Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Application Part 1 of 4

Part 1 includes:

Letter

Affidavit of Ryan J. Brown, Executive Vice President, Paulding Wind Farm IV LLC

Application Narrative

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Date Filed: October 17, 2018

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October 17, 2018

Ms. Barcy F. McNeal, Secretary
Ohio Power Siting Board
Docketing Division
180 East Broad Street, 11th Floor
Columbus, Ohio 43215-3797

Re: Application
Case No. 18-1293-EL-BTX
In the Matter of the Application of Paulding Wind Farm IV LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Transmission Line in Paulding County, Ohio

Dear Ms. McNeal:

Accompanying this letter is an application by Paulding Wind Farm IV LLC ("Applicant") for a Certificate of Environmental Compatibility and Public Need to Construct a Transmission Line in Paulding County, Ohio ("Application"). The original Application was electronically filed, and the required number of copies, both hard copy and electronic, have been provided to the Docketing Division.

Along with this filing, we also provided the Docketing Division copies of the unredacted portions of the Application, and have filed a Motion for Protective Order and Memorandum in Support requesting protective treatment of the confidential information contained therein.

The Applicant further notes that, consistent with the statement regarding waivers set forth in the preapplication notification letter, a Motion for Waiver and Memorandum in Support have been filed. In addition, there have been no revisions to the information presented in the preapplication notification letter.

In accordance with Ohio Administrative Code Rule 4906-2-04, we make the following declarations:

Name of the Applicant:

Paulding Wind Farm IV LLC
(EDP Renewables North America LLC)
129 East Market Street
Suite 600
Indianapolis, Indiana 46204

Name and location of the transmission line:

Timber Road IV Transmission Line
Benton and Blue Creek Townships
Paulding County, Ohio

Name of authorized representative:

Christine M.T. Pirik
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Notarized Statement:

See attached Affidavit of Ryan J. Brown
Executive Vice President, Paulding Wind Farm IV LLC

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
(Counsel of Record)
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(*Counsel agree to receive service by email.*)

Attorneys for Paulding Wind Farm IV LLC

CMTP:AP
Enclosures
COLUMBUS 56242-8 99085v2

BEFORE THE
OHIO POWER SITING BOARD

In the Matter of the Application of Paulding Wind Farm IV LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Transmission Line in Paulding County, Ohio	)))))	Case No: 18-1293-EL-BTX

AFFIDAVIT OF EXECUTIVE VICE PRESIDENT OF PAULDING WIND FARM IV LLC

STATE OF INDIANA :
: ss
COUNTY OF MARION :

I, Ryan J. Brown, 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 on my personal knowledge:

1. I am the Executive Vice President for Paulding Wind Farm IV LLC, which is a wholly-owned subsidiary of EDP Renewables North America LLC.

2. I have reviewed Paulding Wind Farm IV LLC's Application for a Certificate to Construct a Transmission Line in Paulding County, Ohio.

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

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

Ryan J. Brown, Executive Vice President

Sworn to before and signed in my presence this 15th day of October 2018.

KRISTEN L CLASON NOTARY SEAL PUBLIC MARION COUNTY, STATE OF INDIANA MY COMMISSION EXPIRES 11-08-24 COMMISSION NUMBER 695012

Notary Public

T&B

APPLICATION

TO THE

OHIO POWER SITING BOARD

FOR A

CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY & PUBLIC NEED

FOR THE

TIMBER ROAD IV TRANSMISSION FACILITY

Benton and Blue Creek Townships,
Paulding County, Ohio

Case No. 18-1293-EL-BTX
October 2018

TIMBER ROAD
WIND FARM

Applicant:

Paulding Wind Farm IV LLC, a subsidiary of EDP Renewables
129 East Market Street
Suite 600
Indianapolis, Indiana 46204
Contact: Ryan J. Brown
317.636.0866

Prepared By:

Environmental Design and Research,
Landscape Architecture, Engineering, & Environmental Services D.P.C. (EDR)
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Syracuse, New York 13202
Contact: Benjamin Brazell, Principal
315.471.0688

TABLE OF CONTENTS

LIST OF TABLES

FIGURES

EXHIBITS

COMMONLY USED ACRONYMS and ABBREVIATIONS

AEP	AEP Ohio Transmission Company, LLC
ASTM	American Society for Testing and Materials
dBA	Decibels, A-weighted
EDR	Environmental Design and Research, Landscape Architecture, Engineering, & Environmental Services
ESRI	Environmental Systems Research Institute
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Administration
GIS	Geographic Information System
Hz	Hertz
ISA	Interconnection Service Agreement
kV	Kilovolt
MW	Megawatt
NAIP	National Agricultural Imagery Program
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OAC	Ohio Administrative Code
ODA	Ohio Department of Agriculture
ODNR	Ohio Department of Natural Resources
ODOT	Ohio Department of Transportation
Ohio EPA	Ohio Environmental Protection Agency
OPSB	Ohio Power Siting Board
ORAM	Ohio Rapid Assessment Method for Wetlands
ORC	Ohio Revised Code
PJM	PJM Interconnection
POI	Point of interconnection
ROW	Right-of-way
RUA	Road Use Agreement
SPCC	Spill Prevention Control and Countermeasures Plan
SWP3	Stormwater Pollution Prevention Plan
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

4906-5-01 PURPOSE AND SCOPE

(A) REQUIREMENTS FOR FILING CERTIFICATE APPLICATIONS

Paulding Wind Farm IV LLC (hereafter referred to as the Applicant), a Delaware limited liability company (a wholly-owned subsidiary of EDP Renewables North America LLC [EDP Renewables North America LLC], a Delaware limited liability company), is proposing to construct a 2.9-mile 138 kilovolt (kV) transmission line (Timber Road IV Transmission Line or the Transmission Line) and associated laydown yard. The Timber Road IV Transmission Line is associated with the Timber Road IV Wind Farm in Paulding County (Case No. 18-91-EL-BGN, hereafter referred to as the Wind Farm). The materials contained herein and attached hereto constitute the Applicant's submittal (Application) for a Certificate of Environmental Compatibility and Public Need (hereafter referred to as the Certificate), prepared in compliance with Section 4906.06 of the Ohio Revised Code (ORC) and in accordance with Rule 4906-5 of the Ohio Administrative Code (OAC), Instructions for the Preparation of Certificate Applications for Electric Transmission Facilities and Gas Pipelines. The Application has been prepared by the Applicant, with support from Environmental Design and Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) of Syracuse, New York. EDR has over 25 years of experience with siting and permitting wind-powered electric generation facilities. The Applicant has also prepared the Application with support of Dickinson Wright PLLC.

(B) WAIVERS

The Ohio Power Siting Board (OPSB) may, upon an application or motion filed by a party, waive any requirement of this chapter other than a requirement mandated by statute. The Applicant is seeking waivers from certain requirements of Rule 4906-5 and has filed a Motion for Waiver that lists the waivers sought and the underlying rationale for each waiver requested.

4906-5-02 PROJECT SUMMARY AND APPLICANT INFORMATION

(A) PROJECT SUMMARY

The Applicant is proposing to construct the Timber Road IV Transmission Line, a 138 kV transmission line with a laydown yard (referred to as the Facility). The Facility is associated with Timber Road IV Wind Farm (see Case No. 18-91-EL-BGN), and is located in Paulding County, Ohio. The following is a summary of the proposed Facility:

(1) General Purpose of the Facility

The primary purpose of the Facility is to deliver up to 75.9 megawatts (MW) of clean, renewable electricity to the regional electric grid to serve the needs of electric utilities and their customers. The Facility's transmission route will begin at the Wind Farm's collection substation and terminate at the existing Timber Road III Transmission Line (see Case No. 15-1737-EL-BTX). The Timber Road III Transmission Line will then carry up to 75.9 MWs of electricity to the point of interconnect (POI), which is the existing Logtown 138 kV substation, enabling the energy to be transferred to the transmission grid operated by PJM Interconnection, LLC (PJM). Once reaching the grid, the energy will be available for sale at wholesale or under a power purchase agreement (PPA). The Facility's temporary laydown yard will be located northeast of Township Road (TR) 59 and State Route (SR) 114 intersection. The purpose of the laydown yard will be to provide office space for the construction teams and to provide storage space for the Timber Road IV Transmission Line components. The Applicant does not have specific future expansion plans. Therefore, this Application focuses on the need to interconnect up to 75.9 MWs of electricity from the Timber Road IV Wind Farm.

(2) Description of the Facility

The Facility consists of a new 138 kV transmission line, which will be used to deliver up to 75.9 MWs of power generated by the Wind Farm to the regional power grid, and a laydown yard. The transmission route will travel west along TR 52 from the Wind Farm's collection substation, which is located at the intersection of TR 52 and TR 59, ending at the existing Timber Road III Transmission Line (hereafter referred to as the Preferred Transmission Route or the Preferred Route). An alternate route has been identified for the Transmission Line that travels west along TR 52 from the collection substation, then turns south along SR 49 and continues in a southwestern direction before tying into the existing Timber Road III Transmission Line (hereafter referred to as the Alternate Route).

The Timber Road IV Transmission Line is further described below:

The Preferred Transmission Route crosses approximately 2.9 miles of land in Benton Township. The Alternate Route crosses approximately 3.8 miles of land in Benton Township. The Applicant designed the Preferred Route to comply with the 25 ft public road setback and an aerial encroachment easement will be granted to the Facility by the County and Townships in the Road Use Agreement in the event that any portion of the overhead facilities (conductor or arms) encroaches within the setback. The Applicant will not clear any trees to build the Facility. There may be a variety of structure types used for the Facility, due to different constraints at various locations (e.g., angle structures). However, all structures along the Transmission Line are expected to utilize a single-pole design, which minimizes the amount of soil disturbance when compared to double-pole, H-frame designs. Approximately 19 structures are proposed along the 2.9-mile Preferred Route, which equates to an average spacing of approximately 880 feet between structures. The type of materials used for the structures will be steel for the poles, and concrete and rebar steel for the foundation. Structure height will range from approximately 100 to 130 feet above the ground, with a cast-in-place concrete pier foundation. Temporary access will primarily be through the public roads, as well as farm roads and farm fields. The Transmission Line will connect to the existing Timber Road III Transmission Line via a "flying-tap." Additional information on the flying-tap is provided in Section 4906-5-05.

The Timber Road IV laydown yard will be located northeast of the TR 59 and SR 114 intersection. The laydown yard will consist of approximately 18 acres.

(3) Description of the Suitability of the Preferred and Alternate Routes

A suitable potential site for a transmission line must have landowner transmission line easements signed, coordination with the county engineer, and environmental concerns addressed. The Applicant has secured all transmission line easement for the Preferred Route. Timber Road IV Transmission Line poles are located based on landowner preferences.

Based on geographic information system (GIS) data managed by the Ohio Department of Natural Resources (ODNR), the majority of the Preferred Route and the Alternate Route, as well as the laydown yard, is on cropland and farmsteads.

Neither the Preferred Route nor the Alternate Route cross ODNR-mapped wetlands; however, both routes traverse wetlands identified by the National Wetlands Inventory (NWI). The laydown yard does not cross any ODNR-mapped wetlands, but is within 20 feet of an NWI mapped wetland. Wetland delineations were conducted to determine the extent of wetlands in the vicinity of the Facility. Wetland delineations are discussed in detail in Section 4906-5-08(B).

In addition to ecological resources, utility resources were identified in the vicinity of the Facility. In addition to existing Timber Road II and Timber Road III utility infrastructure (buried collection lines, overhead transmission line), one natural gas transmission pipeline exists within the vicinity of the Transmission Line. One segment of the gas pipeline, owned and managed by Panhandle Eastern Pipeline Co., crosses paths with the Alternate Route, while another runs parallel to the Preferred Route. An existing transmission line, owned by AEP Transmission Company, Inc. (AEP), runs along SR 114, immediately south of the laydown yard. All resources present along these transmission routes will be evaluated and avoided to the greatest extent practicable.

(4) Project Schedule

All acquisition of land rights for the Timber Road IV Transmission Line and laydown yard began in the third quarter of 2017 and was completed on October 9, 2018. Preparation of the Application started the second quarter of 2018, with data and analyses added as various studies were completed. A public information meeting was held at the Paulding County Fairgrounds on September 12, 2018. This Certificate Application was officially submitted in October 2018, and it is anticipated that the Certificate will be issued in the first quarter of 2019. Final designs will be completed in the first quarter of 2019. Construction is anticipated to begin following issuance of the Certificate, and will be completed within approximately 6 months, around October 2019. Additional information about the Timber Road IV Transmission Line and the laydown yard schedule, including a bar chart, can be found in Section 4906-5-03(F)(1) of this Application.

(B) APPLICANT INFORMATION

The Applicant, Paulding Wind Farm IV LLC, is a Delaware limited liability company (a wholly-owned subsidiary of EDP Renewables North America LLC) that plans to both construct and operate the proposed Facility. Developing wind farms since 1996, EDP Renewables North America LLC is a renewable energy company focused on solar and wind development to generate and deliver clean electricity. Currently, EDP Renewables North America LLC business operations take place in 12 different countries, including the United States (U.S.) (part of EDP Renewables North America LLC). EDP Renewables North America LLC developments reached the U.S. in 2007 and can be found in the following states: California, Illinois, Indiana, Iowa, Kansas, Minnesota, New York, Ohio, Oklahoma, Oregon, Texas, and Washington. EDP Renewables North America LLC has developed a total of 30 wind farms and 4 solar farms across the U.S. The United States is currently EDP Renewables North America LLC's largest market in terms of installed capacity and production of renewable energy. EDP Renewables North America LLC is the second largest owner/operator of wind farms in Ohio with 265 MWs of operating facilities located in Paulding and Hardin Counties. EDP Renewables North America LLC also received a certificate and built an 8.6-mile transmission line in Paulding County, Ohio.

4906-5-03 NEED AND SCHEDULE

(A) NEED FOR THE PROPOSED FACILITY

The primary purpose of the proposed 138 kV Timber Road IV Transmission Line is to deliver up to 75.9 MWs of electricity generated by Timber Road Wind Farm IV, from the Wind Farm collection substation (see Case No. 18-91-EL-BGN) to the existing Logtown substation, POI, via the existing Timber Road III Transmission Line (see Case No. 15-1737-EL-BTX). The Timber Road IV Transmission Line is required to connect up to 75.9 MWs of electricity to the transmission grid operated by PJM. While other interconnection alternatives were investigated, the Preferred Transmission Route was determined to be the best option available.

(1) Purpose of the Facility

The Applicant is proposing to construct the Facility in Paulding County. This Facility is associated with the Timber Road IV Wind Farm (see Case No. 18-91-EL-BGN), located in Paulding County. The Timber Road IV Wind Farm is being developed by Paulding Wind Farm IV LLC, which is the same Applicant proposing the Facility in this Application. This Facility is designed to deliver power generated by the Timber Road IV Wind Farm to AEP's 138 kV transmission line, which is operated by the regional grid operator PJM.

The Timber Road IV laydown yard will be located northeast of the TR 59 and SR 114 intersection. The laydown yard will consist of approximately 18 acres.

(2) System Conditions and Local Requirements

The Timber Road IV Transmission Line is required to deliver electricity from the Wind Farm to the regional transmission power grid.

The location of the Wind Farm and Facility has a quality of wind resource that is sufficient in making the development of a wind generation facility both productive and profitable. Linking the favorable environmental conditions, a suitable transmission interconnection, and meeting the demands of customers eager to match new infrastructure investments with renewable energy development, as well as the new job and economic investments for the state and local area, allows the Applicant to conclude that there is a need for the Wind Farm and, thus, the Facility.

(3) Load Flow Studies and Contingency Analyses

Because the Facility, and the existing Timber Road III Transmission Line and POI switchyard are connecting the Wind Farm to the regional power grid, there are no relevant load studies or contingency analyses existing that identify the need for system improvement.

The Wind Farm and the Facility will be engineered and constructed to comply with all applicable electrical safety codes and good engineering practices. The proposed method of service is to inject the output from the Wind Farm into the existing 138 kV Lincoln-Sterling circuit. Diagram 03-1 shows the location of the proposed interconnection, labeled Logtown, showing both AC1-173 and T-131 (the Generation Interconnection Request Queue Position assigned by PJM), with respect to existing substations in the region.

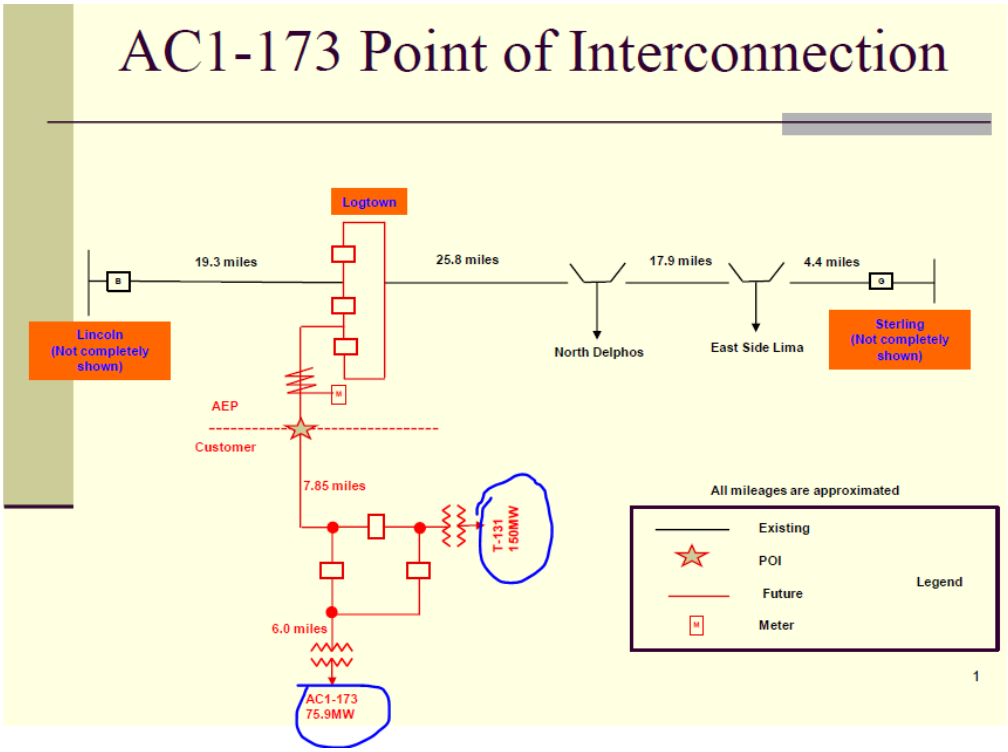


Diagram 03-1 (PJM, 2017)

The Wind Farm collection substation will be located at the intersection of TR 52 and TR 59, on the border between Benton and Blue Creek Townships. The Preferred Route will travel west from the collection substation, along TR 52, until it reaches the existing Timber Road III Transmission Line. The existing Timber Road III Transmission Line terminates at the existing AEP Logtown substation located at the intersection of SR 114 and TR 27 and is part of the 138 kV Lincoln-Sterling circuit.

The Wind Farm will interconnect and operate in conformance with the requirements of PJM and AEP, the transmission line owner. These requirements will also meet the reliability criteria and standards for the North American Electric Reliability Corporation (NERC). PJM has established procedures and requirements for generators that propose to interconnect with facilities under the control of PJM. Specifically, PJM requires a series of electrical studies for each proposed generator, including a Feasibility Study, System Impact Study, and Facilities Study.

PJM performed the System Impact Study on the 75.9 MW, AC1-173 interconnection request. This study was completed in May 2017 and performed an analysis using the base case of summer peak conditions in 2020 for the following seven categories were included in the System Impact Study to assess the impact of the Wind Farm on the system: (1) contingency descriptions; (2) generator deliverability; (3) multiple facility contingency; (4) contribution to previously identified overloads; (5) steady-state voltage requirements; (6) short circuit analysis; and (7) stability analysis. No overloads from contingencies, contributions to previously identified overloads, steady-state voltage requirements, over-duty breakers, or required mitigation measures for stability were identified in the System Impact Study. One upgrade is required to deliver energy from the Wind Farm to the transmission grid. In order to mitigate reliability criteria violations, replacement of the Haviland and East Lime wave traps is necessary. Finally, the Wind Farm successfully met the stability requirements associated with the connection standards for Low Voltage Ride Through and Transient Stability (PJM, 2017).

(4) System Performance Transcription Diagrams

Diagram 03-2 shows the power flows on the line with the proposed Wind Farm in service. Diagram 03-3 shows the power flows on the line without the proposed Wind Farm in service. With the generation out of service, there is a 75.9 MW reduction on the Lincoln-Sterling 138 kV Line flow. The normal and contingency flows on the line with and without the Wind Farm are well below the design rating of the Lincoln-Sterling 138 kV Line, as well as the surrounding system facilities.

