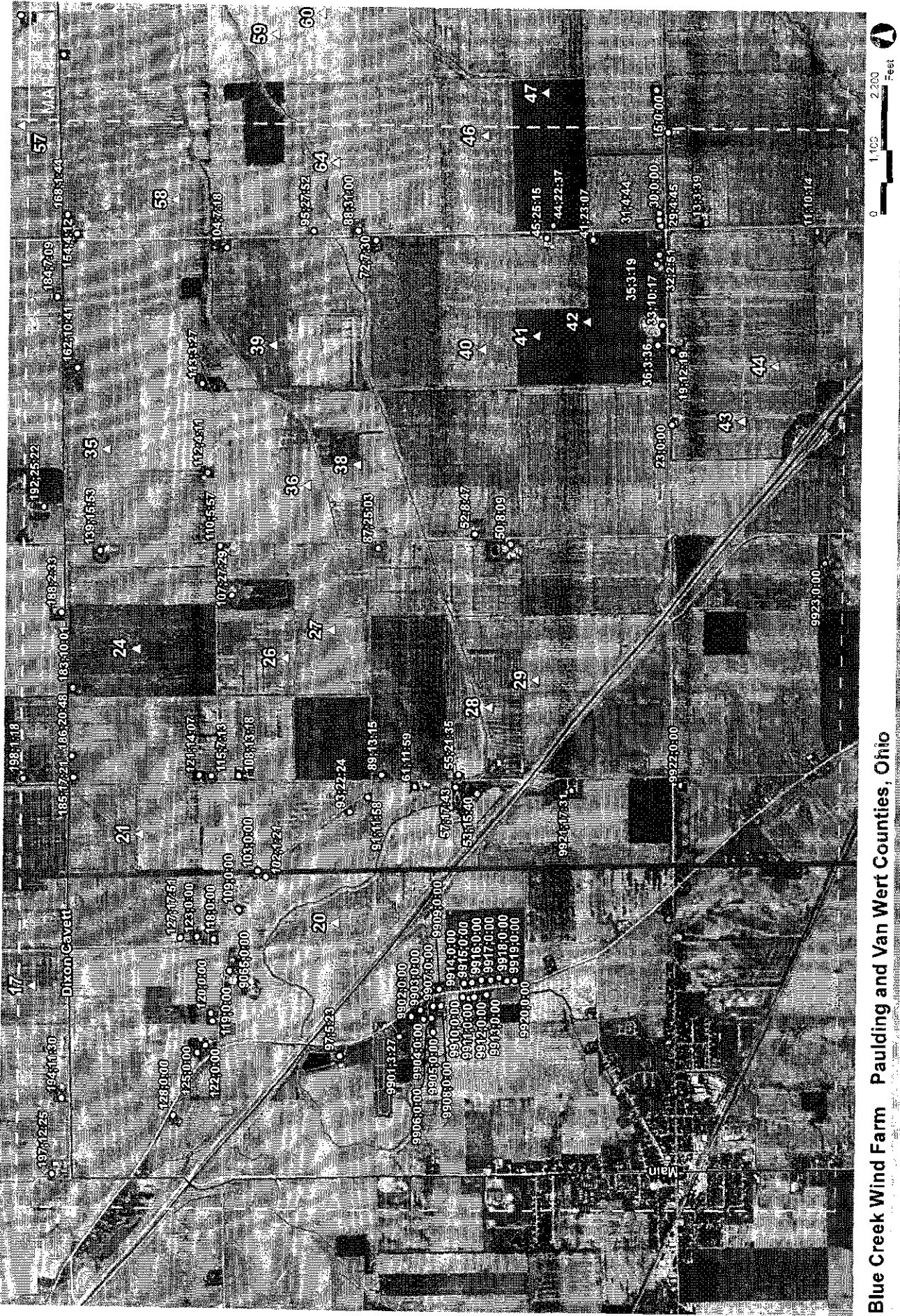


**Figure 4-7**  
*Shadow Flicker Analysis Results - Map 5 of 11*



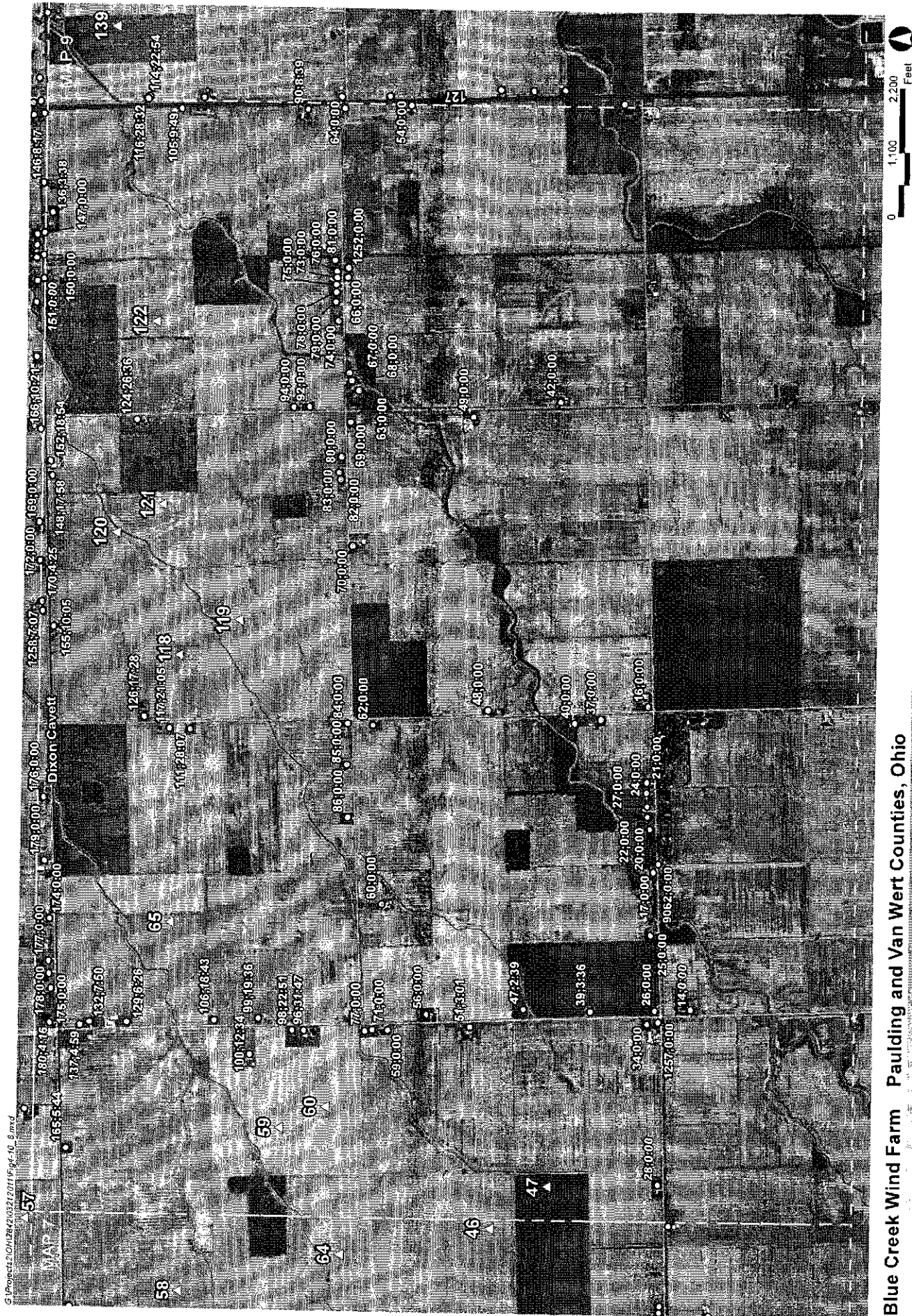