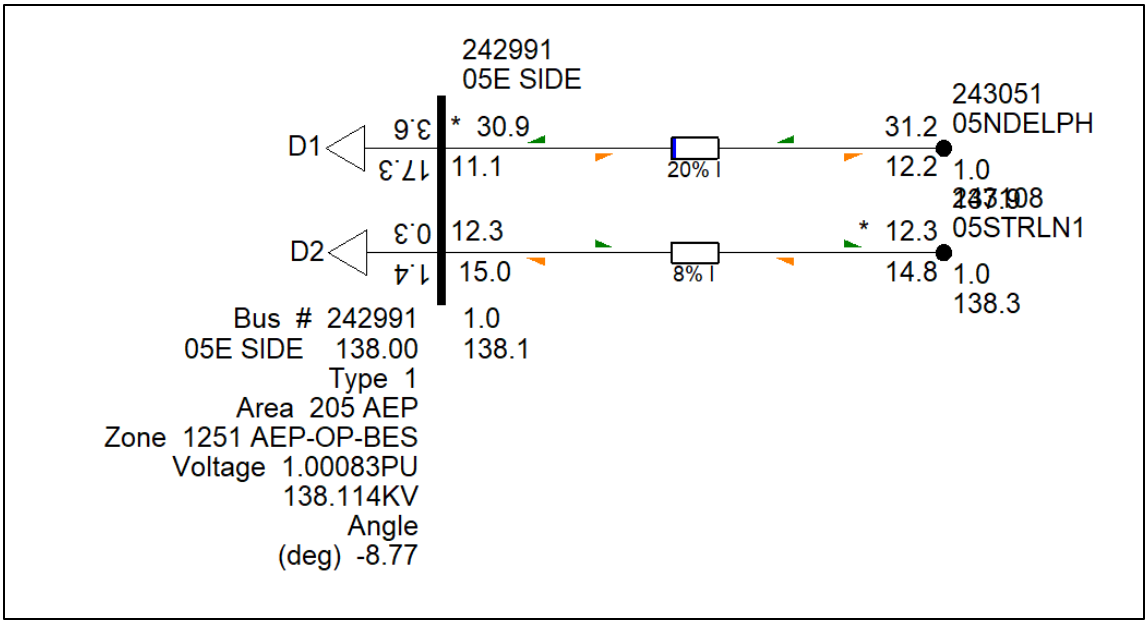


Diagram 03-2

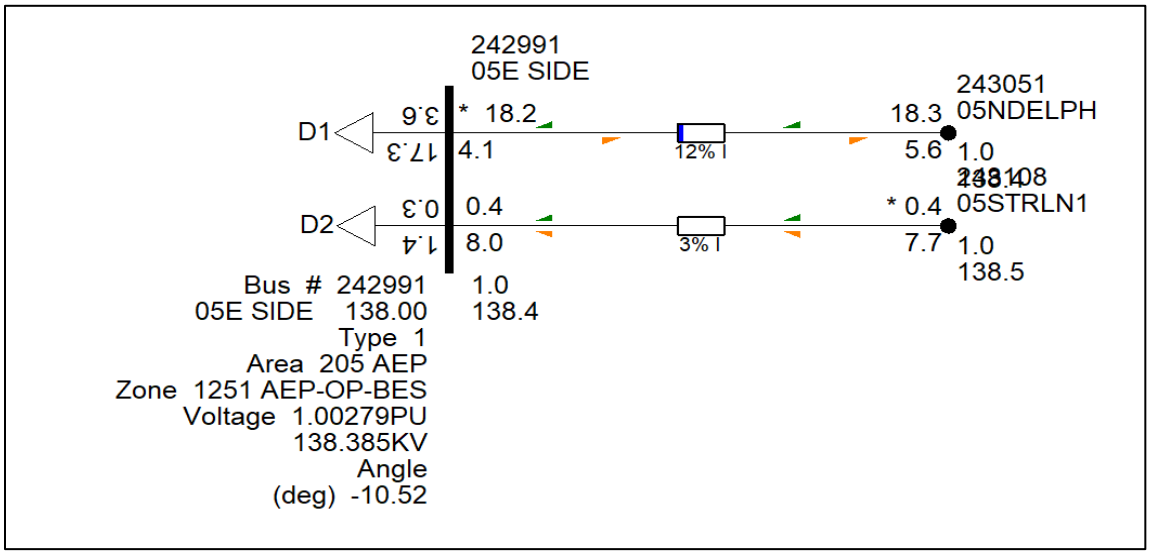


Diagram 03-3

(5) Base Case Data for Natural Gas Pipelines

Since the proposed Facility does not include gas transmission facilities, this section is not applicable.

(B) REGIONAL EXPANSION PLANS

(1) Long-Term Forecast and Regional Planning for Electric Power Transmission and Associated Facilities

(a) *Reference in Long-Term Forecast*

The Applicant is neither an electric distribution company nor an electric distribution utility and, as such, does not have the responsibility of planning for transmission and distribution for franchised service areas. Therefore, the Applicant does not maintain or file long-term electric forecast reports and, therefore, this section is not applicable.

(b) *Explanation If Not Referenced*

As noted above, the Applicant is not required to file long-term electric forecast reports and, therefore, this section is not applicable.

(c) *Effect on Regional Expansion Plans*

As indicated above, PJM performed the System Impact Study on the Wind Farm interconnection request. The System Impact Study concluded "no problems identified" for generator deliverability, multiple facility contingency, and short circuit analysis. As previously discussed, the System Impact Study identified one upgrade to mitigate reliability criteria violations. This upgrade includes the replacement of the Haviland and East Lime wave traps. No additional requirements were required or suggested. In summary, the Wind Farm and the proposed Facility will have no adverse impacts on grid reliability. As such, the Facility will not affect regional plans.

(2) Long-Term Forecast and Regional Planning for Gas Pipelines and Associated Facilities

Since the proposed Facility does not include gas transmission facilities, this section is not applicable.

(C) SYSTEM ECONOMY AND RELIABILITY

Based on the results of the System Impact Study for the Wind Farm and Facility, PJM identified one network upgrade during the analysis assessment. No additional upgrades were identified in the analysis. The Wind Farm and Facility successfully met the requirements associated with overloads from contingencies, contributions to previously identified overloads, steady-state voltage requirements, over-duty breakers, and stability measures (PJM, 2017).

(D) OPTIONS TO ELIMINATE THE NEED FOR THE PROPOSED FACILITY

Several possibilities were considered before the Applicant determined that the proposed Facility is the most viable option to connect the energy from the Wind Farm to the transmission grid.

The first option the Applicant considered was the possibility of connecting to the grid at the nearest possible POI, still along the 138 kV Lincoln-Sterling circuit at the intersection of TR 59 and SR 114. This option would eliminate the need for the Preferred Route. This option would require the Applicant to build and pay for a new interconnect switchyard, which would take almost 5 acres of crop land out of production. The cost of building a new interconnect switchyard exceeds the cost of the Preferred Route, and increases the electricity buyer's price up to a point that would jeopardize the viability of the project. The first option does not have a signed Interconnection Service Agreement (ISA), so the Applicant would have to enter a queue position with PJM, which would impact the delivery of power schedule, and would put the Applicant in breach of meeting its PPA requirements.

Another alternative that was considered by the Applicant was routing the energy from the Wind Farm to Logtown Substation using two underground 34.5 kV lines, totaling 5.8 miles. This option would require the farmers to give up more crop land during construction with an unavoidable impact to drain tile systems. In addition to increased land impacts, this alternative option would be more expensive to construct and operate than the Preferred Route, which would decrease the Applicant's ability to sell the power.

(E) FACILITY SELECTION RATIONALE

This Facility is necessitated by the development of the Wind Farm. It was selected because it is the most efficient way to deliver electricity generated by the Wind Farm to the existing regional power grid. Electricity generated by the Wind Farm cannot be delivered without the proposed Timber Road IV Transmission Line. As noted herein, the alternatives evaluated would have greater environmental and social impacts, and/or would be more expensive.

(F) FACILITY SCHEDULE

This section describes the anticipated schedule for Facility permitting and construction and is immediately followed by the schedule in Gantt-style chart format. Please note that some of the dates/timelines provided herein are estimates. As the actual information becomes known, Staff will be informed of the actual dates of construction commencement, construction completion, and commencement of commercial operation.

(1) Schedule Gantt Chart

(a) *Preparation of the Certificate Application*

Preparation of the Application occurred in the spring and summer of 2018, with data and analyses added as various studies were completed. A public information meeting was held in September 2018. Public

comments were documented, and the Applicant has addressed all feedback to the greatest extent possible.

(b) *Submittal of the Application for Certificate*

This Application was officially submitted in October 2018.

(c) *Issuance of the Certificate*

It is anticipated that the Certificate will be issued in the first quarter of 2019.

(d) *Receipt of Grid Interconnection Studies*

Grid interconnection studies were initiated in 2017. The Feasibility Study was completed in April 2017. The System Impact Study was completed in May 2017. The Facilities Study was completed in May 2018.

(e) *Acquisition of Rights-of-Way and Land Rights for the Certified Facility*

Acquisition of land and land rights began in September 2017 and were completed October 2018.

(f) *Preparation of the Final Design*

It is expected that final designs and detailed construction drawings will be completed in the first quarter of 2019.

(g) *Construction of the Facility*

Construction is anticipated to begin in the second quarter of 2019 and be completed within six months.

(h) *Placement of the Facility in Service*

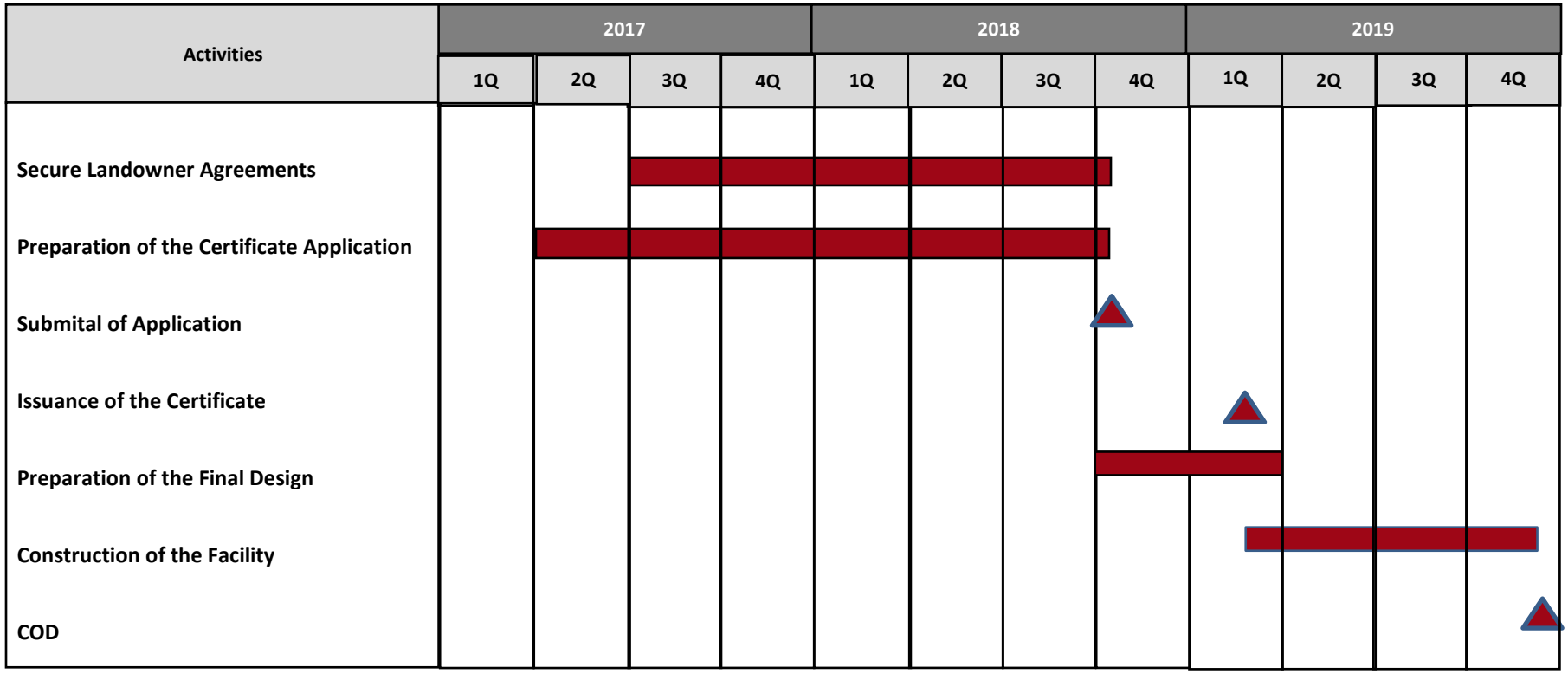
The Facility will be placed in service upon completion of construction, anticipated for the fourth quarter of 2019. As-built specifications will be provided to Staff within one year of the commencement of commercial operation.

(2) Impact of Critical Delays

Critical delays may have material, adverse effects on the financing of both this Facility and the associated Wind Farm, including the Applicant's ability to procure turbines and other Facility components. Such delays may push back the in-service date. In addition, considerable costs would be incurred if the delays prevented the Facility from meeting deadlines for federal incentive programs such as the Production Tax Credit. This

could ultimately interfere with the Applicant's ability to build the Timber Road IV Wind Farm and/or to deliver on contractual obligations to deliver power or renewable energy attributes associated with the Wind Farm.

Timber Road IV Facility Schedule



4906-5-04 ROUTE ALTERNATIVES ANALYSIS

(A) SITE AND ROUTE SELECTION STUDY

The Applicant has identified Preferred and Alternate Transmission Routes, which are set forth in this Application. Given that PJM has completed its initial studies (System Impact Study and Feasibility Study) based on the existing Logtown POI, shifting to an alternate interconnection point would result in PJM requiring the Applicant to submit a new interconnection queue request that would add significant delay to the project. For this and other reasons, the Applicant has filed a Motion for Waiver from the requirement to provide fully-developed information on the alternate route for the proposed Facility. The Applicant is providing the following information on the process for selecting the Preferred Route, including a comparison with the Alternate Route.

(1) Description of Study Area and Rationale for Selection

The Study Area for the route selection process was established based on the location of the Timber Road IV Wind Farm collection substation and the existing 138 kV Lincoln – Sterling circuit. The collection substation will be located at the intersection of TR 52 and TR 59 in Blue Creek Township, and will step up the voltage from the 34.5 kVs produced by the wind turbines to 138 kVs. The Preferred Route will begin at this site, travel due west parallel to TR 52 and will end at the point where the Timber Road III Transmission Line intersects TR 52. The Study Area also includes the location of the Timber Road IV laydown yard just northeast of the TR 59 and SR 114 intersection. The Study Area for the selection process encompasses Blue Creek and Benton Townships in Paulding County.

(2) Study Area and Constraint Map

The Study Area and evaluated transmission routes are illustrated on Figure 04-1. Figure 04-1 depicts constraints used in the route selection process, and also illustrates the Preferred and Alternate Routes and the Timber Road IV laydown yard.

(3) Study Area Evaluated Routes Map

The Study Area and evaluated routes are illustrated on Figure 04-2. As indicated above, the Study Area for the route selection process was established based on the location of the Wind Farm and existing Timber Road II and Timber Road III Wind Farm facilities.

(4) Siting Criteria

The siting criteria used to identify and evaluate transmission routes is based on the primary purpose of the proposed Facility (i.e., delivering electricity generated by the Wind Farm to the existing electric power grid),

OPSB guidelines, and standard transmission line routing practices, as well as the expertise of project engineers and consultants. The following design goals guided the route and site selection process:

- Proximity to the proposed Wind Farm and the existing POI location;
- Landowners willing to provide easement rights for the Transmission Line;
- Where practicable, co-locating with the routes of underground collection lines associated with the Wind Farm as a means of reducing impacts;
- Minimize total length of Transmission Line;
- Minimize number of turns;
- Minimize number of parcels crossed;
- Minimize crossings of public roads and railroads;
- Minimize forest clearing;
- Minimize crossings of wetlands, streams, and other water bodies;
- Minimize crossing/activities within floodplains;
- Minimize proximity to residences and areas of intensive land use; and
- Minimize proximity to sensitive land uses (e.g., schools, churches, hospitals, cemeteries, historic sites, recreation area, parks, preserves, etc.).

Identifying routes that minimize impact and cost requires a balancing and prioritizing of various factors. For example, a route with minimal impacts on wildlife habitat may have greater impacts on residential land uses, and vice versa. In addition to the criteria listed above, all routes must have landowners willing to participate in the project. The Applicant consulted closely with Blue Creek Township, Benton Township, Paulding County, and local landowners in determining potential routes for the Facility.

(5) Route Selection Process

The evaluation of Preferred and Alternate Routes included comparisons based on social, environmental, and engineering factors listed above in 4906-5-04(A)(4). These factors were utilized to identify and evaluate potential transmission line routes, as described below. The primary factor was the location of the Wind Farm collection substation and the closest point to the existing Timber Road III Transmission Line. The Applicant conducted field visits to verify the lowest amount of sensitive land uses. Sources of mapping/GIS data consulted include U.S. Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP) aerial imagery, NWI data, Ohio Wetlands Inventory (OWI) data, Federal Emergency Management Agency (FEMA) floodplain data, ODNR hydrography data, National Register of Historic Places (NRHP) data, and Ohio Historic Inventory (OHI) resources. In addition, landowner preference was a significant factor that assisted in the route selection process.

Table 04-1. Siting Factors for Transmission Route

Factor	Units Evaluated
Length of each transmission line	Miles
Area of each ROW	Acres
Number of turns	Number
Number of parcels in ROW	Number
Area of woodland in ROW	Acres
Amount of NWI and OWI wetland crossed	Linear Feet
Amount of floodplain crossed	Linear Feet
Stream crossings	Number
Road crossings	Number
Residences within 1,000 feet	Number
Residences within 500 feet	Number
Residences within 100 feet	Number
NRHP-listed properties within 1,000 feet	Number
OHI-listed properties within 1,000 feet	Number
Cemeteries within 1,000 feet	Number
Amount of Agricultural District land crossed	Linear Feet

Table 04-1 summarizes the siting factors used in development of the Transmission Line route, including the units used for comparison. Additional information on each of these factors is as follows:

- **Length** is related to cost of the Facility, including increased easement payments, design, engineering, materials, and construction. In addition, a longer transmission line generally has more potential to result in increased environmental impact.
- **Area** is related to the long-term maintenance costs. For safety and reliability reasons, ROWs must be maintained, so the larger the area the more expensive the long-term maintenance costs.
- **Number of turns**, and type of turns (shallow vs. right angles), is related to cost and design/construction complexity.
- **Number of parcels crossed** is related to cost and design/construction complexity.
- **Amount of woodland** is related to environmental impacts. Minimizing impacts to woodlands minimizes impacts to potentially diverse ecological communities and potential habitat for rare species.

- **Amount of wetland and floodplains** is related to environmental impacts. Minimizing impacts to wetlands and floodplains minimizes loss of the functions and values provided by these resources, and also minimizes impacts to potentially diverse ecological communities and potential habitat for rare species.
- **Stream crossings** are related to environmental impacts. Minimizing impacts to streams reduces potential for adverse water quality impacts and also minimizes impacts to potentially diverse ecological communities and potential habitat for rare species.
- **Road crossings** are related to potential visual impacts. Minimizing the number of road crossings has the potential to minimize visual impacts, depending on the sensitivity of the setting.
- **Proximity to residences** is related to potential impacts to local residents. Minimizing the number of residences proximate to the Transmission Line typically also minimizes community wide impacts.
- **Listed historic properties (NRHP and OHI) and cemeteries** are related to potential impacts on cultural resources. Minimizing proximity to such resources typically minimizes the potential for adverse impacts.
- **Amount of agricultural district land** is related to minimizing land use impacts. While it is desirable to site transmission facilities in agricultural land to avoid various environmental impacts, it is also desirable to minimize activities within agricultural districts, because such lands are formally recognized as particularly important for agricultural production.

In addition, the Applicant's familiarity with this general area as a result of its activities associated with developing the Wind Farm was also utilized during the route selection process. Specifically, the Applicant used its knowledge of the area to site the Preferred Transmission Route on parcels owned by landowners willing to participate in the project, and on parcels that are primarily flat, are dominated by agricultural land use, generally have existing access through established farm lanes/roads and have limited environmental constraints. Routes were sought within land already under lease for the Timber Road II Wind Farm (see Case No. 10-369-EL-BGN), and siting was designed to avoid socioeconomic and ecological impacts to the greatest extent practicable. Using these parameters, the most direct routes with the fewest of turns were identified for further evaluation.

(6) Identified Routes, Evaluation, and Ranking

As indicated above, the location of a transmission line is dictated in large part by the location of the collection station and the Timber Road III Transmission Line. The Study Area was defined as the area between the

Wind Farm collection substation and the existing Timber Road III Transmission Line. Within the Study Area, the Applicant examined numerous potential routes using the siting factors listed in Table 04-1. Ultimately, the Preferred Route, along with the Alternate Route, were identified as the best siting options.

The Applicant did not conduct a formal, stand-alone route/site ranking process (see Motion for Waiver). However, with respect to comparing potential ecological impacts associated with the Preferred and Alternate Routes, please note the following:

- No significant populations of commercially or recreationally important species (other than agricultural crops) were observed within the ROWs of the Preferred Route or Alternate Route.
- The ROWs for the Preferred and Alternate Routes have only very limited potential habitat for rare, threatened, or endangered species.
- No viable bat habitat was found in the Study Area for the Preferred or Alternate Routes.
- The Study Areas for the Preferred and Alternate Routes did not contain suitable freshwater mussel habitat.

With respect to comparing potential land use impacts, there are few differences in the existing land use within 1,000 feet of each route. Cropland comprises approximately 742 acres (97%) within 1,000 feet of the Preferred Transmission Route, and 967 acres (98%) within 1,000 feet of the Alternate Route. Farmstead lands constitute the second most common land use in the Study Area totaling 12.3 acres (1.6%) and 13.9 acres (1.4%) within 1,000 feet of the Preferred and Alternate Routes. Within 1,000 feet of each route, forestland comprises 12 acres (1%) along the Preferred Route, and 14 acres (1%) along Alternate Route. Land use patterns are also similar within the ROWs for the Preferred and Alternate Routes. The majority of the land use is cropland: 33 acres (91%) of the Preferred ROW, 63 acres (98%) of the Alternate Route ROW.

(B) SUMMARY TABLE

Following the selection of the Preferred and Alternate Routes, a more thorough comparison of the attributes of each potential route was conducted. Table 04-2 summarizes the results of this analysis, which are discussed in greater detail in the subsequent sections of this Application.

Table 04-2. Summary Comparison Table

Siting Factor	Transmission Routes	
	Preferred	Alternate
Length of line	2.9 miles	3.8 miles
Area of ROW	35.8 acres	64.2 acres
Number of turns	0	5
Number of parcels in ROW	19	16
Area of woodland in ROW	1.3 acres	0 acre
Amount of NWI wetland[1]	99 feet	2,475 feet
Amount of OWI wetland[1]	0 feet	0 feet
Amount of 100-year floodplain[1]	0 feet	0 feet
Mapped stream crossings	6	5
Road crossings	4	6
Residences within 1,000 feet	5	6
Residences within 500 feet	3	3
Residences within 100 feet	1	0
NRHP-listed properties within 1,000 feet	0	0
OHI-listed properties within 1,000 feet	4	2
Cemeteries within 1,000 feet	0	0
Agricultural District land[2]	0 miles	0 miles

[1] Linear feet crossed by Transmission Line
[2] Miles crossed by Transmission Line.

(C) PUBLIC INVOLVEMENT DURING THE SITE AND ROUTE SELECTION PROCESS

Consultation with landowners began September 2017. At that time, the proposed collection substation was positioned about a quarter mile north of the intersection of TR 52 and TR 59. The proposed Transmission Line was then a quarter mile north of its current location, still running parallel to TR 52. This first proposed location of the Transmission Line did not work for the majority of the landowners, as the Transmission Line would cut through the middle of their crop land, which would reduce the amount of crop production during both construction and operations. The landowners had strong opposition to hosting it in the middle of the field. Taking the feedback of the landowners, the Applicant then met with the Paulding County Engineer and Benton Township zoning inspector in September 2017 to determine the suitability of constructing the Facility along field edges along TR 52, which is the landowners' preferred location. The County Engineer stated that the Transmission Line infrastructure placed in the ground (the transmission line poles) needed to be 25 feet or greater outside of the center line of TR 52. The Benton Township zoning inspector had no issues with the Transmission Line being as close to TR 52 as possible. The Applicant designed the Preferred Route to comply with the 25 foot public road setback and an aerial encroachment easement that will be granted to the Facility

by the County and Townships in the Road Use Agreement in the event that any portion of the overhead facilities (conductor or arms) encroaches within the setback.

The Applicant then held many landowner meetings in order to determine pole locations, which include landowner feedback. The Applicant shared the proposed pole locations using maps, as well as survey stakes, to communicate with the landowners.

Oral comments were received at the public meeting, which was held on September 12, 2018 at the Paulding County Fair Grounds in Paulding, Ohio. The public comments generally focused on the construction schedule. No written comments were submitted at the public meeting.

4906-5-05 PROJECT DESCRIPTION

(A) DESCRIPTION OF PROJECT AREA

The following sub-sections provide information on the location, major features, population centers, major industries, landmarks, and the topographic, geologic, and hydrologic suitability of the Project Area. For the purposes of this discussion, the Project Area refers to the area within 1,000 feet of the Preferred and Alternate Transmission Routes and the Timber Road IV laydown yard.

(1) Geography and Topography Map

Figure 05-1 depicts the geography and topography in the Project Area at a 1:24,000 scale, and includes all areas within the 1,000-foot Project Area.

(a) *The proposed transmission line or pipeline alignments*

The proposed Preferred and Alternate Routes are shown on Figure 05-1.

(b) *The proposed substation or compressor station site locations*

Figure 05-1 depicts the location of the Wind Farm's collection substation (see Case No. 18-91-EL-BGN), located at the eastern end of the Preferred and Alternate Routes.

(c) *Roads and railroads*

Public roads are depicted on Figure 05-1. Neither the Preferred nor Alternate Routes cross any U.S. highways. In order of crossing from east to west (i.e., from the collection substation to the location of the Timber Road III Transmission Line) the Preferred Route crosses the following SRs, County Roads (CRs), and TRs: TR 59, CR 55 and SR 49; and the Alternate Route crosses TR 59, CR 55, CR 49, TR 52, CR 48, and SR 49.

According to the Ohio Department of Transportation (ODOT), there are no active railroads in the Project Area (ODOT, 2016).

(d) *Major institutions, parks, and recreation areas*

There are no institutions, recreational areas, or parks within the Project Area (Figure 05-1).

(e) *Existing gas pipeline and electric transmission line corridors*

Figure 05-1 depicts one natural gas pipeline, owned by Panhandle Eastern Pipe Line, one electric transmission line, owned by Paulding Wind Farm III LLC, and existing Timber Road II Wind Farm underground collection lines within the Project Area.

(f) *Named lakes, ponds, reservoirs, streams, canals, and rivers*

Named waterbodies are depicted on Figure 05-1.

(g) *Population centers and legal boundaries of cities, villages, townships, and counties*

The proposed Facility spans across Benton Township and crosses the western border of Blue Creek Township. Figure 05-1 illustrates township boundaries within the Project Area. There are no legal municipal boundaries of cities, villages, and counties, or population centers in the Project Area and, therefore, they will not be depicted in Figure 05-1.

(2) Facility Dimensions and Number of Properties Crossed

The Preferred and Alternate Routes are 2.9 miles and 3.8 miles long, respectively. Table 05-1 summarizes the dimensions and number of properties crossed by the Preferred and Alternate Routes.

Table 05-1. Facility Dimensions and Number of Properties Crossed

Route	Area of Right-of-Way	Length of Transmission Line	Number of Properties Crossed
Preferred	35.8 acres	2.9 miles	19
Alternate	64.2 acres	3.8 miles	16

(B) LAYOUT AND CONSTRUCTION

(1) Site Activities

(a) *Surveying and Soil Testing*

The Timber Road IV Transmission Line route will be surveyed to establish centerline, ROW, and pole locations. The surveying will be completed using conventional or aerial methods and will locate topographic features and manmade structures that may affect the final design of the Facility.

Soil testing will be conducted at representative sites along the Preferred Route. The borings will extend to the proposed depth or competent bedrock, whichever is encountered first. Split-barrel sampling of soil will be performed in accordance with American Society for Testing and Materials (ASTM) D1586 for each boring in increments of 2.5 feet to the depth of 12 feet, and at 5-foot intervals below 12 feet to the depth of the 60-foot borings along the Preferred Route and 30-foot borings within the laydown yard area. In all the borings, Standard Penetration Test (SPT) data will be developed and representative samples preserved. Water observations in the boreholes will be recorded during (and at the completion of) drilling. A truck-mounted drill rig will be used to perform the borings, unless unfavorable weather conditions make the site inaccessible, in which case an ATV-mounted drill rig will be used. All borings will be backfilled at the completion of drilling with bentonite chips and drill cuttings.

The laboratory testing program will include examination of soil samples by an engineer. All laboratory testing will be performed in accordance with ASTM standards. Based on the material's texture and plasticity, the Applicant's consultant, Terracon, will describe and classify the soil samples in accordance with the Unified Soil Classification System. Final boring logs will be prepared that will include both field observations and results of the laboratory tests. A report will be prepared and will include a summary of boring and testing results, boring logs, discussion of regional seismicity, foundation design recommendations, and an estimate of foundation settlement potential. See Section 4906-5-08(D) for additional information regarding test borings. This report will be provided to OPSB Staff prior to commencement of Facility construction.

(b) *Grading and Excavation*

No significant grading is anticipated to construct either the Preferred or Alternative Routes, as the existing terrain within the ROWs generally provides a suitable surface for construction vehicle operations.

The area for the Timber Road IV laydown yard will be cleared of all vegetation and graded, if necessary. Upon completion of the Facility and Wind Farm, any structures will be removed and the area will be regraded and re-spread with stockpiled topsoil.

As described below in 4906-5-05(C)(1)(c), the transmission poles will be placed on concrete and steel foundations. The excavation for pole placement is anticipated to be conducted using an auger. A portion of the excavated soil may be used for backfilling. Excess excavated soils will be placed around the structure or hauled off-site.

(c) *Construction of Temporary and Permanent Access Roads and Trenches*

Access for the proposed Facility during construction and for long-term operation and maintenance will be through the use of existing farm lanes and paths, and public roads already in place and in use today. However, additional stabilization of existing field roads with gravel may be required in order to improve the all-weather accessibility. Most of the existing field roads are approximately 12 feet in width; if they are narrower, road widening, and improvement may be necessary. Limited tree clearing is anticipated for the proposed Facility. Impacts will be largely restricted to active agricultural areas. No new or improved bridges or stream crossings (other than overhead wire crossings) are planned. Access to all transmission route locations will be via public roads, existing farm lanes, and over pasture or cultivated farmland.

Construction entrances will most likely be temporarily covered with wooden matting to minimize ground disturbance or stabilized with geotextile covered by clean stone to minimize the tracking of mud off-site. Stormwater best management practices will be employed to reduce erosion and control stormwater runoff to prevent sedimentation from leaving the site. Construction entrances will be temporarily installed at locations along TR 52.

The access plan for both construction and maintenance activities will be confirmed based on final designs and detailed construction drawings, expected to be completed in the first quarter of 2019.

(d) *Stringing of Cable and/or Laying of Pipe*

After the structures are erected, the conductors will be installed through established stringing setup areas. Equipment set up will include a wire puller, conductor reels, ground wire reels, and a wire tensioner. Conductor installation will be accomplished using the tension stringing method. Conductors will be pulled through under sufficient tension to keep the conductor off the ground. Temporary guard or clearance poles will be used as a safety precaution at locations where the conductors could create a hazard to either crew members or the general public.

Wire stringing locations will be used at turns in the line to support pulling equipment and cable trailers. Each dead-end structure will have a stringing location setup consisting of two pulling spots, ahead and back. Each pulling site will be approximately 60 feet x 50 feet, for a total of 3,000 square feet per stringing location. Exact means and methods for stringing will be determined by the contractor and presented to the OPSB prior to the pre-construction meeting. Impacts from wire stringing activities will be temporary.

(e) *Installation of electric transmission line poles and structures, including foundations.*

All structures will be designed to meet the National Electric Safety Code's (NESC's) "heavy" loading condition ratings. Although steel poles were used for the preliminary design basis, the final design material may vary. The total pole heights will range from 100 to 130 feet, with a drilled, cast-in-place, concrete pier foundation installed using the "casing method." Foundations will be installed at least 50 feet into the soil, or one foot into competent bedrock. Bedrock is anticipated to be encountered between 30 and 50 feet deep. Above ground heights will range from 100 to 130 feet. Pole diameter at ground line will range from 48 to 84 inches depending on the pole (angle versus tangent), with slightly larger dimensions at the base. Foundations are anticipated to be approximately seven feet in diameter.

Construction equipment (line trucks, cranes, digging equipment) will be accessing pole locations during installation in order to dig poles, set poles, and connect the conductors to the pole insulators. It is anticipated that construction vehicles and cranes will cause temporary disturbance of approximately 22 feet x 22 feet around each pole during Facility construction. The permanent impact from each pole foundation will be approximately 10 feet x 10 feet around each pole.

(f) *Post-Construction Reclamation*

Once Facility construction is complete, temporarily disturbed areas will be restored (including removal of excess materials, de-compaction, and rock removal in agricultural areas) and returned to their approximate pre-construction contours. Exposed soils will be stabilized by seeding, mulching, and/or agricultural planting. Any drainage ditches, field drainage tiles, or fencing damaged by construction activities will be repaired.

(2) Layout of Associated Facilities

(a) *Transmission Line Routes and Associated Facilities Map*

Detailed plans illustrating the preliminary designs for the Preferred and Alternate Routes have been included as Figure 05-2. Prepared at a scale of 1:12,000 on an aerial base, this map includes the following features:

(i) Access Roads, Staging Areas, and Laydown Areas

The location of the laydown yard is illustrated in Figure 05-2. Temporary access will primarily be through the public roads, as well as farm roads and farm fields. No access roads are proposed for the Facility.

(ii) Proposed Location of Major Structures and Buildings, Including Transmission Line Poles

The locations of all major structures, including pole locations for the Preferred Route are depicted in Figure 05-2.

(iii) Fenced-In or Secured Areas

The Facility will include two fenced-in areas. The final pole on the Preferred Route is located 2.9 miles west of the Wind Farm substation. The Applicant plans to use an 8-foot tall fence topped with barbwire in an area of about 30 feet by 30 feet around the final pole.

The second area will be the area surrounding the Timber Road IV laydown yard. The fence around the laydown yard will most likely be about 8 feet in height topped with barbwire in an area of about 870 feet by 900 feet.

(b) *Reason for Proposed Layout and Unusual Features*

Structure locations were selected based on the nature of the terrain, property lines, roads, and other landscape features in the area. Pole locations for the Preferred Route were developed through consultations with Paulding County and landowners. The proposed Facility will allow for delivery of electricity from the Wind Farm to the regional power grid with minimal impact on sensitive land uses and natural habitats. There are no unusual features associated with construction of the proposed Facility.

(c) *Plans for Future Modifications*

As indicated above, the purpose of the Facility is to deliver electricity generated by the Wind Farm (see Case No. 18-91-EL-BGN) to the existing 138 kV Lincoln – Sterling circuit. The Logtown POI has a capacity of 225.9 MWs without significant interconnection upgrade costs. Timber Road III Wind Farm LLC currently uses 100.8 MWs. The proposed Wind Farm will generate a total of 125.1 MWs. The proposed Facility will deliver up to 75.9 MWs to the existing Logtown switchyard via the Timber Road III Transmission Line, causing the switchyard to reach maximum capacity. Therefore, there are no future plans with respect to this Facility.

(C) TRANSMISSION LINE OR PIPELINE EQUIPMENT

(1) Electric Power Transmission Line Data

(a) *Design Voltage*

The Timber Road IV Transmission Line will be designed and operated at 138 kVs.

(b) *Pole, Conductor, and Insulator Design*

The Timber Road IV Transmission Line will be supported on multiple mono-pole structures with concrete/rebar pole foundations to the extent they are called for by the geotechnical evaluation and engineering. All poles will be weathering steel, and all poles will be self-supported. While multiple pole types may be used, the two most common structure types will consist of single-pole tangent-braced post structures and single-pole dead-end corner structures. A detailed list of all pole types is currently being developed and will be provided to the OPSB prior to the preconstruction meeting. The various structure types are illustrated in Exhibit A prepared by SGC Engineering and described below:

- For tangent configurations (assumes an angle range of 0-1 degree), the tower design will be a single, mono-pole design with a delta configuration. A conceptual drawing of the proposed tangent structures is included in Exhibit A.
- For dead-end configurations (assuming an angle range of 0-90 degrees), the tower design will be a single, mono-pole design with anchors. A conceptual drawing of the proposed dead-end structures is included in Exhibit A.
- For S-switch configurations, the tower design will be a single, mono-pole design with a 138 kV motor operated disconnect switch in Exhibit A.

The Transmission Line will be installed within an approximately 150-foot wide ROW, which on average will extend 75 feet from the centerline of the Transmission Line along each side. Because the Preferred Route runs along the public road, the ROW will end at the centerline of the public road, so the majority of the Preferred Route ROW will in actuality be less than 150 feet wide. To minimize potential clearing impacts to forestland, the Preferred Route is primarily located within open agricultural land and along open, public road. Approximately 19 structures are proposed along the 2.9-mile Preferred Route, which equates to an average spacing of approximately 800 to 880 feet between structures.

The type of materials used for the structures will be steel for the poles, and concrete and rebar steel for the foundations. All structures will be designed to meet the NESC's heavy loading and extreme wind

condition ratings. Although steel poles were used for the preliminary design basis, the final design material may vary. The conductor size will be 795 ACSR "DRAKE". For grounding and communications needs, there will be two Optical Ground Wires (OPGWs) with 24 fibers. The insulator arrangement will be a "delta" configuration.

Aboveground pole heights will range from 100 to 130 feet. Pole diameter at ground line may range from 36 to 100 inches depending on the pole (e.g., dead-end versus tangent), with slightly larger dimensions at the base. Steel pole concrete foundations are anticipated to be approximately 4 to 12 feet in diameter.

(c) *Base and Foundation Design*

The mono-pole structures will be installed on drilled pier, cast-in-place concrete and rebar foundations installed using the "casing method." Groundwater will be displaced from excavation using a bentonite slurry and concrete placed in the excavation from bottom to top using a tremie pipe to displace slurry.

Construction equipment (line trucks, cranes, digging equipment) will be accessing the pole locations during installation in order to dig poles, set poles, and to connect the conductors to the pole insulators. It is anticipated that construction vehicles and cranes will cause temporary disturbance of approximately 22 feet x 22 feet around each pole during Facility construction. The permanent impact from each pole foundation will be approximately 10 feet x 10 feet around each pole.

(d) *Underground Cable Design*

No underground circuitry is proposed.

(e) *Other Major Equipment or Special Structures*

Standard electric utility transmission digger derrick trucks and bucket lift trucks will be utilized for installation of the 138 kV Transmission Line.

The Timber Road IV Transmission Line will include a steel pole standing 95 feet above the ground at the located 2.9 miles west from the Wind Farm substation just north of TR 52. The pole will host a 138 kV vertical break horizontal mounted operated three-pole disconnect switch. See Exhibit A for further detail.

(2) Electric Transmission Substation Data

The proposed Facility does not include the construction of a new POI switchyard. The Facility will utilize the existing Logtown switchyard located at the intersection of SR 114 and TR 27 in Benton Township. This section is not applicable for this Application.

(a) *Breakers*

The Facility will not include the installment of breakers.

(b) *Switchgear*

The Facility will not include the installment of switchgears.

(c) *Bus arrangement and structures*

The Facility will not include the installment of breakers.

(d) *Transformers*

The Facility will not require the installment of breakers.

(e) *Control buildings*

Given the nature of the Facility, a control building is not required and will not be installed.

(f) *Other major equipment*

No additional equipment, outside of that discussed in this application, is anticipated for use.

(3) Gas Pipeline Facilities Data

Since the proposed Facility will not include the installation of gas pipeline facilities, this section is not applicable.

4906-5-06 ECONOMIC IMPACTS AND PUBLIC INTERACTION

(A) OWNERSHIP

The Applicant will permit, construct, own, operate, and maintain all structures and equipment associated with the Facility. Limited portions of the Timber Road IV Transmission Line will span into the public road ROWs, specifically where the lines cross roads from one participating parcel to another; however, the proposed Facility will not change the ownership status of such ROWs. Transmission Line components will be located entirely on privately-owned land under voluntary easement agreements between the Applicant and landowners. The Transmission Line will have swing out across the public road ROW. Paulding County and the Applicant have agreed to add an aerial easement, to account for the blow out, within the Road Use Agreement (RUA). Lease agreements granting rights along the Preferred Route have already been signed, as have many of those along the Alternate Route. Acquisition of easement rights for the proposed Facility commenced in September 2017 and is on-going. The proposed Facility and associated easement agreements are not expected to change the ownership status of these private lands.

(B) ELECTRIC TRANSMISSION LINE CAPITAL AND INTANGIBLE COSTS

Estimates of applicable intangible and capital costs for the proposed Facility are presented in Table 06-1, including costs for the Preferred and Alternate Routes. The Logtown POI switchyard and the Wind Farm's collection substation are not included in estimated costs because it is either existing infrastructure, or not applicable to this Application.

Table 06-1. Estimated Capital and Intangible Costs

Description	Preferred Route	Alternate Route
Land and Land Rights	$ [redacted]	$ [redacted]
Poles and Fixtures	$ [redacted]	$ [redacted]
Towers and Fixtures	n/a	n/a
Overhead Conductors	$ [redacted]	$ [redacted]
Underground Conductors and Insulation	n/a	n/a
Underground to Overhead Conversion Equipment	n/a	n/a
Right-of-Way Clearing and Access Roads	$ [redacted]	$ [redacted]
Switch Gears	$ [redacted]	$ [redacted]
Labor for the Overhead Transmission Line	$ [redacted]	$ [redacted]
Laydown Yard	$ [redacted]	$ [redacted]
Total	**$ [redacted]**	**$ [redacted]**

(C) GAS CAPITAL COST

Since the proposed Facility will not include the installation of gas pipeline facilities, this section is not applicable.

(D) PUBLIC INTERACTION INFORMATION

(1) Counties, Townships, Villages, and Cities within 1,000 Feet of the Route Alternatives

The Preferred and Alternate Route Study Areas are both located entirely within Paulding County, and include portions of Benton and Blue Creek Townships. There are no cities or villages within 1,000 feet of any portion of the Facility.

(2) Public Officials Contacted

The following public officials have been contacted regarding the application:

- Benton Township Trustee Mark Crosby
  1065 SR 114
  Payne, OH 45880
  Phone: (419) 263-2267

- Benton Township Trustee Randy Noggle
  6437 SR 114
  Haviland, OH 45851
  Phone: (419) 263-2459

- Benton Township Trustee Joseph Thome
  Phone: (419) 263-2673

- Benton Township Zoning Inspector Tom Sinn
  (419) 399-4613

- Blue Creek Township Fiscal Officer Chris Laukhuf
  Phone: (419) 263-4049

- Blue Creek Township Trustee Jammie L. Hughes
  Phone: (419) 622-3310

- Blue Creek Township Trustee Calvin Sinn
  Phone: (419) 771-0926

- Blue Creek Township Trustee Bryce Mills
  Phone: (419) 203-4758

- Paulding County Commissioner Tony Zartman
  115 N Williams Street
  Paulding, OH 45879

Phone: (419) 399-8215

- Paulding County Commissioner Roy Klopfenstein
  115 N Williams Street
  Paulding, OH 45879
  Phone: (419) 399-8215

- Paulding County Commissioner Mark Holtsberry
  115 N Williams Street
  Paulding, OH 45879
  Phone: (419) 399-8215

- Paulding County Engineer Travis R. McGarvey
  801 West Wayne Street
  Paulding, OH 45879
  Phone: (419) 399-2366

(3) Public Information and Complaint Resolution Programs

The Applicant held a public information meeting on September 12, 2018 at the Paulding County Fairgrounds, inviting the public to review maps and studies performed on the Preferred and Alternate Routes. The Applicant has and will continue to make general information about wind power and specific information about the Wind Farm and the proposed Facility available to community members, elected officials, the media, and local civic organizations. Local landowners will be updated through periodic newsletters and personal contacts with Applicant representatives.

The Applicant maintains an information website about the Wind Farm and Facility (www.TimberRoadWindFarm.com). This site provides project information, along with news releases and general information about wind power resources and the benefits of wind power. This website will be updated with new information throughout the planning and review process. In addition, the Applicant's staff will continue to be available to interact with the community and public officials during the construction and operation phases of the Facility.

A complaint resolution procedure will be implemented to ensure that any complaints regarding Facility construction or operation are adequately investigated and resolved. A toll-free number, 1-866-263-5594, and a local number, 419-463-0594, have been set up to receive and formally document all complaints, which will then be investigated by onsite Facility staff. This complaint resolution process will be formalized with OPSB Staff before construction begins. At least seven days prior to the start of construction, the Applicant will mail

a notice to affected property owners and tenants summarizing the upcoming construction activities, details of the Complaint Resolution Plan, and other sources of information about the Facility. A draft Complaint Resolution Plan is attached hereto as Exhibit B.