Blue Creek Wind Farm Paulding and Van Wert Counties, Ohio





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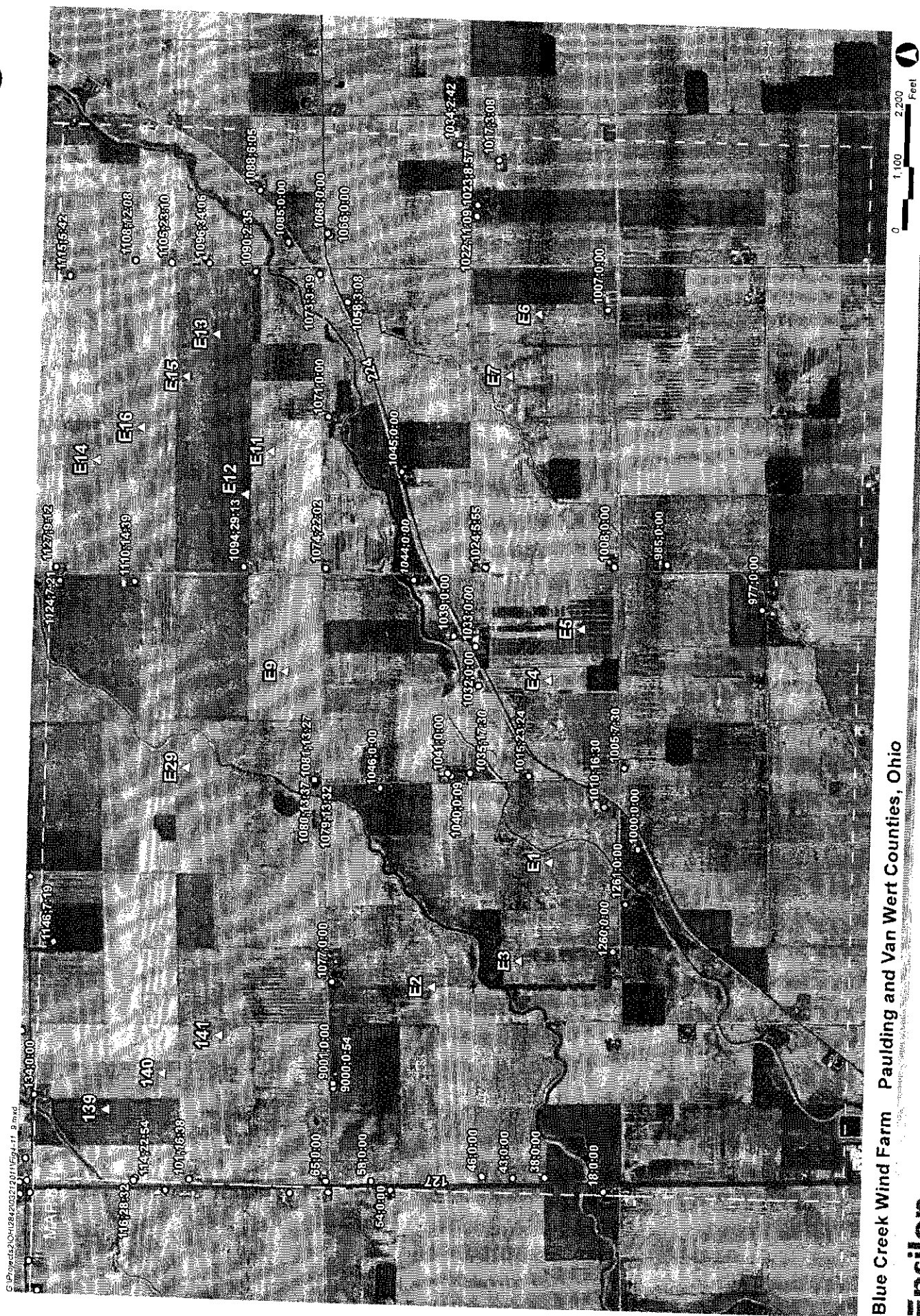
Blue Creek Wind Farm Paulding and Van Wert Counties, Ohio

**epsilon**

Figure 4-10

Shadow Flicker Analysis Results - Map 8 of 11





**Figure 4-11**  
*Shadow Flicker Analysis Results - Map 9 of 11*