(4) Liability Compensation

The Applicant will affect and maintain throughout the term of the Facility, at its sole cost, insurance policies against claims and liabilities arising out of personal injury, death, and property damage arising from operation of the Facility. The insurance policy or policies will insure the Applicant to the extent of its interests. The limits of the insurance policy described shall be $10,000,000 per occurrence and $10,000,000 in annual aggregate. The Applicant may choose any combination of primary and excess liability policies to reach the aforementioned insurance limits.

(5) Tax Revenues

According to the ORC Chapter 5727, the Facility is part of an "Energy Facility." ORC Section 5727.01(P) states that:

> *""Energy facility" means one or more interconnected wind turbines, solar panels, or other tangible personal property used to generate electricity from an energy resource owned by the same person, including:*
>
> *(1) All interconnection equipment, devices, and related apparatus connected to such tangible personal property; and*
>
> *(2) All cables, equipment, devices, and related apparatus that connect the generators to an electricity grid or to a building or facility that directly consumes the electricity produced, that facilitate the transmission of electrical energy from the generators to the grid, building, or facility, and, where applicable, that transform voltage before ultimate delivery of electricity to the grid, building, or facility.*

Furthermore, the Facility will not be constructed unless the associated Wind Farm is constructed. Therefore, the increase in tax revenues as a result of Facility placement will be the same as those anticipated from the Wind Farm. As described in 4906-4-06(E)(3) of the application for the Wind Farm (see Case No. 18-91-EL-BGN), the proposed Wind Farm (and thus the associated Transmission Line that is the subject of this Application) will have a significant positive impact on the local tax base, including local school districts and other taxing districts that service the area where the Facility and proposed Wind Farm is to be located. Taxing districts include five municipalities (Benton, Blue Creek, Crane, Harrison, and Paulding Townships) in

Paulding County, along with three school districts (Wayne Trace Local School District, Antwerp Local School District, and Paulding Exempted Village School District).

The amount of the annual service payment depends on the ratio of Ohio-domiciled full-time equivalent employees to total full-time equivalent employees during construction or installation. The base payment ranges from $6,000 and $8,000 per MW of nameplate capacity. The county could also require that an additional service payment be made to the county's treasurer; however, in accordance with the ORC Section 5727.75, the total annual payment cannot exceed $9,000 per MW.

The Applicant anticipates that it will pay real and personal property taxes at the maximum rate set under ORC Section 5727.75; between $6,000 to $9,000 per MW of nameplate capacity per year during the life of the wind farm turbines. The Transmission Line will connect up to 75.9 MWs of energy to the regional power grid. Therefore, the increase in annual local tax revenues associated with the Facility will be between $455,400 and $683,100.

It is important to note that the proposed Wind Farm and Facility will make few, if any, demands on local government services. Therefore, payments made to local governments will be net positive gains and represent an important economic benefit to the local area.

4906-5-07 HEALTH AND SAFETY, LAND USE, AND REGIONAL DEVELOPMENT

(A) HEALTH AND SAFETY INFORMATION

(1) Compliance with Safety Regulations

Safety is the Applicant's highest priority. Therefore, the Applicant will assure that the Facility will be constructed and operated to comply with the requirements specified in the NERC mandatory Reliability Standards, the NESC, the Public Utilities Commission of Ohio, the ORC, and will meet all applicable safety standards established by the Occupational Health and Safety Administration (OSHA).

(2) Electric and Magnetic Fields

Electric fields in the home, on average, range from 0 to 10 volts per meter. Electric fields directly beneath power lines may vary from a few volts per meter for some overhead distribution lines to several thousands of volts per meter for extra high voltage power lines. Electric fields from power lines rapidly weaken with distance and can be greatly reduced by walls and roofs of buildings (NIH, 2002; EPRI, 2009).

In contrast, magnetic fields are not blocked by most materials. Magnetic fields encountered in homes vary greatly and exponentially weaken with distance from the source. Magnetic fields close to electrical appliances are often much stronger than those from other sources, including magnetic fields directly under power lines. Appliance fields decrease in strength with distance more quickly than do power line fields. Alternating magnetic fields produced by AC electricity can induce the flow of weak electric currents in the body. However, such currents are estimated to be smaller than the measured electric currents produced naturally by the brain, nerves, and heart (NIH, 2002; EPRI, 2009).

Due to public concern that the use of electricity, electrically-powered devices, and electrical power distribution networks may adversely affect health, numerous research studies and scientific reviews have been conducted to address this topic. Initial concerns were raised in the late 1970s, and scientists continue to investigate possible relationships between electric and magnetic fields (EMFs) and positive or negative health effects. However, there is no conclusive evidence that exposure to EMF causes health effects. Additional discussion of potential health effects of EMF is included below in Section 4906-05-07(A)(2)(b). During the public information meeting, no public health concerns were raised.

Currently, there are no federal standards for occupational or residential exposure to 60 hertz (Hz) Extra Low Frequency – Electromagnetic Frequencies (ELF-EMF) of the levels produced by power lines. However, there

are national and international guidelines for the exposure of workers in occupational settings and to members of the public (ICNIRP, 1998; IEEE, 2002; AGCIH, 2001). These exposures are complex and come from multiple sources within the home, the workplace, and power lines. Although scientists are still debating whether EMF is a hazard to health, the National Institute of Environmental Health Sciences (NIEHS) recommends continued education on ways of reducing exposures without adding other safety concerns.

The unit measurement for the strength of magnetic fields is the Gauss (G). Since magnetic fields from power lines and other low level sources are typically much lower than a Gauss, a smaller unit of 1/1000th of a Gauss, called a milli Gauss (mG), is used. This unit of measurement of a magnetic field is also sometimes referred to as the "magnetic flux density" or the "magnetic induction." The electric field is measured by the change in voltage potential over a certain distance. The unit of electric field is kilovolts per meter or kV/m. An electric field of 1 kV/m indicates a difference in electric potential of 1000 volts (1 kV) measured over a 1-meter distance.

It is the intention of the Applicant to design the overhead transmission line with magnetic and electric field levels well below the Institute of Electrical and Electronics Engineer guidelines (IEEE, 2002) given in Table 07-1.

Table 07-1. Institute of Electrical and Electronics Engineer EMF Exposure Guidelines

Exposure Population	Electric Field	Magnetic Field
Worker	20 kV/m	27,100 mG
Public	5 kV/m	9,040 mG

The following analysis provides a demonstration of the magnetic and electric fields strengths of the proposed Facility.

(a) *Calculated Electric and Magnetic Field Strength*

SGC Engineering, LLC performed an analysis to evaluate the electric and magnetic fields of the Transmission Line (Exhibit C). The design of the proposed Facility will be the same for either the Preferred or Alternate Route, so the EMF analysis applies to either route. The EMF related to the Facility were modeled using the TRALIN module of the Current Distribution, Electromagnetic Fields, Grounding and Soil Structure Analysis (CDEGS) program. The following calculations provide an approximation of the magnetic and electric fields strengths of the proposed Timber Road IV Transmission Line.

The voltage dependent electric field calculations were performed assuming that the line was operating at an American National Standards Institute (ANSI) maximum of 1.05% of nominal voltage (138 kV x 1.05 = 144.9 kV). The current dependent magnetic field calculations were performed assuming the phase conductors were loaded to either their winter or summer normal rated current carrying capacity (1,252 or 852 amperes [Amps], respectively).

The electric and magnetic fields were calculated for both the minimum conductor height of 25 feet (Hmin) at the center of each transmission line span (point of maximum conductor sag), and at the average conductor height (Havg) of 28.833 feet (based on a span-to-span conductor sag of 11.5 feet). The results at Hmin are representative of the values found under the transmission line conductors within the ROW and the results at Havg are representative of the values at the edge of the ROW and beyond. The electric field levels produced by the Transmission Line are the same under winter normal conductor rating, emergency line loading, and normal maximum loading, and are discussed in Section 4906-5-07(2)(a)(iii).

(i) Winter Normal Conductor Rating

The conductor being specified for the 138 kV transmission line is a single 795 Drake conductor For this project, the winter normal conductor rating is 1,252 Amps. Table 07-2 shows the magnetic field strengths under the winter normal conductor rating at a reference point of approximately 3 feet above ground.

Table 07-2. Predicted Magnetic Field Strengths – Winter Normal Conductor Rating

Peak Inside ROW		Edge of ROW (± 62.5 feet)	
Hmin	Havg	Hmin	Havg
204.48 mG	158.65 mG	41.18 mG	39.13 mG

(ii) Emergency Line Loading

The emergency line loading conductor rating is 852 Amps. Again, the 138 kV transmission line proposed is a radial feed, in that it only supports the transmission of the power from the Wind Farm to the existing transmission grid. The emergency amount of power transmitted across this line will be limited by the generating capacity of the Wind Farm. Table 07-3 shows the magnetic field strengths under the emergency line loading (which is the same as the normal maximum loading rating) at a reference point of approximately 3 feet above ground.

Table 07-3. Predicted Magnetic Field Strengths – Emergency Line Conductor Rating

Peak Inside ROW		Edge of ROW (± 62.5 feet)	
Hmin	Havg	Hmin	Havg
139.5 mG	107.96 mG	28.02 mG	26.63 mG

(iii) Normal Maximum Loading

The normal maximum loading values in this study are based on a conductor rating of 852 Amps. Again, because the 138 kV transmission line proposed is a radial feed, it only supports the transmission of the power from the Wind Farm to the existing AEP transmission grid. Diagram 07-1 provides an illustration of the magnetic field strengths under this hypothetical scenario, at a reference point of approximately 3 feet above ground. The predicted magnetic field values are the same as those presented in Table 07-3 above.

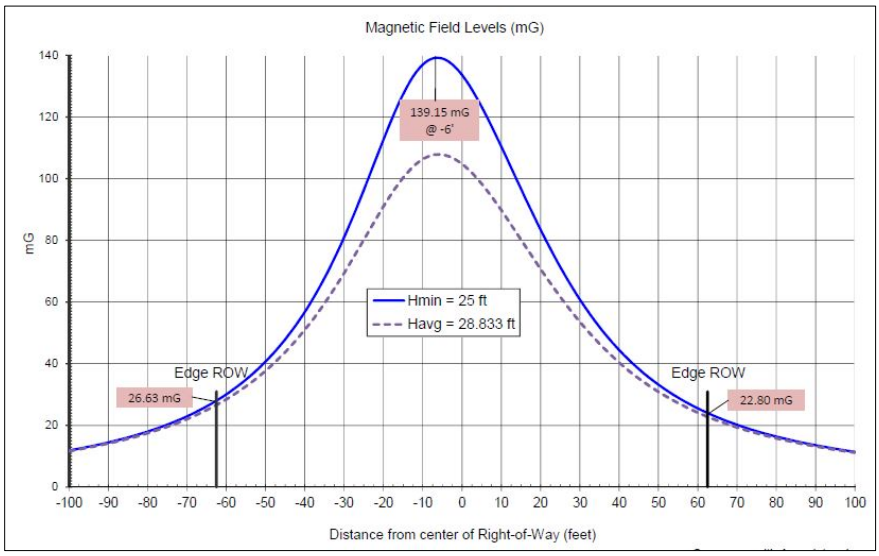


Diagram 07-1. Magnetic Fields, Summer Normal Rating

The electric field reaches a maximum level of almost 2 kV under the conductors within the ROW. Because the delta configuration on the vertical poles is not symmetrically positioned relative to the ground, the electric field is mildly asymmetrical at the measurement point one meter above ground. At the right edge of the ROW the electric field is 0.30 kV/meter and on the left edge of the ROW it is 0.24 kV/m. Diagram 07-2, below, provides an approximation of the electrical field strengths at a reference point of approximately 3 feet above ground.

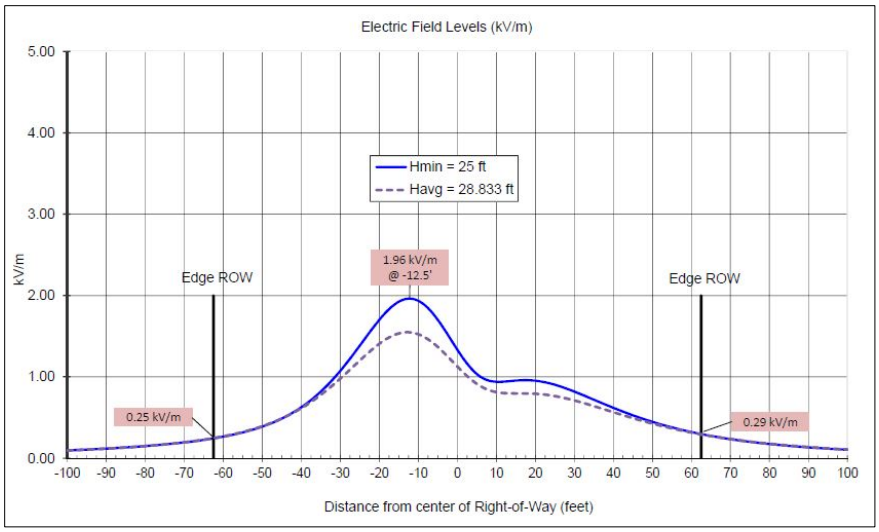


Diagram 07-2. Electric Fields, Summer Normal Rating

(iv) At Occupied Residences or Institutions Within 100 Feet of Centerline

There is only one residence within 100 feet of the centerline of the Transmission Line. As such, the values are as presented in Sections 4906-5-07(A)(2)(a)(i) through 4906-5-07(A)(2)(a)(iii).

(b) *Current State of EMF Knowledge*

Electric transmission lines produce EMF when they are in operation. These fields are caused by different aspects of the operation of a transmission line and can be evaluated separately. Electric fields are produced whenever a conductor is connected to a source of electrical voltage. An example of this is the plugging of a lamp into a wall outlet in a home. When the lamp is plugged in, a voltage is induced in the cord to the lamp which causes an electric field to be created around the cord. Magnetic fields are produced whenever electrical current flows in a conductor. In the lamp example, if the lamp is turned on allowing electricity to flow to the lamp, a magnetic field is created around the lamp cord in addition to the electric field.

Electric and magnetic fields are naturally occurring in the environment and can be found in the Earth's interior and in the human body. EMFs are generated essentially where ever there is a flow of electricity, including electrical appliances and power equipment. Electric fields are associated with the voltage of the source; magnetic fields are associated with the flow of current in a wire. The strength of these fields decreases rapidly with distance from the source. Scientists have conducted extensive research over the past two decades to determine whether EMFs are associated with adverse health effects. At this time

there is no firm basis to conclude that EMFs from transmission lines cause adverse health effects (NIH, 2002).

Included in the National Energy Policy Act of 1992, the Electric and Magnetic Fields Research and Public Information Dissemination program was initiated as a five-year effort under the National EMF Research Program. The culmination of this five-year effort resulted in a final RAPID Working Group report, which was released for public review in August 1998. The Director of the NIEHS then prepared a final report to Congress after receiving public comments. The NIEHS Director's final report, released to Congress on May 4, 1999, concluded that "the scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak." However, ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence suggesting that exposure may pose a leukemia hazard. The Director further stated that the conclusion of this report is insufficient to warrant aggressive regulatory concern (NIEHS, 1999).

Congress also directed the National Academy of Science (NAS) to undertake a comprehensive review of the EMF scientific literature. The NAS also submitted its report to Congress in 1999 (NAS, 1999). In its report, it concluded "the results of the EMF RAPID program do not support the contention that the use of electricity poses a major unrecognized public health danger." The NAS went further and recommended that Congress stop federal funding of EMF research, which Congress did.

In 2007, a comprehensive World Health Organization EMF health risk assessment was published which generally concluded: "A number of other diseases have been investigated for possible association with ELF magnetic field exposure. These include other types of cancers in children and adults, depression, suicide, reproductive dysfunction, developmental disorders, immunological modifications, neurological disease and cardiovascular disease. The scientific evidence supporting a linkage between exposure to ELF magnetic fields and any of these diseases is weaker than for childhood leukemia and in some cases (for example, for cardiovascular disease or breast cancer) the evidence is sufficient to give confidence that magnetic fields do not cause the disease" (WHO, 2007).

From these and other similar reports, the overall conclusion from more than 10,000 scientific studies conducted around the world over the past 40 years is there is no demonstrated biological linkage between human exposure to power line EMF and the occurrence of a disease.

(c) *Line Design Considerations*

The strength of electric and magnetic fields can potentially be reduced by installing the transmission line conductors in a compact configuration and, for multiple circuit transmission lines, by selecting conductor phasing that reduces the field strengths. The Applicant will design its transmission facilities according to the requirements of the NESC. The heights of the transmission line pole and the configuration of the conductors will be based on NESC requirements, engineering parameters, and cost. The Applicant will install the 138 kV Transmission Line primarily on mono-pole tangent structures; this is a compact design that reduces EMF field strengths in comparison to other structure designs.

(d) *Procedures for Addressing Public Inquiries Regarding EMF*

Information on electric and magnetic fields is available on AEP Ohio's website (https://www.aepohio.com/info/projects/emf/). It describes the basics of electromagnetic field theory, scientific research activities and EMF exposures encountered in everyday life. Similar material will be made available to those that request additional information.

In addition, a complaint resolution procedure will be implemented to ensure that any complaints regarding construction or operation of the proposed Facility are adequately investigated and resolved. A toll-free number, 1-866-263-5594, and a local number, 419-463-0594, have been established to receive and formally document all complaints, which will then be investigated by onsite Facility staff. The final complaint resolution process will be developed by the Applicant in consultation with the OPSB and be in place at least 30 days before the pre-construction conference.

(3) Estimate of Interference to Radio, Television, and Other Communication Systems

To evaluate the potential for the Facility to impact existing telecommunication signals, Comsearch was contracted to determine if there would be electromagnetic interference from the Facility on existing AM/FM radio, microwave beam paths, and television broadcast signals in the area (see Exhibits D, E, and F).

AM/FM Radio

Comsearch found seven database records for AM stations and 12 database records for FM stations within 30 kilometers (19 miles) of the Preferred Transmission Line. These stations are mapped and listed in tabular form in Exhibit D. The closest AM station was 20.5 kilometers (12.7 miles) from the Preferred Transmission Route and the closest FM station was 7.6 kilometers (4.7 miles) from the Preferred Transmission Route.

The exclusion distance for AM broadcast stations varies as a function of the antenna type and broadcast frequency. For directional antennas, the exclusion distance is calculated by taking the lesser of 10 wavelengths or 3 kilometers (1.8 miles). For non-directional antennas, the exclusion distance is equal to one wavelength. Potential problems with AM broadcast coverage are only anticipated when AM broadcast stations are located within their respective exclusion distance limit from transmission lines. The closest AM station to the proposed Facility, WERT, is more than 20.5 kilometers (12.7 miles) southeast of the Preferred Transmission Line. As there were no AM stations found within 3 kilometers of the Preferred or Alternate Routes, which is the maximum possible exclusion distance based on a directional AM antenna broadcasting at 1,000 kilohertz (kHz) or less, the proposed Facility should not impact the coverage of local AM stations.

The coverage of FM stations is generally not susceptible to interference caused by large objects, such as transmission line towers, especially when they are sited in the far field region of the radiating FM antenna. The closest FM station to the Preferred Transmission Route, WKSD, is more than 7.6 kilometers (4.7 miles) away. At this distance, there should be adequate separation to avoid radiation pattern distortion.

Electromagnetic interference from a transmission line is the result of the induction field created by the 60 Hz electrical voltage and by the harmonics of the 60 Hz fundamental signal. The interference can also be the results of arcing that can occur at high voltage interconnect points on the transmission line. In either case, the interfering signal is amplitude modulated, and the propagation of the interference occurs over very short distances. These distances are generally less than 500 feet. Also, the frequency of the interference does not normally extend above 50 MHz.

The only reception devices that could be affected by electromagnetic interference would be AM radios. The degree of degradation to AM reception is a function of the separation distance of the AM radio from the transmission line and the strength of the received signal. However, this degradation is generally no different than what occurs when a car radio passes under or near existing high voltage transmission lines that interconnect utility companies and their substations throughout the state.

Comsearch did not identify any impacts on the licensed and operational AM or FM broadcast stations in their analysis.

Television

Comsearch identified off-air stations whose service could potentially be affected by the proposed Facility. Comsearch identified 116 database records for off-air television stations within 150 kilometers (93 miles). The closest stations to the Facility were 21.5 kilometers (13.4 miles) from the Facility. These stations are mapped and listed in tabular form in Exhibit E.

Typically, transmission lines, including those carrying high voltages, do not create reception problems for television signals. However, if the transmission lines were not well maintained, corona and arcing may occur at the insulators or conductor connectors, creating broad band noise. The broad band noise could cause interference to television receivers in residences near the Transmission Line, particularly those residents whose homes are within approximately 500 feet of the Transmission Line. This is based on a worst-case scenario, which requires the presence of foul weather and takes into account the variable characteristics of the transmission line.

Based on a contour analysis of the licensed stations within 100 kilometers (62 miles) of the Transmission Line, it was determined that 10 of the full-power digital stations have service contours that overlap with the Facility and thus fall within the range of potential impact as described above.

In order to prevent interference to television broadcast reception in the homes near the Transmission Line, there should be an effective quality control maintenance program in effect for the useful life period of the Transmission Line's operation. In the unlikely event that interference is observed in any of the TV service areas, a high-gain directional antenna may be employed, preferable outdoors, and oriented towards the signal origin in order to mitigate the interference.

Both cable service and direct broadcast satellite service will be unaffected by the presence of the Transmission Line and may be offered to those residents who can show that their off-air TV reception has been disrupted by the presence of the Transmission Line after it is installed.

Microwave

Comsearch has developed and maintains comprehensive technical databases containing information on licensed microwave networks throughout the U.S. These systems are the telecommunication backbone of the country, providing long-distance and local telephone service, backhaul for cellular and personal communication service, data interconnects for mainframe computers and the internet, network controls for utilities and railroads, and various video services.

Four microwave paths intersect the area of interest, determined by Comsearch, around the Preferred Transmission Route (Exhibit F). Transmission lines generally do not affect the operation of microwave paths, as their attenuation loss is considered insignificant. Transmission support structures are considered to cause higher signal attenuation losses with more significant reflective and scattering properties. Of the support structures considered in the analysis, none were found to intersect the Fresnel Zones of the four identified microwave paths.

As described above, no impacts to FM or AM radio signal reception are anticipated. The Applicant will maintain the Transmission Line in good condition, which should avoid impacts to television reception at the residences closest to the Facility. A complaint resolution procedure, to be formalized with OPSB Staff, will be implemented to ensure that any complaints regarding impacts to television reception as a result of construction or operation of the proposed Facility are adequately investigated and resolved. At least seven days prior to the start of construction, the Applicant will mail a notice to affected property owners and tenants summarizing the upcoming construction activities, details of the Complaint Resolution Plan, and other sources of information about the Facility. A draft Complaint Resolution Plan is attached hereto as Exhibit B.

(4) Sound Emissions

Tetra Tech Inc. was retained by the Applicant to evaluate potential noise impacts from the proposed Facility. The Acoustic Assessment (see Exhibit G) provides an overview of the mechanisms of corona sound generation, describes applicable requirements, describes the acoustic modeling methodologies, and presents results. An assessment of construction noise is also provided.

Construction: Transmission Line and laydown yard construction will generate periodically audible noise levels. Additional noise sources may include commuting workers and trucks, moving material to and from the work sites. The construction equipment that will be used is similar to that used during typical public-works projects and tree service operations (e.g., road resurfacing, storm-sewer installation, natural gas line installation, tree removal, etc.). The laydown yard will be constructed prior to the Transmission Line. The laydown yard will be cleared of all vegetation and graded, if necessary. Transmission Line construction will occur sequentially, moving along the length of the project route, or in other areas such as structure sites, conductor pulling sites, and staging and maintenance areas. Overhead line construction is typically completed in the following stages, but various construction activities may overlap, with multiple construction crews operating simultaneously:

1. Site Access and Preparation: Preparing the ROW would require the removal of trees from the ROW and may also require selective clearing of tall trees near the ROW.
2. Installation of Structure Foundations. The next step in the construction process is drilling foundations for the new transmission structures. This involves drilling large holes, which are then typically filled with concrete for the steel structure foundation.
3. Erecting of Support Structures: Once the foundation is cured, transmission structure installation can begin. The new steel poles often come in sections that are assembled on or near the foundation. Cranes or bucket trucks are used to lift the poles and set them into position on the foundations.
4. Stringing of Conductors. With the new steel structures in place, the next step is to install the conductor wire. The wire-stringing operation requires equipment at each end of the section being strung. Wire is pulled between these "pulling sites" through stringing blocks (pulleys) at each structure. These pulling sites are set up at various intervals along the ROW, typically 1 to 3 miles apart.

Noise levels from overhead transmission line construction were evaluated using a screening-level analysis approach. The calculation methodology requires the input of the number and type of construction equipment used by phase, as well as typical noise levels associated with each piece of equipment. Construction sound source level data were obtained from the Federal Highway Administration's (FHWA) Roadway Construction Noise Model. These data were used to determine the composite sound levels per construction phase at distances of 50 feet and 1,000 feet. The analysis conservatively assumes all phased construction equipment operating simultaneously. Table 07-4 summarizes results for the four conceptual construction phases.

Table 07-4. Summary of Transmission Line Construction Noise

Construction Phase	Equipment	Equipment Noise Level at 50 feet	Composite Noise Level at 50 feet	Composite Noise Level at 1,000 feet
Site Access and Preparation	Bulldozer	85 dBA	88 dBA	53 dBA
	Grader	85 dBA		
	Roller-Compactor	85 dBA		
	Loader	80 dBA		
	Water Truck	84 dBA		
	Dump Truck	84 dBA		
Installation of Structure Foundations	Bulldozer	85 dBA	90 dBA	56 dBA
	Loader	80 dBA		
	Backhoe-Loader	80 dBA		
	Forklift	80 dBA		
	Mobile Crane	85 dBA		
	Auger Rig	85 dBA		
	Drill Rig	85 dBA		

Construction Phase	Equipment	Equipment Noise Level at 50 feet	Composite Noise Level at 50 feet	Composite Noise Level at 1,000 feet
	Compressor	80 dBA		
	Pump	77 dBA		
	Portable Mixer	82 dBA		
	Jackhammer	85 dBA		
	Cement Mixer Truck	85 dBA		
	Dump Truck	84 dBA		
	Slurry Truck	78 dBA		
	Specialty Truck	84 dBA		
	Water Truck	84 dBA		
Erecting of Support Structures	Forklift	80 dBA	86 dBA	52 dBA
	Mobile Crane	85 dBA		
	Compressor	80 dBA		
	Flatbed Truck	84 dBA		
	Flatbed Truck	84 dBA		
	Water Truck	84 dBA		
Stringing of Conductors	Tracked Dozer	85 dBA	88 dBA	54 dBA
	Backhoe-Loader	80 dBA		
	Compressor	80 dBA		
	Line Puller	81 dBA		
	Mixed Trucks	84 dBA		
	Specialty Truck	84 dBA		
	Specialty Truck	84 dBA		
	Water Truck	84 dBA		

Construction sound would attenuate with increased distance from the ROW. Other factors, such as vegetation, terrain, and obstacles, such as buildings, would also act to further limit the impact of construction noise levels, but were not considered in this analysis. Actual received sound levels would fluctuate, depending on the construction activity, equipment type, and separation distances between source and receiver. The variation in power and usage imposes additional complexity in characterizing construction noise levels and the analysis conservatively assumes all phased construction equipment operating simultaneously. As a general construction practice, functional mufflers would be maintained on all equipment to maintain noise levels as low as reasonably achievable.

Received sound levels at all noise sensitive areas from construction will depend on the type of equipment used, the mode of equipment operation, the length of time the equipment is in use, the amount of equipment used simultaneously, and the distance between the sound source and noise sensitive area. All of these factors are expected to vary regularly throughout the construction period. Work in the proximity of any single

general location will likely last no more than a few days to one week as construction activities move along the corridor; therefore, no single receptor will be exposed to significant noise levels for an extended period.

Noise levels from specific construction activities are described below.

(a) *Blasting Activities*

Blasting is not anticipated.

(b) *Operation of Earth Moving and Excavating Equipment*

During construction of the Facility, a temporary increase in noise will result from the equipment used to excavate, install equipment and, where necessary, clear the area of any woody brush. Standard construction techniques will be used. Typical noise levels of equipment used in each phase of construction are provided above in Table 07-4.

(c) *Driving of Piles*

Driving of piles is not anticipated.

(d) *Erection of Structures*

Structures will be erected by vehicle-mounted cranes. As indicated above in Table 07-4, this phase of construction could produce a maximum composite sound level of 86 dBA at 50 feet and 52 dBA at 1,000 feet.

(e) *Truck Traffic*

Beyond construction equipment access, delivery of construction supplies, and pole and hardware equipment delivery, no additional truck traffic is anticipated for the Facility.

(f) *Installation of Equipment*

The equipment will be installed using standard practices and equipment. As indicated above in Table 07-4, the stringing of conductors phase could produce a maximum composite sound level of 88 dBA at 50 feet and 54 dBA at 1,000 feet.

Operation and Maintenance: High voltage transmission lines can generate noise during corona discharges. This occurs primarily in foul weather when water droplets form on the conductors. Dirty conductors can also lead to corona discharge. The acoustic assessment of the Timber Road IV Transmission Line involved two

separate analytical methods. The Bonneville Power Administration (BPA) and Corona and Field Effects (CAFE) program Version 3 was used to determine anticipated corona noise levels generated along the Transmission Line conductors. DataKustik's Computer-Aided Noise Abatement (CadnaA) was then used to model how sound propagates from the Transmission Line to nearby residences. Representative broadband and octave band center frequencies were derived using BPA CAFE program and from standardized engineering technical guidelines based on measurements from similar equipment types and line types operating after the burn-in period. It is expected that the Transmission Line installed will exhibit sound source characteristics similar to the sound data used in the acoustic modeling analysis. The parameters used in the BPA CAFE and Cadna A models are summarized in Table 3-1 of Exhibit G.

The BPA CAFE program calculated the expected audible noise levels in both foul and fair weather at the edges of the ROW. In fair weather, audible noise levels at the edges of the ROW are negligible. In foul weather, the audible noise levels are approximately 22.4 dBA directly beneath the line, decreasing to 17.5 dBA at the edge of the ROW. Diagram 07-3, below, plots the noise levels at mid-span out to a distance of 80 feet from the Transmission Line, beyond the edge of the ROW. Given that sound levels attenuate with distance, audible noise from the Transmission Line will be even less at most nearby homes.

Figures 4-2 and 4-3 in Exhibit G illustrate the anticipated sound contours that will be generated by operation of the Preferred and Alternate Routes during foul weather conditions. The highest predicted sound levels at nearby residences will be less than 25 dBA, which is well below the OPSB noise criterion which states the Facility may operate at the project area ambient nighttime Leq plus five dBA as well as other well-recognized noise guidelines provided by the U.S. Environmental Protection Agency and World Health Organization. The acoustic assessment demonstrates that for both the Preferred and Alternate Routes would result in very low noise levels. Furthermore, due to the low 138-kV voltage of the Transmission Line, noise at sensitive receptors is expected to be minimal and will not result in any cumulative noise impacts with future wind turbine operation.

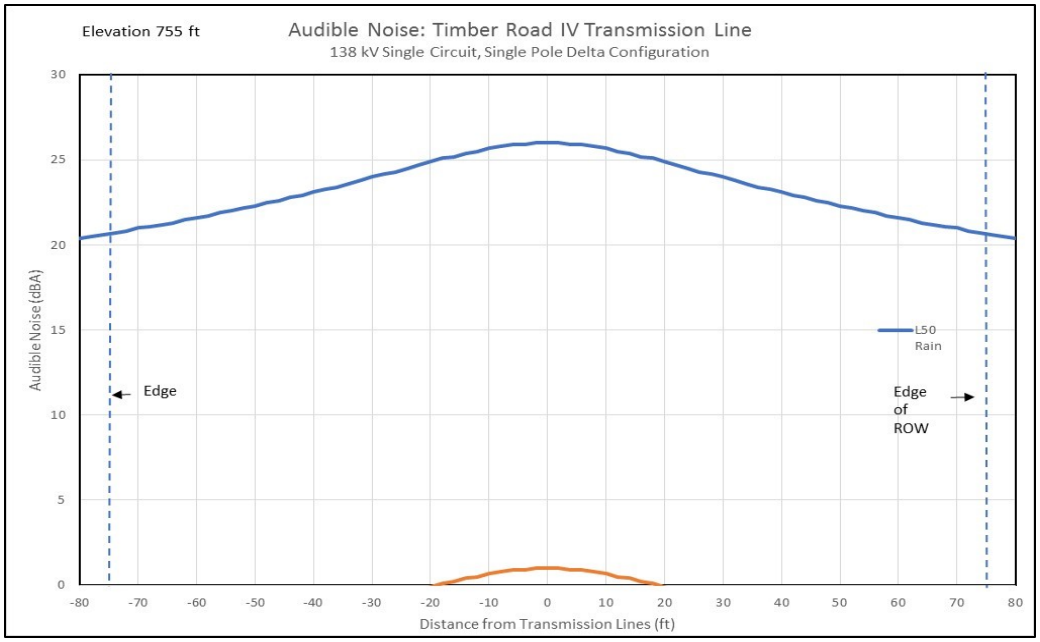


Diagram 07-3. Audible Noise Profile at Midspan for Timber Road IV Transmission Line

Mitigation: During construction of the Transmission Line, mitigation procedures will include properly maintaining construction equipment with mufflers and generally limiting construction activities to occur during daylight hours, to the extent feasible. Noise-related procedures will be implemented according to the OSHA requirements. No additional noise mitigation is expected as noise sources are primarily associated with operation of construction equipment and will be temporary in nature.

Noise levels associated with the operation of the proposed Timber Road IV Transmission Line will be well below the noise criterion prescribed by the OPSB, and well below other well-recognized noise guidelines. Potential impacts at nearby residences are expected to be minimal. The Transmission Line will be maintained in good condition to minimize broadband noise associated with corona and arcing at the insulators. No additional mitigation measures are necessary.

(B) LAND USE

(1) Route Alignment and Land Use Maps

Figure 07-1 illustrates the area 1,000 feet to all sides of the Preferred and Alternate Routes and the laydown yard at a 1:24,000 scale. The land use data was derived from the Paulding County Auditor's land use codes associated with parcel data. Among other information, Figure 07-1 shows the following features:

(a) *Approximate Centerline for Each Alternative*

The centerlines for both the Preferred and Alternate Routes are depicted on Figure 07-1.

(b) *Proposed Substation or Compressor Station Locations*

The proposed Facility does not include the construction of a POI switchyard.

(c) *Land Use*

Land use within 1,000 feet on either side of the Preferred and Alternate Routes and the laydown yard is depicted on Figure 07-1.

(d) *Road Names*

Road names 1,000 feet on either side of the Preferred and Alternate Routes and laydown yard are depicted on Figure 07-1.

(e) *Structures*

Structures including residences and trailers are depicted on Figure 07-1. Commercial centers, industrial buildings, schools, hospitals, churches, civic buildings, or other structures with occupancy were not present in the Study Area.

(f) *Incorporated Areas and Population Centers*

The Study Area does not contain any incorporated areas or population centers.

(2) Land Use Impacts

The Preferred Route ROW is approximately 35.8 acres. Of that, 34.3 acres (96%) is agricultural land use, with the remaining 1.5 acres (4%) as residential. The Alternate Route ROW is approximately 64.2 acres with 63.1 acres (98%) comprised of agricultural land and 1.1 acres (2%) comprised of residential land. During construction, the Applicant plans to clear 35 feet on either side of the Transmission Line. During operation, the ROW will be returned to agricultural land use. Temporary disturbance to the ROW includes vegetative clearing and the installation of poles and stringing locations. Permanent impacts to the ROW are primarily limited to the removal of trees and other existing vegetation. Property owners may continue to utilize most of the ROW for general uses that will not affect the operation of the Transmission Line, including for agriculture. Table 07-5 presents the detailed impacts to land use as a result of specific structures and components. This data is based on land use codes associated with parcels, provided by the Paulding County Auditor, and was verified through comparison to recent aerial imagery and field review.

Table 07-5. Land Use Impacts

Land Use Category	Vegetative Clearing Along Transmission Line (acres)[1]		Total Disturbance (acres)		Temporary Disturbance (acres)		Permanent Loss (acres)	
	Preferred	Alternate	Preferred	Alternate	Preferred	Alternate	Preferred	Alternate
Agricultural (100)	23.70	31.91	17.35	17.40	17.31	17.35	0.04	0.05
Poles[2]	-	-	*0.21*	*0.26*	*0.17*	*0.21*	*0.04*	*0.05*
Stringing Location[3]	-	-	*0.14*	*0.14*	*0.14*	*0.14*	*0.0*	*0.0*
Laydown Yard[4]	-	-	*17.0*	*17.0*	*17.0*	*17.0*	*0.0*	*0.0*
Residential (500)	0.65	0.65	0.40	0.40	0.4	0.4	0.0	0.0
Poles[1]	-	-	*0.1*	*0.1*	*0.1*	*0.1*	*<0.01*	*<0.01*
Stringing Location[3]	-	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Laydown Yard[4]	-	-	*0.3*	*0.3*	*0.3*	*0.3*	*0.0*	*0.0*
Unknown	0.00	0.00	0.50	0.50	0.5	0.5	0.0	0.0
Poles[1]	-	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Stringing Location[3]	-	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Laydown Yard[4]	-	-	*0.5*	*0.5*	*0.5*	*0.5*	*0.0*	*0.0*
Total	**24.35**	**32.56**	**18.25**	**18.30**	**18.21**	**18.25**	**0.04**	**0.05**

[1] The Applicant plans to clear an area of 35 feet on either side of the Transmission Line. During operation, the land will be returned to its original use. The Applicant does not anticipate any tree clearing associated with the Facility.
[2] Impacts were calculated based on the impacts provided in 4906-5-05(B)(1)(e). Pole locations are not known for the Alternate Route. However, based on the length of the Alternate Route (3.8 miles) and the average distance between poles (approximately 840 feet) there would likely be 24 pole locations along the Alternate Route. The proportion of each land use within the Alternate Route ROW was used to estimate the proportion of pole impacts in each land use.
[3] Stringing locations are not known. However, there are only temporary impacts described in 4906-5-05(B)(1)(d), and there will be two stringing locations per route, one at each dead-end structure for a total of 6,000 square feet (3,000 square feet at each location). The land use at each dead end structure is agricultural; therefore, the total impact is assumed to be agricultural.
[4] The laydown yard is not associated with either transmission route, and was included as part of both routes.

A description of the impact of the proposed Facility on land use is provided below in Sections 4906-5-07(B)(2) and (3), and 4906-5-07(C)(2). Mitigation procedures are discussed below in Section 4906-5-07(B)(3)(c) and 4906-5-07(C)(2)(c).

(3) Impacts to Structures

(a) *Distance Between Structures within 250 feet and Edge of Right-of-Way*

Ten structures are located within 250 feet of the edge of the ROW. The distance between structures within 250 feet of the proposed Facility ROW is provided in Table 07-6 below.

Table 07-6. Distance Between Structures and ROW

Structure Type	Component	Distance to ROW (feet)
Residence	Preferred Route ROW	0
Barn	Preferred Route ROW	0
Residence	Preferred Route ROW	45
Barn	Preferred Route ROW	69
Barn	Alternate Route ROW	114
Residence	Preferred/Alternate Route ROW[1]	115
Barn	Alternate Route ROW	188
Barn	Preferred/Alternate Route ROW[1]	220
Barn	Alternate Route ROW	234
Residence	Alternate Route ROW	236

[1] The Preferred and Alternate Route and subsequent ROW overlap along TR 52.

(b) *Structures to be Destroyed, Acquired, or Removed and Criteria for Owner Compensation*

The Applicant does not anticipate destroying, acquiring, or removing any structures as a result of the proposed Facility. Construction of the overhead Transmission Line will not result in the removal or acquisition of any structures.

(c) *Mitigation Procedures*

Various procedures will be used to reduce impacts during construction, including impact minimization measures and site restoration. The Facility is sited in agricultural land, which is land that has already been disturbed. The Applicant will use existing farm roads and public ROWs where available to limit the amount of crop area disturbed during construction. Following construction activities, temporarily disturbed areas will be seeded (and stabilized with mulch and/or straw if necessary) to re-establish vegetative cover/agricultural crops in these areas. Restoration of disturbed agricultural fields will be accomplished by de-compacting the soil, removing rocks, and re-spreading stockpiled topsoil, as necessary. Any drainage ditches, field drainage tiles, or fencing damaged by construction activities will be repaired.

Ongoing operation and maintenance impacts will likely be limited. If operation and maintenance will require heavy equipment, the impacted areas will be restored using the method proposed following construction impacts, as described above.

(C) AGRICULTURAL LAND AND AGRICULTURAL DISTRICTS

(1) Agricultural Land Map

Figure 07-2 illustrates agricultural land uses, including potential disturbance area, along the Preferred and Alternate Routes and at the laydown yard at a 1: 20,000 scale. Agricultural land use data was derived from USDA's National Agricultural Statics Service for Paulding County.

(a) *Agricultural Land Use*

Agricultural land use is depicted on Figure 07-2.

(b) *Agricultural District Land*

The Facility does not cross any properties enrolled in an Agricultural District. The closest Agricultural District lands to the Facility are depicted on Figure 07-2.

(2) Impact on Agricultural Land Uses and Agricultural District Land

(a) *Quantification of Acreage Impacted*

Table 07-7 quantifies the agricultural land uses within the Preferred and Alternate Route ROW. Temporary disturbance to the ROW includes vegetative clearing and the installation of poles and stringing locations. Permanent impacts to the ROW are primarily limited to the removal of trees and other existing vegetation. Property owners may continue to utilize most of the ROW for general uses that will not affect the operation of the Transmission Line, including agricultural use. Table 07-8 quantifies the impacts to agricultural land uses based on the impact areas described in Sections 4906-5-05(B)(1)(d) and 4906-5-05(B)(1)(e). This data is based on the USDA National Agricultural Statistics Service for Paulding County (GIS) (USDA, 2018). The Facility does not cross any Agricultural Districts.

Table 07-7. Impacts to Agricultural Land Use

Agricultural Land Use	Acres in Preferred ROW	Percent of Preferred ROW	Acres in Alternate ROW	Percent of Alternate ROW
Corn	5.5	15.4	14.5	22.6
Grass/Pasture	0.3	0.1	0.0	0.0
Soybeans	8.6	24.0	21.6	33.6
Winter Wheat	3.6	10.1	3.8	6.9
Total[1]	**18**	**49.6**	**39.9**	**63.1**

[1] The total acreage of the ROWs differs from those elsewhere in the Application because not all areas include agricultural land use. Data between Tables 07-4 and 07-5 were derived from different sources. Land uses were derived from property tax codes, which are assigned by parcel, while agricultural land use was derived from USDA data, which are not assigned by parcel. The parcels that may be listed as agricultural by ODNR may include developed areas in the USDA dataset.

Table 07-8. Impacts to Agricultural Land Use

Land Use Category	Vegetative Clearing Along Transmission Line (acres)		Total Disturbance (acres)		Temporary Disturbance (acres)		Permanent Loss (acres)	
	Preferred	Alternate	Preferred	Alternate	Preferred	Alternate	Preferred	Alternate
Corn	3.07	6.62	0.10	0.13	0.09	0.12	0.01	0.01
Poles[2]	-	-	*0.04*	*0.06*	*0.03*	*0.05*	*0.01*	*0.01*
Stringing Location[3]	-	-	*0.02*	*0.03*	*0.02*	*0.03*	*0.0*	*0.0*
Laydown Yard[4]	-	-	*0.04*	*0.04*	*0.04*	*0.04*	*0.0*	*0.0*
Grass/Pasture	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Poles[2]	-	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Stringing Location[3]	-	-	*<0.01*	*0.0*	*<0.01*	*0.0*	*0.0*	*0.0*
Laydown Yard[4]	-	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Soybeans	4.27	10.24	13.26	13.34	13.25	13.32	0.01	0.02
Poles[2]	-	-	*0.03*	*0.09*	*0.02*	*0.07*	*0.01*	*0.02*
Stringing Location[3]	-	-	*0.03*	*0.05*	*0.03*	*0.05*	*0.0*	*0.0*
Laydown Yard[4]	-	-	*13.2*	*13.2*	*13.2*	*13.2*	*0.0*	*0.0*
Winter Wheat	1.40	1.41	0.01	0.02	0.01	0.02	0.0	0.0
Poles[2]	-	-	*0.0*	*0.02*	*0.0*	*0.02*	*0.0*	*>0.01*
Stringing Location[3]	-	-	*0.01*	*0.0*	*0.01*	*0.0*	*0.0*	*0.0*
Laydown Yard[4]	-	-	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Total	**8.74**	**18.27**	**13.37**	**13.49**	**13.35**	**13.46**	**0.02**	**0.03**

[1] The Applicant plans to clear an area of 35 feet on either side of the Transmission Line. During operation, the land will be returned to its original use. The Applicant does not anticipate any tree clearing associated with the Facility.
[2] Impacts were calculated based on the impacts provided in 4906-5-05(B)(1)(e). Pole locations are not known for the Alternate Route. However, based on the length of the Alternate Route (3.8 miles) and the average distance between poles (approximately 840 feet) there would likely be 24 pole locations along the Alternate Route. The proportion of each agricultural land use within the Alternate Route ROW (Table 07-5) was used to estimate the proportion of pole impacts in each agricultural land use.
[3] Stringing locations are not known. However, there are only temporary impacts described in 4906-5-05(B)(1)(d), and there will be two stringing locations per route, one at each dead-end structure for a total of 6,000 square feet (3,000 square feet at each location). The proportion of each agricultural land use within each ROW was used to estimate the proportion of stringing location impacts in each agricultural land use.
[4] The laydown yard is not associated with either transmission route, and was included as part of both routes.

(b) *Evaluation of Impact on Agricultural Practices*

(i) Field Operations

As shown above in Table 07-8, construction of the Transmission Line and the laydown yard will collectively disturb a total of up to 13.5 acres of agricultural lands. Although most of these impacts will be temporary, approximately 0.02 acre of agricultural land will be converted to built facilities. Each pole location will have a temporary impact of 484 square feet (22 feet by 22 feet). Following construction, this area will be reduced to 100 square feet (10 feet by 10 feet). The remaining area will be restored to agricultural use.

Along with these direct impacts to agricultural land, movement of equipment and material during Facility construction could result in damage to growing crops, damage to fences and gates, and/or temporary blockage of farmers' access to portions of agricultural fields. However, as described in the following section, the Timber Road IV Transmission Line and associated poles have been located so as to minimize loss of active agricultural land and interference with agricultural operations. Such impacts are not anticipated during Facility operation and maintenance, but landowners will be compensated for any impacts that do occur.

(ii) Irrigation

Irrigation systems are not in widespread use in the vicinity of the Facility. Potential interference to irrigation operations is very limited and coordination with affected landowners will alleviate potential for significant long-term disruption.

(iii) Field Drainage Systems

Facility construction could result in damage to subsurface drainage systems (tile lines). Avoidance of damage to drainage systems will be incorporated in the Facility design, and mitigation measures will be implemented as outlined in Section 4906-5-07(C)(2)(c) below.

(iv) Structures Used for Agricultural Operations

The Facility will not physically impact any agriculturally related structures.

(v) Impact on the Viability of Agricultural District Lands

Aside from temporary disturbance during construction activities, the Facility is largely compatible with farming practices. Furthermore, the Facility will not result in a change in land use and will promote the long-term economic viability of the affected farms by supplementing the income of participating farmers. The presence of the Timber Road IV Transmission Line will help preserve agricultural land and avoid conversion of that land to other developmental land uses, such as seasonal or permanent high-density residences.

(c) *Proposed Mitigation Procedures*

(i) To Avoid/Minimize Impacts to Field Tile Drainage Systems

The proposed Facility will be primarily located along public roads. However, the Transmission Line will run along active agricultural fields. The Applicant sited pole locations through consultations with landowners. Where Facility components are proposed to cross active agricultural fields, an attempt will be made to determine the location of any subsurface drainage tiles through consultation with the landowner and/or review of public records. Additional efforts to avoid impacts to tile drainage systems include siting of the Facility as an overhead transmission line, rather than underground where tile drainage systems exist.

(ii) To Repair Damaged Field Tile Drainage Systems

Though not anticipated, any drainage tiles damaged during construction will immediately be identified, documented, and repaired at the Applicant's expense. It is anticipated that a local drain tile contractor or the farmer tending the land will be involved in repair activities.

(iii) Topsoil Segregation, Decompaction, and Restoration

Pole locations have been sited along field edges to minimize adverse impacts on agricultural land and farming operations. Additional measures to reduce impacts to agricultural land will be undertaken during Facility construction, operation, and maintenance. These mitigation measures include:

<u>Laydown Yard Specifications</u>

- Temporary construction parking, laydown, and storage areas on active agricultural land will be developed by removing all topsoil from areas that will receive vehicular traffic. Topsoil will be stockpiled adjacent to the laydown yard in windrows or piles of the same property from which it was removed.
- Storage of construction materials on undisturbed ground will only be permitted if their placement and removal can be accomplished without driving over the undisturbed area.
- Upon completion of construction, any gravel and/or geotextile mats will be removed, and the soils will either be de-compacted and restored as described below in the restoration specifications or the Applicant will compensate the landowner for the cost of decompaction.

Excavation/Backfill Specifications

- The boundaries of all ROWs and work areas will be identified with snow fence of other temporary barrier. No vehicles or equipment shall be allowed outside the work area.
- All agricultural areas to be disturbed by excavation shall first be stripped of topsoil. Topsoil stripping must be undertaken on the full area to be disturbed by excavation, grading, or piling of excavated subsoil/rock.
- Stripped topsoil will be segregated from subsoil and stockpiled in temporary storage areas of the property from which it was removed.
- All areas to be disturbed by excavation and backfilling will be enclosed within silt fencing or other temporary barrier to define the allowable limits of disturbance. No vehicular activity will be allowed outside the defined work area.
- Excess excavated subsoil and rock that is not suitable for backfill will be removed from the site. On-site disposal will only occur outside of active agricultural land with permission from the landowner.
- Open excavation areas in active pastureland will be temporarily fenced to protect livestock access to the work area and/or escape from fenced enclosures. Following construction, any related fencing will be restored to "like new" condition in its original location (or as otherwise agreed upon with the landowner).
- Backfill will utilize excavated subsoil and rock wherever possible. If this material is determined to be unsuitable as backfill, select granular fills (e.g., bank run gravel) will be utilized in its place. No rock backfill will be used in the top 24 inches in active agricultural fields.

Foundation Specifications

- Excess concrete shall be disposed of off-site, unless otherwise approved by the landowner.
- Concrete trucks will be washed outside of active agricultural areas in locations approved by the landowner.
- In active pasture areas, foundations treated with concrete curing compound or sealer shall be temporarily fenced to prevent access by livestock.

Restoration Specifications

- Following completion of construction, excess gravel/fill will be removed from around poles and the laydown yard.

- Following de-compaction of the subsoil, the surface of the subsoil will be picked over to remove all rocks 4 inches in size or larger. Following rock picking, stockpiled topsoil will be returned to all disturbed agricultural areas. The topsoil will be re-graded to match original depths and contours to the extent possible.
- The surface of the re-graded topsoil will be disked, and any rocks over 4 inches in size will be removed from the soils surface. Restored topsoil will be stabilized with seeding and/or mulching, unless other arrangements have been made with the landowner.
- Restored agricultural areas will be stabilized with seed and/or mulch. In areas to remain in hay production, an appropriate seed mix will be selected in consultation with the landowner. If future crop type is undetermined at the time of restoration, the site shall be seeded with annual rye or similar cover crop, or as agreed to with the landowner. If restoration occurs outside the growing season, restored areas will be stabilized by mulching with hay or straw.
- Any surface or subsurface drainage features, fences, or gates damaged during construction shall be repaired or replaced as necessary.
- All construction debris will be removed and disposed of off-site at the completion of restoration.
- The Applicant will review restored agricultural land with the landowner during the following growing season to identify and correct any facility-related problems that may not have been apparent immediately following restoration.

(D) LAND USE PLANS AND REGIONAL DEVELOPMENT

(1) Impact on Regional Development

As indicated above, the Facility will not be constructed unless the Wind Farm is constructed. Therefore, assuming these facilities are constructed they will cumulatively have a positive impact on regional development. For example, as discussed in the Application for the Wind Farm (see Case No. 18-91-EL-BGN), construction and operation of the proposed Wind Farm will have a positive impact on commercial and industrial development in Paulding County, as well as throughout northwest Ohio and the entire state. According to a 2007 report prepared by Environment Ohio, the development of additional wind energy facilities in Ohio will have significant and positive economic impacts within the region. If the State of Ohio increased wind power production to 20% of the state's total energy portfolio by 2020, such development would create 3,100 permanent, full-time positions within the state, and result in cumulative wages totaling $3.7 billion (Bowser et al., 2007). These impacts are principally due to the impact of wind energy development on the manufacturing sector. The Plan that covers Paulding County is the Comprehensive Economic Development

Strategy (CEDS) developed by the Maumee Valley Planning Organization (MVPO) in 2012. Objectives are: 1. Establish a regional marketing and business attraction voice for the five-county region; 2. Expand the economic development role of the MVPO; 3. Increase awareness of schools, cost of living, housing, health care facilities, recreational amenities; 4. Increase the educational attainment and skillset of the workforce; and 5. Continue to expand and develop all categories of infrastructure. The Facility will increase employment growth and investment (Goal 1) by facilitating the building of the Wind Farm. According to the Renewable Energy Policy Project's report (2004), "Wind Turbine Development: Location of Manufacturing Activity" if the U.S. were to invest $50 billion into 50,000 MWs of new wind production, Ohio manufacturers could stand to create 11,688 jobs in wind turbine and related manufacturing. Additionally, the project will improve the efficiency and effectiveness of economic development (Goal 2) given its impact on economic development in the local and state economies.

No negative impacts on regional development are anticipated as a result of the proposed Facility. See Section 4906-5-03 of this Application for a more detailed discussion of the need for the proposed Facility.

(2) Compatibility with Regional Land Use Plans

The Paulding County Vision Board, comprised of representatives from the County, Villages and Townships, is currently in the process of developing a Community Development Plan that will describe the history, current conditions, and future vision for the County. Upon doing so, it is intended to develop a road map for making that vision a reality. Draft goals presented by the Paulding County Visioning Board in May 2018 include sidewalk improvements, road repair, addressing drug problems, sewer and water, upkeep of properties and downtown areas, increasing local industry, improving reliability of internet and cell phone coverage. Wind energy is not mentioned specifically in the draft plan; however, as a strategy to increase employment growth and investment, natural resources can be advertised as an asset of the county to increase the number of employment options.

(E) CULTURAL AND ARCHAEOLOGICAL RESOURCES

This section summarizes previously collected cultural and archaeological resources data for the area within 1,000 feet on either side of the Preferred and Alternate Route centerlines (Cultural Study Area). EDR previously prepared a cultural resources records review identifying cultural and archaeological resources within 10 miles of the Wind Farm (EDR, 2018a) consistent with OPSB guidelines. The entire Cultural Study Area for the Preferred and Alternate Routes and laydown yard is located within the previously surveyed areas covered in the studies conducted for the Wind Farm.

(1) Cultural Resources Map

Figure 07-3 depicts formally adopted land or water recreations areas, recreational trails, scenic rivers, scenic routes or byways, and registered landmarks of historic, religious, archaeological, scenic, natural, or other cultural significance within 1,000 feet of the Preferred and Alternate Routes and laydown yard.

(2) Cultural Resources Studies and Agency Correspondence

EDR prepared a memorandum identifying cultural and archaeological within 1,000 feet of the Preferred and Alternate Routes and the laydown yard (Exhibit H). This memorandum summarizes the cultural and archaeological resources within the Study Area that were previously identified in the cultural resource records review prepared for the Wind Farm. Per the requirements of OAC Chapter 4906-5-07(E)(2), the cultural resources records review prepared by EDR (2018a) included the following records available from the Ohio State Historic Preservation Office (OHPO):

- NRHPs,
- NRHP Determination of Eligibility (DOE) properties,
- National Historic Landmarks (NHL) List,
- OHI,
- Ohio Archaeological Inventory (OAI),
- Ohio Genealogical Society (OGS) cemetery files,
- Mills *Archaeological Atlas of Ohio* (1914), and
- Previous Phase I, II, and III cultural resources surveys conducted within the Study Area.

As described above, the area surrounding the Transmission Line was evaluated for cultural resources as part of the Wind Farm application. Correspondence between EDR and OHPO regarding historic and archaeological resource surveys is attached as Exhibit I. The results of the cultural resources Transmission Line memorandum for the 1,000-foot Cultural Study Area associated with the Facility are described below, and in Exhibit H. The records review of the OHPO online GIS mapping revealed the following:

- No properties listed on or determined eligible for the NRHP have been recorded within the 1,000-foot Cultural Study Area.
- No NHL properties have been recorded within the 1,000-foot Cultural Study Area.
- One resource listed in the OAI has been recorded within the 1,000-foot Cultural Study Area. Site number PA0263 is a non-aboriginal historic archaeological site located on the north side of TR 52, west of TR 49. OHPO records indicate that the site did not have the potential to yield important

information and was determined not to be eligible for listing in the State/National Register of Historic Places (S/NRHP) (JFNew, 2010).

- Five OHI properties have been previously recorded within 1,000-foot Cultural Study Area.
    - W. D. Price Farmstead, a farmstead consisting of a two-story vernacular residence and six associated agricultural buildings located at 450 TR 52. OHPO records indicate that this property has been demolished and consequently not eligible for listing in the S/NRHP (Rutter, 2011a).
    - William Rodenhaver Farmstead, a vacant gable roof barn with a small associated shed located on the 4000 block of Township Road 52. OHPO records indicate that the extant buildings are in an advanced state of deterioration and are therefore determined not to be eligible for listing in the S/NRHP (Rutter, 2011b).
    - George Armstrong Farmstead, a two-story residence with an attached garage located at 4987 TR 52. OHPO records indicate that this residence has been extensively renovated and modernized and is therefore not eligible for listing in the S/NRHP (Rutter, 2011c).
    - C. Christman Farmstead, a one-and-one-half-story vernacular residence with gambrel roof barn located at 4624 CR 55. OPHO records indicate that the residence has been extensively renovated and modernized and is therefore not eligible for listing in the S/NRHP (Rutter, 2011d).
    - Karschner-Maloy Farmstead, a gable roof corn crib and gable roof chicken coop located on the 3000 block of SR 49. OHPO indicates that the primary buildings associated with the farmstead are no longer extant, and therefore the property is determined not to be eligible for listing in the S/NRHP (Rutter, 2011e).

- No historic bridges as listed on the Ohio Historic Bridge Inventory are located within the 1,000-foot Cultural Study Area.
- No OGS cemeteries are located within the 1,000-foot Cultural Study Area.

Of the properties and resources identified in the Cultural Resources Transmission Line Memorandum (Exhibit H), none were recognized by, registered with, or identified as eligible for registration by the national registry of natural landmarks, the Ohio historical society, or the ODNR.

(3) Construction, Operation, and Maintenance Impacts

There will be no direct impacts to previously documented archaeological resources or aboveground cultural resources (i.e., cemeteries or historic structures) from construction of the Facility. However, the proposed

Preferred and Alternate Routes have not been systematically surveyed for archaeological resources. After the final route has been selected and all land rights procured, an archaeological survey for those portions of the proposed Facility where direct ground disturbance is proposed may be conducted if required by OHPO.

In estimating the impact of the proposed Facility on the preservation and continued meaningfulness of known historic landmarks, direct, indirect, and reasonably foreseeable future impacts to aboveground, historic resources were considered. Direct effects to aboveground resources will not occur.

The extent to which the proposed Facilities may impact any individual historic property will depend on the property's area of significance and its orientation on the landscape relative to the proposed Facility. As none of the cultural resources identified in Exhibit H are eligible for listing in the S/NRHP, there will be no impacts from the operation of the Facility on cultural or archaeological resources.

(4) Mitigation Procedures

As described above, the proposed Facility will not directly (physically) impact any known archaeological or historic resources within the Cultural Study Area, and no specific mitigation measures related to archaeological resources are proposed at this time. However, to address the potential that previously unidentified archaeological resources may be encountered during construction, it is anticipated that an Unanticipated Discovery Plan will be developed. The Unanticipated Discovery Plan will describe a response protocol to identify and evaluate previously unidentified archaeological resources that are disturbed during construction. In the event that unanticipated archaeological resources are encountered during construction, the Unanticipated Discovery Plan will include provisions to stop all work in the vicinity of the archaeological finds until those resources can be evaluated and documented by a Registered Professional Archaeologist.

The proposed Facility has the potential to cause indirect (visual) impacts to aboveground historic resources within the Study Area. However, since no S/NRHP eligible properties are located within 1,000 feet of the Preferred and Alternate Routes or the Timber Road IV laydown yard, there are no known impacts to aboveground historic properties at this time, and no mitigation measures are proposed.

(5) Aesthetic Impacts

Construction of the proposed Facility will have an effect on the aesthetic character of the existing landscape. The analysis presented below is based on EDR's significant experience with evaluating the potential visual impacts of proposed electric transmission facilities.

Introduction of new poles and overhead conductors and the associated clearing of vegetation along the ROW will introduce new man-made, utilitarian features into the landscape. However, the extent of Transmission Line visibility and its visual impact are likely to be highly variable, depending on a number of factors, including proximity to viewers; viewer sensitivity; the extent of screening provided by intervening topography, vegetation, and structures; and the presence of other built features in the view. In most instances, the visibility and visual impact of a transmission line diminishes quickly with distance. Viewpoints located over 0.5-mile from a transmission line will generally not experience a substantial impact. The highest degree of visibility and potential visual impact will occur when the built feature is directly adjacent to, or in the case of a transmission line actually crosses, a receptor location. Certain viewers, such as local residences and recreational users, are particularly sensitive to visual change, while others are less so.

Landscape characteristics such as topography, vegetation, and land use also influence how visible a transmission line or cleared ROW will be, and how well it fits in the context of the existing landscape. Hills can be effective in blocking views of transmission lines from many locations within a landscape. However, a transmission line structure located on a hilltop will often be highly visible against the sky. Hilltop viewing locations can also provide long distance views of significant portions of transmission lines (including the cleared ROW that are not available in flatter terrain. In general, transmission lines will be less visible in forested settings due to the screening provided by mature trees. However, where they are seen in such settings, the contrast presented by transmission lines can be high due to the clearing required for the ROW and the lack of other visible man-made features in the landscape. In open agricultural settings, transmission lines are typically more visible, but their contrast is often reduced due to the limited ROW clearing required and the presence of other structures in the landscape. Similarly, because transmission lines are typically viewed as industrial or utilitarian features, they appear most compatible in landscapes that already include industrial facilities or utility infrastructure and are less compatible with residential or recreational settings.

(a) *Visibility of the Proposed Facility*

Both the Preferred and Alternate Routes traverse an agricultural landscape. This landscape is characterized by level topography with a mix of open fields, residences, farmsteads, and small patches of deciduous forest. Dominant agricultural uses include soybean, winter wheat, and corn according to publicly available data (USDA, 2018). Due to the presence of open fields, views within this landscape are more open and longer in distance than those available in more forested or developed settings. These views typically include a level foreground field, often with a woodlot in the distance, and, in places, existing transmission lines crossing or framing the view. Views also include widely scattered homes, barns, and silos, with working farm equipment occasionally seen in the fields.

The area in the vicinity of the Preferred and Alternate Routes includes three distinct types of viewers. These viewers and their sensitivity to visual change in the landscape are described below.

Local Residents

Local residents include those who live and work in the area. They generally have visibility of the landscape from their yards, homes, local roads, and places of employment. Except when involved in local travel, residents are likely to be stationary and have frequent or prolonged visibility of the landscape. Local residents may have visibility of the landscape from ground level or elevated viewpoints (typically upper floors/stories of homes). Residents' sensitivity to visual quality is variable; however, it is assumed that residents may be sensitive to changes in particular views that are important to them.

Through Travelers/Commuters

Commuters and travelers passing through the area have visibility of the landscape from motor vehicles on their way to and from work or other destinations. Commuters and through travelers are typically moving, have a relatively narrow field of view, and are destination oriented. Their sensitivity to visual change tends to be relatively low. Drivers will generally be focused on the road and traffic conditions, and have limited opportunity to observe roadside scenery. Passengers in moving vehicles will have greater opportunities for prolonged off-road visibility than will drivers, and accordingly, may have greater perception of changes in the visual environment.

Tourists/Recreational Users

Recreational users and tourists include local residents and out-of-town visitors involved in cultural and recreational activities at parks, recreational facilities, and historic sites, as well as in undeveloped natural settings such as forests and fields. Due to the lack of recreational areas in the vicinity of the proposed Facility, members of this group will likely have visibility of the landscape around the Preferred and Alternate Routes from area highways while on their way to their recreational destinations, rather than from the destinations themselves. Visual quality may or may not be an important part of the recreational experience for these viewers, but their sensitivity to visual change while on-route to their destination is generally similar to that of through-travelers.

Both the Preferred and Alternate Routes are proposed to run from the Wind Farm's collection substation on the border of Blue Creek Township and Benton Township, to the existing Timber Road III Transmission

Line which traverses the middle of Benton Township. Both routes are proposed to be located along public roadways. Minimal forest clearing is anticipated as the Preferred and Alternate Routes will run through primarily open fields. The Preferred and Alternate Routes are surrounded by operational turbines and those proposed for the Wind Farm. As a result, the Transmission Line will be seen among multiple new utilitarian structures that will be substantially taller and will represent the dominant focal points within the landscape. Both routes are relatively short (approximately 2.9 miles for the Preferred Route and 3.8 miles for the Alternate Route) which limits the geographic area where views of the line will be available.

The proposed Timber Road IV laydown yard is not anticipated to include any tall structures. It will be surrounded by an approximately 8-foot tall fence, which is smaller than homes in the area. The laydown yard will generally not be visible from most areas. Viewers in the vicinity of the laydown yard are almost exclusively local residents and travelers along adjacent roads.

Viewers in the vicinity of the Preferred and Alternate Routes are almost exclusively local residents and travelers along adjacent roads. Fifteen structures are located within 1,000 feet of the Preferred Transmission Route, primarily along the frontage of TR 52, and SR 49. Fifteen structures occur within 1,000 feet of the Alternate Route, and are concentrated along TR 52, TR 49, and SR 49. The Preferred Transmission Route includes four road crossings and the Alternate Route includes six road crossings. These crossing locations will offer the closest, most unobstructed visibility of the line, but the visibility will be of brief duration and peripheral to the orientation of the driver's view along the roadway. Residential density and traffic volume are low in the vicinity of the Preferred and Alternate Routes, thus limiting the number of viewers affected by the proposed Facility.

Based on the sensitive site inventory conducted for the Wind Farm Visual Impact Assessment (EDR, 2018b), there is one sensitive site, Cunningham Creek, located within 1,000 feet of the proposed Alternate Route. The creek is not listed as a scenic river.

According to the Cultural Resources Transmission Line Memorandum (Exhibit H), there are no landmarks recognized by, registered with, or identified as eligible for registration by the national registry of natural landmarks, the Ohio historical society, or the ODNR. In addition, there are no national or state parks, forests, or wildlife refuges/management areas with 1,000 feet of the Preferred or Alternate Routes or the laydown yard. There no state- or federally-designated trails, scenic roads, or scenic overlooks.

(b) *Facility Effect of the Site and Surrounding Area*

As described above, the proposed Facility will change the visual character of the area by adding a new, built, utilitarian feature into a rural agricultural landscape. It will be visible from public roads and nearby residences but should be well screened/removed from sensitive aesthetic resources. While nearby residences may be sensitive to this visual change, the rural nature and low population density of the area, as well as the lack of major thoroughfares, limits the number of viewers potentially affected by the line. In addition, transmission lines are a common feature of rural landscapes, and do not appear entirely out of place in a working agricultural setting. Finally, the presence of the Wind Farm and additional existing turbines in the area will further reduce any visual impact associated with the proposed Transmission Line. The wind turbines will be the dominant man-made features of the landscape. Their greater height and movement will make them focal points within the view, which will limit the prominence of the proposed Facility and any landscape contrast it presents.

(c) *Visual impact Minimization*

As mentioned above, certain routing and design features of the proposed Facility will help to mitigate visual impact. These include the following:

- Routing through open/agricultural land that minimizes the need for ROW clearing.
- Relatively short overall line length (2.9 miles for the Preferred Route and 3.8 miles for the Alternate Route) that limits the geographic area and number of viewers potentially affected.
- Minimizing lighting to security lighting at the laydown yard and to Federal Aviation Administration (FAA) lighting on poles over 100 feet tall.
- Avoidance of major road crossings, areas of concentrated settlement, and recognized sensitive aesthetic resources, to limit the number and sensitivity of potentially affected viewers.
- Use of single monopole structures to minimize the number of poles required and present a simple clean appearance.
- Using existing farm roads to the extent practicable.
- Location of the line among or adjacent to the existing wind turbines and overhead distribution lines, which will be the dominant visual features of the landscape.

Due to the lack of trees and flat topography of the area, visual screening would not be an applicable method to mitigate visual impacts.

4906-5-08 ECOLOGICAL INFORMATION AND COMPLIANCE

(A) ECOLOGICAL FEATURES MAP

Figure 08-1 illustrates the area 1,000 feet on each side of the Preferred and Alternate Route centerlines and the laydown yard at a 1:20,000 scale. Among other information, Figure 08-1 shows the following features:

(1) Proposed Transmission Line or Pipeline Alignments

The Preferred and Alternate Routes are depicted on Figure 08-1.

(2) Proposed Substation or Compressor Station Locations

The proposed Facility does not include the construction of a POI switchyard or substation. The POI substation was originally permitted under Case No. 15-1737-EL-BTX and the collection substation is included in Case No. 18-91-EL-BGN.

(3) All Undeveloped or Abandoned Land Including:

(a) *Streams and Drainage Channels*

Streams, rivers, and lakes data, as depicted on Figure 08-1, are derived from Environmental Systems Research Institute (ESRI) data. However, the delineated stream data, as also depicted on Figure 08-1, are derived from site specific delineations conducted by Cardno in winter of 2017 and spring of 2018. Therefore, with respect to any discrepancies between these two data sets in relation to proposed Facility infrastructure locations, the delineated stream data is more accurate.

(b) *Lakes, Ponds, and Reservoirs*

No such water features were identified within 1,000 feet of the Preferred or Alternate Route or the laydown yard.

(c) *Wetlands*

Wetland data, as depicted on Figure 08-1, are derived from publicly available state and federal databases. However, delineated wetland data, as depicted on Figure 08-1, are derived from site-specific delineations conducted by Cardno in winter of 2017 and spring of 2018. Figure 08-1 illustrates delineated wetlands; however, none occur within 1,000 feet of any Facility component.

(d) *Woody and Herbaceous Vegetation Land*

The aerial photography in Figure 08-1 displays vegetative cover within the 1,000-foot Study Area.

(4) Highly Erodible Soils and Slopes 12 Percent or Greater

Figure 08-1 illustrates highly erodible soils and slopes that are 12% or greater within 1,000 feet of the Preferred and Alternate Route centerlines and the laydown yard.

(5) Wildlife Areas, Nature Preserves, and Conservation Areas

According to data obtained from ODNR, no wildlife areas, nature preserves, or conservation areas are located within 1,000 feet of the Preferred and Alternate Route centerlines or the laydown yard.

(B) FIELD SURVEY OF VEGETATION AND SURFACE WATERS WITHIN 100 FEET

Vegetative communities, surface waters, soils, and geological features within 100 feet of the Preferred and Alternate Routes, and laydown yard were evaluated by Cardno using online data sources and field surveys (Exhibit J). Soils, geology, navigable waters, and wetland data were collected through a desktop analysis using the following sources: National Land Cover Database (NLCD); the USDA National Resource Conservation Service (NRCS) Soil Survey for Paulding County; historic aerial photographs; U.S. Fish and Wildlife Service (USFWS) NWI maps; U.S. Geological Survey (USGS) topographic maps; the USGS National Hydrography Dataset (NHD); and the OWI. The purpose was to characterize the dominant ecological communities that occur within the vicinity of the Facility and identify potential habitat for federally- or state-listed species.

In addition, Cardno performed field verification and delineation surveys to confirm the results of the desktop analysis. Cardno completed wetland and waterbody delineation efforts in the winter of 2017 and spring of 2018 to determine the extent and jurisdiction of these water resources which may experience some disturbance due to Facility construction. Areas within 100 feet of the Preferred Route, Alternate Route, and laydown yard were surveyed (Project Corridor). The data obtained during the desktop review was found to be generally consistent with the results of the survey.

(1) Description of Vegetative Communities and Delineated Wetlands and Streams

Vegetative communities within the Project Corridor were evaluated based on 2011 NLCD data, aerial imagery, and field verification. Based on a desktop analysis, the Project Corridor is dominated by cultivated crops, followed by developed, open space. Developed open space refers to areas that have less than 20% impervious surface, as well as vegetation in the form of lawn grasses (e.g., parks, golf courses).

Agricultural areas in the Project Corridor were comprised of soybean and corn fields. The cultivated areas within the Project Corridor are expected to occupy the same general area from year to year, with the potential for the type of crop to change seasonally. Many of the crop areas and roadsides had man-made or modified ditches, which helped maintain field drainage for agricultural operations. In between many of the fields, as well as along many roadsides, there were grassy swales (consisting of *Festuca* and fescue grasses). In intermittent and ephemeral ditches, the channels were often vegetated with reed canary grass (*Phalaris arundinacea*) and narrow-leaf cattail (*Typha angustifolia*). Some ditches, which rarely receive any runoff except during extreme storm events, lacked vegetation in the channel or had a mix of grasses (*Festuca* and fescue). There were no woodlots that were observed within the Project Corridor. The majority of trees within the Project Corridor were located on residential properties only. Additional detail on vegetative cover along the Preferred and Alternate Routes is provided below.

All flowing streams and ditches delineated in the Project Corridor were assessed using the Habitat Headwater Evaluation Index (HHEI). The HHEI allows for uniform scoring of various waterbodies using a standard methodology that identifies pertinent information about the waterbody including substrates, pool depths, and bankfull widths. Using the HHEI scoring, streams can be classified as Class I (ephemeral streams, normally dry channel, little to no aquatic life), Class II (intermittent flow, summery-dry, warm water streams), or Class III (perennial flow, cool-cold water streams).

The Class I waterbodies in the Project Corridor were considered modified, highly disturbed ditches that lacked typical characteristics of a high quality stream. The waterbodies had very little, if any, standing water present and served mostly as channels for stormwater runoff. They lacked variety and abundance of vegetation and were typically found along the roadside or within crop areas. The Class II waterbodies in the Project Corridor had a mix of substrates, higher maximum pool depth measurements, and many had deep, flowing water at the time of the field survey. No Class III streams or wetlands were identified within the Project Corridor. Additional information about the waterbodies delineated in the Project Corridor are described below.

Preferred Route

As previously mentioned, the Project Corridor along the Preferred Route is dominated by cultivated crops, accounting for approximately 56% (49.51 acres) of the total area. According to the USDA's National Agricultural Statistics Service, cropland within the Project Corridor consists primarily of corn, soybeans, and winter wheat. Developed, open space also makes up a significant amount of the Preferred ROW, comprising 41% (36.03 acres) of the total area. Low intensity development and grassland/herbaceous communities contribute to the remaining area within the Project Corridor along the Preferred Route, consisting of 2% (2.07

acres) and <1% (0.26 acre), respectively, of the total Project Corridor along the Preferred Route (86.87 acres). No unique vegetative communities were identified within the Preferred ROW that would provide habitat for federally- or state-listed species. The sparseness of the viable habitat, and impacts to existing habitat from surrounding land uses (such as roads, residential land use, and farming activities) reduces the likelihood of significant wildlife occurring in the Project Corridor.

No wetlands were delineated within the Project Corridor. A total of seven waterbodies were delineated within the Project Corridor along the Preferred Route, totaling 8,708 linear feet. Based on a review of the HHEI scores, two of the seven streams are Class I Primary Headwater Stream (PHWH) waterbodies. The remaining five are Class II PHWH, intermittent waterbodies. All delineated waterbodies were categorized as roadside and agricultural drainage ditches with defined banks. Characteristics of delineated waterbodies in the Project Corridor along the Preferred Route are summarized below in Table 08-1.

Table 08-1. Delineated Waterbodies within the Project Corridor Along the Preferred Route

Stream ID	Type	HHEI Score[1]	PHWH Class[1]	Linear Feet Within Preferred ROW[2]
WB-115	Ditch	59	Class II	2,884.20
WB-118	Ditch	42	Class II	200.32
WB-119	Ditch	27	Class I	4,053.77
WB-124	Ditch	52	Class II	200.35
WB-126	Ditch	27	Class I	110.10
WB-151	Ditch	35	Class II	110.94
WB-314	Ditch	51	Class II	1,148.53

[1] Subject to verification by Ohio Environmental Protection Agency (Ohio EPA).
[2] Stream length within the Project Corridor; waterbody may continue off-site.

Alternate Route

The Project Corridor along the Alternate Route is also dominated by cultivated crops. Cultivated crops like corn, soybean, and winter wheat comprise 65% (72.59 acres) of the total area in the Project Corridor specific to the Alternate Route. Developed open space is the second most dominant land cover within the Alternate Route Project Corridor, making up 32% (35.56 acres) of the total area. Low-intensity development contributes to the remaining 3% (3.05 acres) of the Alternate Route Project Corridor. No unique vegetative communities were identified within the Project Corridor that would provide habitat for federally- or state-listed species. The sparseness of the viable habitat, and impacts to existing habitat from surrounding land uses (such as roads,

residential land use, and farming activities) reduces the likelihood of significant wildlife occurring in the Project Corridor.

A total of ten streams were delineated within the Project Corridor along the Alternate Route totaling 17,315 linear feet (Exhibit J). Based on a review of the HHEI scores, three of these waterbodies were classified as Class I, consisting of both ephemeral and intermittent streams with scores ranging from 12 to 27. The remaining seven waterbodies were classified as Class II with scores from 42 to 59. All delineated waterbodies within the Project Corridor along the Alternate Route are drainage ditches with maintained and vegetated banks. Characteristics of delineated streams in the Project Corridor along the Alternate Route are summarized below in Table 08-2.

Table 08-2. Delineated Streams within the Alternate ROW

Stream ID	Type	HHEI Score[1]	PHWH Class[1]	Linear Feet Within Alternate ROW[2]
WB-115	Ditch	59	Class II	315.27
WB-118	Ditch	42	Class II	200.32
WB-119	Ditch	27	Class I	4,053.77
WB-124	Ditch	52	Class II	2,680.57
WB-127	Ditch	21	Class I	27.46
WB-128	Ditch	12	Class I	2,182.07
WB-129	Ditch	56	Class II	2,735.06
WB-132	Ditch	52	Class II	45.00
WB-133	Ditch	42	Class II	3,927.13
WB-314	Ditch	51	Class II	1,148.53

[1] Subject to verification by Ohio EPA.
[2] Stream length within the Project Corridor; waterbody may continue off-site.

Laydown Yard

The laydown yard is dominated by cultivated crops, primarily soybeans, which accounts for approximately 72% (approximately 19.25 acres) of the total area. The second most predominate land use within 100 feet of the laydown yard is developed, open space, comprising approximately 21% (approximately 5.75 acres). Low intensity developed makes up the remaining acreage within 100 feet of the laydown yard.

No streams or wetlands were identified within 100 feet of the laydown yard.

(2) Delineated Wetlands and Streams Map

Figure 08-2 illustrates the Facility and all delineated resources within the ROW at a scale of 1:12,000.

(3) Impact of Construction on Vegetation and Surface Waters

Facility construction and operation activities do not require the crossing of streams by equipment or any in-water work. The Applicant will not be installing any vehicle crossings during construction. Field crews will utilize existing farm roads and crop areas to access either side of waterbodies/ditches.

Poles and pulling locations have been sited outside waterbodies, thereby avoiding temporary soil disturbance and permanent direct (fill) impacts to waterbodies.

The Facility is not anticipated to require any forest clearing. The Preferred and Alternate Routes are proposed to follow alongside public roads on open agricultural land. See below for additional information on impacts to vegetation.

Avoidance measures during construction will ensure protection of the streams, which could include pre-construction field preparation such as flagging and signage of regulated resources, environmental training for construction crews and the use of environmental monitors during construction as determined necessary. Siting of access roads to utilize existing farm infrastructure and not crossing any streams will further avoid potential impacts. The Construction General Permit that is required for project construction and the Stormwater Pollution Protection Plan (SWP3) that will be prepared will also identify additional controls and best management practices to be followed during construction and operation, further avoiding potential impacts.

The waterbodies found within the Study Area are highly impacted by surrounding land use and have low potential in supporting rare species. A majority of the streams identified in the Study Area were identified as agricultural or roadside ditches. Streams that traverse agricultural fields or run along roads often experience significant nutrient loading from fertilizer runoff or impervious surface runoff during rain events. The implementation of field tilling may also increase the loading onto streams. Additionally, the Project Area is dominated by agricultural fields which provide little shade. The lack of cover leads to higher temperatures in the summer, which is further compounded by the relative lack of depth in many of the streams.

Wetlands

No wetlands were identified within the Preferred or Alternate Route ROW, therefore the construction of poles and pulling locations are not anticipated to impacts wetland resources.

Streams

A total of 12 streams were identified within the Preferred and Alternate Route ROW. All of these streams were identified as ditches, having a low potential for rare, threatened, or endangered species. Both the Preferred and Alternate Routes will cross four delineated streams. However, given the aerial-position of the transmission line, there will be no impacts to delineated streams at these points. In addition, poles and pulling locations are sited for upland areas, thereby avoiding impacts to surface waters to the greatest practicable extent.

Vegetation

Facility construction will result in temporary and permanent impacts to vegetation within the ROW and at the laydown yard. Construction activities that will result in impacts to vegetation include the use of temporary access routes, and excavation/backfilling activities associated with construction/installation of the Transmission Line and laydown yard. These activities will result in damage to onsite vegetation (largely agricultural crops, specifically corn and soybeans) and increased exposure/disturbance of soil. Along with direct loss of vegetation, these impacts can result in loss of wildlife food and cover, increased soil erosion and sedimentation, increased risk of colonization by non-native invasive species, and disruption of normal nutrient cycling. However, it is not anticipated that any plant species occurring within the ROW or laydown yard will be extirpated or significantly reduced in abundance as a result of construction activities.

As previously mentioned, the majority of the vegetation is actively manipulated within both the Preferred and Alternate Route ROWs, and at the laydown yard. Because these areas currently contain monocultures of species, primarily commercial corn or soybeans in the cultivated areas and non-native grasses within the developed portion (e.g., residential yards), they do not provide significant habitat to any federally- or state-listed species. The Applicant will use existing farm roads where available to limit the amount of crop area disturbed during construction. The Applicant plans to clear the area for the laydown yard (17.8 acres) and 35 feet on each side of the Transmission Line (24.4 acres for the Preferred Route and 32.7 acres for the Alternate Route). The Applicant does not plan to clear any trees for the construction of the Facility.

(4) Impact of Operation and Maintenance on Vegetation and Surface Waters

The Facility consists of an overhead Transmission Line, 19 poles (along the Preferred Route), and a laydown yard. Given the aerial-position of the transmission line, ongoing operation and maintenance impacts will likely be limited, and will generally not require heavy equipment. The operation and maintenance of the Transmission Line will not require crossing of streams or any in-water work, and therefore and not anticipated to cause any direct impacts. In addition, the Construction General Permit that is required for Project construction and the SWP3 that will be prepared will also identify additional controls and best management practices to be followed during construction and operation, further avoiding potential impacts.

(5) Mitigation Procedures to Be Used During Construction, Operation, and Mitigation

To avoid or minimize Facility-related impacts on waterbodies, preliminary and final Facility design is guided by the following criteria during the siting of the Transmission Line and related infrastructure:

- The Transmission Line pole locations have been sited to completely avoid waterbodies.
- Stream impacts will be avoided by the field crews utilizing existing farm roads and crop areas to access either side of ditches.
- Potential impacts to waterbodies within the Preferred Route ROW will be minimized due to the nature of overhead transmission line stringing, which utilizes aerial methodologies to minimize potential disturbance to streams.

Various procedures will be used to reduce impacts during Facility construction, including impact minimization measures and site restoration. Each of these procedures is described further below.

(a) *Restoration Plans*

Following completion of construction, temporarily impacted areas will be restored to their pre-construction condition. Restoration activities are anticipated to include the following:

- Pre-construction soil/substrate conditions will be established in all disturbed areas, to the extent practicable.
- Restoration of disturbed agricultural fields will be accomplished by de-compacting the soil, removing rocks, and re-spreading stockpiled topsoil, as necessary.
- Disturbed soils throughout the area will be re-seeded with an annual cover crop to stabilize exposed soils and control sedimentation and erosion. Seeding outside of active agricultural fields will be restricted to native seed mixes, unless otherwise requested by the landowner.

- Any drainage ditches, field drainage tiles, or fencing damaged by construction activities will be repaired.

These actions will assure that, as much as possible, the site is returned to its pre-construction condition and that long-term impacts are minimized.

(b) *Frac Out Contingency Plan*

A Frac Out Contingency Plan will not be required given that the Transmission Line will be constructed overhead.

(c) *Methods to Demarcate Surface Waters and Wetlands During Construction*

The boundaries of jurisdictional streams within and immediately adjacent to the construction limits of disturbance will be demarcated with highlight visible fluffing, staking, or fencing prior to construction. These sensitive areas will also be depicted on construction drawings. All contractors and subcontractors working on-site will be provided with training to understand the significance of the types of flagging used, and the importance of staying within defined limits of work areas, especially in and adjacent to marked sensitive resource areas such as wetlands.

(d) *Procedures for Inspection and Repair of Erosion Control Measures*

Erosion and sediment control measures will be inspected by a third party duly qualified individual contracted by the Applicant at the Applicant's expense once per month throughout the period of construction to assure that they are functioning properly until completion of all restoration work. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of or the potential for pollutants entering the drainage system. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site vehicle tracking.

Following each inspection, the qualified inspector will complete and sign a checklist/inspection report. At a minimum, the inspection report shall include:

- The inspection date;
- Names, titles, and qualifications of personnel making the inspection;
- Weather information for the period since the last inspection (or since commencement of construction activity if the first inspection) including a best estimate of the beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;

- Weather information and a description of any discharges occurring at the time of the inspection;
- Locations of any best management practices that need to be maintained; and
- Any corrective actions recommended.

For three years following the submittal of a notice of termination form, the Applicant will maintain a record summarizing the results of the SWP3 inspections described above, including the name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWP3, and a signed certification as to whether the Facility is in compliance with the SWP3.

(e) *Measures to Divert Storm Water Runoff*

The Applicant will direct stormwater from fill slopes and other exposed surfaces to the greatest extent possible, and direct instead to appropriate catchment structures, sediment ponds, etc., using diversion berms, temporary ditches, check dams, or similar measures.

(f) *Methods to Protect Vegetation from Damage*

Mitigation measures to avoid or minimize impacts to vegetation will include identifying/delineating sensitive areas (such as waterbodies) where no disturbance or vehicular activities will be allowed, limiting areas of disturbance to the smallest size practicable, siting Facility components in previously disturbed areas, educating the construction workforce on respecting and adhering to the physical boundaries of off-limit areas, employing best management practices during construction, and maintaining a clean work area within the designated construction sites. Following construction activities, temporarily disturbed areas will be seeded (and stabilized with mulch and/or straw if necessary) to reestablish vegetative cover in these areas. Native species will be allowed to revegetate these areas, except in active agricultural fields or to otherwise meet the desires of the landowner.

(g) *Clearing Methods and Options to Dispose of Downed Trees, Brush, and Other Vegetation*

Facility construction (including the laydown yard and Preferred Transmission Line) will require clearing of approximately 42 acres of vegetation. Almost all of this disturbance will occur in agricultural lands. Facility construction and operation will not require the clearing of any trees. Brush and vegetation cleared from the work area will be buried, chipped, or otherwise disposed of as directed by the landowner and as allowed under federal, state, and local regulations.

(h) *Expected Use of Herbicides for Maintenance*

The Applicant does not anticipate using herbicides for construction, operation, or maintenance of the Facility.

(C) IMPACT OF ROUTE AND ALTERNATIVES ON PLANT AND ANIMAL LIFE

This section provides the results of literature and field surveys of the plant and animal life that may be affected by the Facility.

Literature Surveys

Aquatic and Terrestrial Plants

The review of plant resources that may be affected by the Facility focuses on species of commercial or recreational value, and species designated as endangered or threatened. This information was compiled through review and analysis of existing data sources, including Natureserve, USDA Plants, and ODNR NHDs.

Agricultural impacts, including impacts to crops and other commodity plants, are addressed in Section 4906-5-07(C). Aside from crops, there are no other plant species of commercial or recreational value identified as occurring in vicinity of the Facility.

Based on ODNR records for state-listed species, there are two endangered and three threatened plant species known to occur in Paulding County (ODNR, 2016a). The status and generalized habitat requirements for these species are summarized below in Table 08-3.

Table 08-3. Threatened and Endangered Plant Species in Paulding County

Scientific Name	Common Name	General Habitat	Ohio Status[1]
Carex crus-corvi	Raven-foot sedge	Swampy woods	T
Cuscuta cuspidata	Cuspidate dodder	Openings along creeks and streams	E
Iris brevicaulis	Leafy blue flag	Shaded or semi-shaded wet areas	T
Rorippa aquatica	Lakecress	Sunny shores of ponds and slow moving streams	T
Vernonia fasciculata	Prairie ironweed	Sunny wet areas	E

Source: ODNR, 2016a

[1] E = Endangered, T = Threatened

As shown in Table 08-3, the majority of state-listed plant species that are found in Paulding County occur in wetland habitats. As described in the wetland delineation report, no wetlands were identified in the vicinity of the Facility. In addition, due to the vast modification and disturbance present in the surrounding area, none

of the waterbodies were identified as highly likely to serve as habitat for any threatened or endangered species. No threatened or endangered species were observed during field surveys. Frequently a waterbody may be able to provide physical habitat, but lack suitable water chemistry due to intensive land use in the upland areas.

Aquatic and Terrestrial Animals

Commercial species consist of those trapped or hunted for fur. The ODNR regulates the hunting and trapping of the following furbearers in Paulding County: common muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), red fox (*Vulpes Vulpes*), gray fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), mink (*Mustela vison*), Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), long-tailed weasel (*Mustela frenata*), and American beaver (*Castor canadensis*) (ODNR, 2016b). Each of these species is briefly described below, based on habitat and distribution data published by the ODNR (2012a, 2016a) and the American Society of Mammalogists (ASM) (ASM, 2018).

- Common muskrat: Muskrat are abundant throughout Ohio, and prefer habitats with slow-moving water, such as creeks and wetlands. This species is likely to occur in the vicinity of the Project Area.
- Raccoon: Raccoon are common statewide, occupying a wide variety of habitats near water, including forests, cropland, and developed land. This species is likely to occur in the vicinity of the Project Area.
- Red fox: Red fox are common statewide, occupying a wide variety of habitats, including forests, cropland, and developed land. This species is likely to occur in the vicinity of the Project Area.
- Gray fox: Less common in Ohio than the red fox, gray fox prefer forested and shrubland habitats, avoiding open areas. Although the Project Area is predominantly open agricultural land, this species could occur in low numbers in area woodlots and shrubland.
- Coyote: Once extirpated in Ohio, coyotes are now common statewide, occupying a wide variety of habitats, including forests, cropland, shrubland, and developed land. This species is likely to occur in the vicinity of the Project Area.
- American mink: This semi-aquatic weasel has a statewide distribution and favors forested wetlands with abundant cover. Although the Project Area is predominantly open agricultural land, this species could occur in low numbers in the area woodlands.
- Virginia opossum: Opossum are common statewide, occupying a wide variety of habitats, including forests, cropland, and developed land. This species is likely to occur in the vicinity of the Project Area.
- Striped skunk: Skunk are common statewide, occupying a wide variety of habitats, including forests, cropland, and developed lands. This species is likely to occur in the vicinity of the Project Area.

- Long-tailed weasel: Found in a wide variety of habitats (including forests, cropland, and shrubland), this species is Ohio's most common weasel, and is likely to occur in the vicinity of the Project Area.
- American beaver: Beaver are common statewide, inhabiting and modifying permanent sources of water of almost any type, particularly low gradient streams and small lakes/ponds with outlets. This species has potential to inhabit the Project Area, but is less likely than in other areas of Ohio.

Recreational species consist of those hunted as game. The ODNR regulates the hunting of the following species in Paulding County: white-tailed deer (*Odocoileus virginianus*), gray squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), fox squirrel (*Sciurus niger*), cottontail rabbit (*Sylvilagus floridanus*), woodchuck (*Marmota monax*), wild turkey (*Meleagris gallopavo*), ring-necked pheasant (*Phasianus colchicus*), American crow (*Corvus brachyrhynchos*), mourning dove (*Zenaida macroura*), and various waterfowl (ODNR, 2016b). Each of these species are briefly described below, based on habitat and distribution data published by the ODNR (2016b, 2013, 2016c), ASM (ASM, 2018), USGS North American Breeding Bird Survey (BBS) (Pardiek et al., 2017), and Audubon Christmas Bird Count (CBC) (National Audubon Society, 2017).

- White-tailed deer: Deer are common statewide, occupying a wide variety of habitats, including forests, shrubland, cropland, and developed land. This species is likely to occur in the vicinity of the Project Area.
- Gray, red, and fox squirrels: The fox squirrel is primarily an inhabitant of open woodlands, while the gray squirrel and the red squirrel prefer more extensive forested areas. However, all three species have adapted well to landscaped suburban areas and are often found around structures. These tree squirrels occur throughout Ohio and are likely to occur in the vicinity of the Project Area.
- Eastern cottontail: Cottontails are abundant statewide. The species prefers open areas bordered by brush and open woodlands and have adapted well to developed areas. This species is likely to occur in the vicinity of the Project Area.
- Woodchuck: Woodchuck are common statewide, occupying a variety of habitats, including pastures, grasslands, and open woodlands. This species is likely to occur in the vicinity of the Project Area.
- Wild turkey: Once extirpated in Ohio, this species has re-established populations statewide, and is especially common in the southern and eastern parts of the state. Wild turkey is an adaptable species that prefers mature forest habitats, but live successfully in areas with as little as 15% forest cover. This species has been documented in the vicinity of the Project Area in the Audubon CBC.
- Ring-necked pheasant: Although not native to North America, the pheasant is naturalized in northern and western Ohio, and occupies open habitats such as agricultural landscapes and old fields. This

species has been documented in the vicinity of the Project Area in the USGS BBS and the Audubon CBC.

- American crow: Crow are common statewide, occupying a wide variety of habitats, including forests, cropland, shrubland, and developed land. This species has been documented in the vicinity of the Project Area in the USGS BBS and the Audubon CBC.
- Mourning dove: Mourning doves are common statewide, occupying a wide variety of habitats, including cropland, shrubland, and developed land. This species was documented in the USGS BBS and the Audubon CBC.
- Waterfowl: The following waterfowl game species have been recorded in the vicinity of the Project Area in the USGS BBS and/or the Audubon CBC: Canada goose, mallard, American black duck (*Anas rubripes*), ruddy duck (*Oxyura jamaicensis*), and wood duck (*Aix sponsa*).

The proposed Facility will have limited (if any) impacts to commercially/recreationally valuable species. The footprint of the Facility will be minor, only permanently impacting less than 0.1 acre. In addition, the Facility avoids impacts to wetlands, streams, and ditches, and species are accustomed to overhead transmission lines, as there are existing lines within the vicinity of the Facility.

Threatened or Endangered Species

Review of the U.S. Department of the Interior's federally-listed species by Ohio counties list indicates that the proposed Facility is within the range of two federally-listed species: Indiana bat (endangered) and northern long-eared bat (threatened). Each of these species is briefly described below:

- Indiana Bat (*Myotis sodalis*): The Indiana bat is a migratory species that hibernates in caves and mines in the winter. In the spring, reproductive females emerge from their hibernaculum and migrate, forming maternity colonies in wooded areas to bear and raise their young. Trees (dead, dying, or healthy) with exfoliating or defoliating bark, or trees containing cracks or crevices, provide suitable summer roosts. Indiana bats require a mosaic of habitats for feeding, preferring to forage along streams/rivers and above waterbodies, but also utilizing upland forests, clearings with successional old field vegetation, the borders of croplands, wooded fencerows, and pastures (USFWS, 2007).
- Northern Long-eared Bat (*Myotis septentrionalis*). Northern long-eared bats also hibernate incaves and mines over the winter and migrate to forested areas to bear young under the bark or in crevices of trees. Northern long-eared bats primarily forage in forested areas, catching insects as they fly through the understory.

Based on the USGS BBS state-threatened or endangered avian species may potentially be located near the Facility. The Berne Survey Route is located approximately 4.5 miles southwest of the Alternate Route and approximately 5.2 miles southwest of the Preferred Transmission Route. Data on breeding birds was collected on this route during 49 of the 51 years between 1966 and 2017. There have been 90 species recorded on this route since 1966. Two state-listed endangered species (northern harrier [*Circus cyanues*] and upland sandpiper [*Bartramia longicauda*]) and three state-listed species of concern (bobolink [*Dolichonyx oryzivorous*], northern bobwhite [*Colinus virginianus*], and black-billed cuckoo [*Coccyzus erythropthalmus*]) were observed during these surveys. These state-listed species have generally been detected in very low numbers. The bobolink and northern bobwhite were identified in moderate numbers in the 1970s, 1980s, and 1990s, but since 2010 no bobolinks and only five northern bobwhites have been observed. Two northern harriers were observed (in 1983 and 1987), and none have been detected since. Similarly, only three upland sandpipers (two in 1977 and one in 1982) were observed, and two black-billed cuckoos (1982 and 1987). No federally-listed endangered or threatened species were observed (Pardieck, et al., 2017; ODNR, 2017).

Data from the Audubon CBC provides an overview of the birds that inhabit the region during the early winter. Counts take place on a single day during a three-week period around Christmas, when birdwatchers comb a 15-mile (24-kilometer) diameter circle in order to count the number of bird species and individuals observed. The Black Swamp count circle is centered approximately 13 miles east of the Facility. The following state-listed avian species were documented over the past 10 years of the Black Swamp CBC: northern harrier (endangered); sandhill crane (*Grus canadensis*; threatened); and sharp-shinned hawk (*Accipiter striatus*; species of concern); no federally-listed endangered or threatened species were recorded (National Audubon Society, 2017; ODNR, 2017).

The potential occurrence of aquatic species in the vicinity of the Project Area was determined through review of the Ohio Aquatic Gap Analysis Program and ODNR data. Based on this information, it is estimated that approximately 68 fish species, 35 mollusk species, and four crayfish species could occur in the area (Covert et al., 2007). These aquatic species are generally common and widely distributed throughout Ohio. However, the following state-listed endangered clubshell (*Pleurobema clava*) is thought to occur in watersheds in the vicinity of the Facility: the endangered clubshell (*Pleurobema clava*) and the threatened threehorned wartyback (*Obliquaria reflexa*); and the species of special concern creek heelsplitter, deertoe (*Truncilla truncate*), elktoe (*Alasmidonta marginata*), kidneyshell (*Ptychobranchus fasciolar*), purple wartyback (*Cyclonaias tuberculate*), salamander mussel (*Simpsonaias ambigua*), and wavyrayed lampmussel (*Lampsilis fasciola*) (Covert et al., 2007, ODNR 2017). The rayed bean and clubshell mussels are also federally-listed

as endangered. An evaluation of potential mussel habitat and the need for site-specific surveys is discussed below.

As mentioned above, due to the fact that the footprint of the Facility is small, the impact will be minor, only impacting less than 0.1 acre. In addition, the Facility will the avoid impacts to wetlands, streams, and ditches. Likewise, due to the presence of existing overhead transmission lines in the vicinity of the Facility, species are accustomed to overhead transmission lines, thus, there will be little to no impacts to threatened or endangered species as a result of the Facility.

Field Surveys

A series of site-specific field surveys was completed to further evaluate the plants and animals found in the vicinity of the Wind Farm. The site-specific wildlife studies focused on birds and bats, which are more vulnerable to operational impacts from wind energy facilities than flightless wildlife species, and on endangered and threatened species likely to occur within the vicinity of the Wind Farm. As the Facility is located within the Project Area of the Wind Farm, these site-specific studies are applicable to the Facility. The discussion below is a limited summary of species found in the vicinity of the Wind Farm, and subsequently, the Facility.

Timber Road Wind Farms II, III, and IV Avian Use Survey

Western EcoSystems Technology, Inc. (WEST) conducted an avian use survey between March 4, 2016 to February 16, 2017 from 24 observation points at the Timber Road Wind Farms II and III, as well within the northern area of the proposed Wind Farm (Exhibit K). The main objective of the study was to determine the seasonal and spatial use of the site by eagles. The survey also recorded uses of sensitive species (i.e., state- of federally-listed) and other large birds. Survey methods were designed in accordance with USFWS and ODNR recommendations. Surveys were conducted monthly at the 24 observation points, yielding a total of 288 survey hours.

A total of 3,129 observations were recorded, representing 23 unique species. The most abundant species observed was the rock pigeon with 1,592 individuals, followed by the killdeer with 483 individuals. Of the raptor family, the red-tailed hawk (*Buteo jamaicensis)* was the most observed species with a total of 43 individuals, followed by the American kestrel (*Falco sparverius*) with 36 individuals. Fall and winter experienced the greatest use compared to spring and summer.

Three state-listed species were observed in the vicinity of the Facility, the northern harrier (endangered), sharp-shinned hawk (species of special concern), and bobolink (species of special concern). A total of 25

observations of the northern harrier were made, as well as two observations of a sharp-shinned hawk and one observation of a bobolink. Federally-listed species were not observed in the study area.

Timber Road IV Wind Farm Avian Use Survey

WEST conducted an avian survey from November 2, 2016 to October 30, 2017 from 30 observation points to assess use and risk by eagles and sensitive species including the sandhill cranes during migration (Exhibit L). The secondary objective was to record use of other large birds in the vicinity of the Wind Farm.

A total of 4,969 observations were recorded, representing 21 different species. Overall, the most commonly observed species included the Canada goose (1,969 observations), rock pigeon (935 observations), killdeer (722 observations), and the turkey vulture (*Cathartes aura*; 327 observations). The most common raptors recorded were the red-tailed hawk (76 observations of 84 individuals) and the northern harrier (64 observations of 64 individuals). Avian use varied seasonally. Doves and pigeons were the most commonly observed group in the spring, shorebirds were most commonly observed group in the summer and fall, and waterfowl was the most commonly observed group in the winter months.

Four state-listed sensitive species were identified, including the endangered sandhill crane (37 observations), endangered northern harrier (64 observations), endangered upland sandpiper (1 observation), and the sedge wren (1 observation), which is listed as species of concern. No federally-listed species were identified in the study area.

Bat Acoustic Survey

WEST conducted bat acoustic surveys from May 4 to November 16, 2017 and March 14 through July 15, 2018 to characterize seasonal bat activity within the vicinity of the Wind Farm (Exhibit M). A total of 1,918 bat passes were recorded during these periods and analyzed by acoustic bat experts. Across all microphone heights, the majority (56.9%, 980 bat passes) of calls were identified as big brown/silver-haired bats. The next most commonly recorded species was eastern red bat (18.8%, 324 bat passes).

No known federally and/or state endangered or threatened species calls were recorded or identified during the study. The majority of calls recorded were from the silver-haired/big brown bat group, followed by eastern red bats. The peak of bat activity was recorded in August and was mainly attributed to the relatively high number of bat passes identified as silver-haired/big brown bat group. Overall, the study at the Wind Farm presents bat species composition and seasonal patterns that are similar to other Midwestern wind energy facilities in similar landscapes.

Bat Mist-Net Survey

WEST completed a bat mist-netting survey during the summer of 2017 to assess the presence, or probable absence, of federally-listed Indiana and northern long-eared bat species in the vicinity of the Wind Farm during summer maternity season (Exhibit N). One site consisting of nine nets was monitored over two non-consecutive nights on July 17 and 19, 2017. A total of 26 bats were captured and identified as one species: big brown bat. The number of captures each night were similar, with 14 bats caught on July 17, 2017 and 12 caught on July 19, 2017. No northern long-eared bats or Indiana bats were captured by mist-netting surveys.

Mussel Assessment

WEST assessed the proposed Project Area to identify any areas of potential instream impact and determine if a field assessment should be conducted in areas of potential instream impacts (Exhibit O). The methods for the assessment were based on the Ohio Mussel Survey Protocol (OMSP) (ODNR, 2016d). Locations where streams within the Project Area may have instream impacts were assessed for mussel habitat using USFWS NWI mapping and aerial photography. The OMSP calls for in-stream surveys of streams with a watershed greater than 10 square miles or within streams listed in Appendix A of the OMSP (ODNR, 2016d).

Based on NWI mapping and aerial imagery, 17 stream locations were determined to contain water over multiple years and were investigated further as potential mussel habitat. Of the 17 locations, the stream with the largest watershed drained an area of 6.1 square miles and watersheds of all other streams being impacted were less than 5 square miles and none were listed within the OMSP. Potential mussel habitat is limited within the vicinity of the Wind Farm (and associated Transmission Line Facility), and the potential impact areas assessed were either ephemeral/intermittent ditches or had a watershed of less than 10 square miles. As such, none of the streams in the area represented suitable mussel habitat.

(1) List and Status of Species Identified in Field Surveys

Table 08-4 below is a list of the species identified in both the literature and field surveys, including their federal and state protection status, if any.

Table 08-4. Species Identified in Literature and Field Surveys

Common Name	Scientific Name	Status[1]
Plants		
Raven-foot sedge	*Carex crus-corvi*	OH-T
Cuspidate dodder	Cuscuta cuspidata	OH-E
Leafy blue flag	Iris brevicaulis	OH-T
Lakecress	Rorippa aquatica	OH-T
Prairie ironweed	*Vernonia fasciculata*	OH-E
Mammals		
Beaver	*Castor canadensis*	
Coyote	*Canis latrans*	
Eastern cottontail	*Sylvilagus floridanus*	
Eastern gray squirrel	*Sciurus carolinensis*	
Fox squirrel	*Sciurus niger*	
Gray fox	*Urocyon cinereoargenteus*	OH-SC
Longtail weasel	*Mustela frenata*	
Mink	*Mustela vison*	
Muskrat	*Ondatra zibethicus*	
Opossum	*Didelphis virginiana*	
Raccoon	*Procyon lotor*	
Red fox	*Vulpes vulpes*	
Red squirrel	*Tamiasciurus hudsonicus*	
Striped skunk	*Mephitis mephitis*	
Whitetail deer	*Odocoileus virginianus*	
Woodchuck	*Marmota monax*	
Birds		
Acadian flycatcher	*Epidonax viresceus*	
American black duck	*Anas rubripes*	
American crow	*Corvus brachyrhynchos*	
American goldfinch	*Carduelis tristis*	
American kestrel	*Falco sparverius*	
American robin	*Turdus migratorius*	
American wigeon	*Anas americana*	
American woodcock	*Philohela minor*	
Bald eagle	*Haliaeetus leucocephalus*	
Baltimore oriole	*Icterus galbula*	

Common Name	Scientific Name	Status[1]
Bank swallow	*Riparia riparia*	
Barn swallow	*Hirundo rustica*	
Barred owl	*Strix varia*	
Belted kingfisher	*Ceryle alcyon*	
Black-billed cuckoo	*Coccyzus erythropthalmus*	
Black-capped chickadee	*Parus atricapillus*	
Blue jay	*Cyanocitta cristata*	
Blue-gray gnatcatcher	*Polioptila caerulea*	
Bobolink	*Dolichonyx oryzivorus*	OH-SC
Bonapate's gull	*Chroicocephalus philadelphia*	
Broad-winged hawk	*Buteo platypterus*	
Broad-winged hawk	*Buteo platypterus*	
Brown creeper	*Certhia americana*	
Brown thrasher	*Toxostoma rufum*	
Brown-headed cowbird	*Molothrus ater*	
Canada goose	*Branta canadensis*	
Carolina chickadee	*Poecile carolinensis*	
Carolina wren	*Thryothorus ludovicianus*	
Cedar waxwing	*Bombycilla cedrorum*	
Chimney swift	*Chaetura pelagica*	
Chipping sparrow	*Spizella psserina*	
Common grackle	*Quiscalus quiscula*	
Common yellowthroat	*Geothlypis trichas*	
Cooper's hawk	*Accipiter cooperii*	
Dark-eyed junco	*Junco hyemalis*	
Dickcissel	*Spiza americana*	
Double crested cormorant	*Phalacrocorax auritus*	
Downy woodpecker	*Picoides pubescens*	
Eastern bluebird	*Sialia sialis*	
Eastern kingbird	*Tyrannus tyrannus*	
Eastern meadowlark	*Sturnella magna*	
Eastern phoebe	*Sayornis phoebe*	
Eastern screech owl	*Otus asio*	
Eastern towhee	*Pipilo erythrophthalmus*	
Eastern wood-pewee	*Contopus virens*	
European starling	*Sturnus vulgaris*	

Common Name	Scientific Name	Status[1]
Field sparrow	*Spizella pusilla*	
Fox sparrow	*Passerella iliaca*	
Gadwall	*Anas strepera*	
Golden eagle	*Aquila chrysaetos*	
Golden-crowned kinglet	*Regulus satrapa*	
Grasshopper sparrow	*Ammodramus savannarum*	OH-SC
Gray catbird	*Dumetella carolinensis*	
Great blue heron	*Ardea herodias*	
Great crested flycatcher	*Myiarchus crinitus*	
Great horned owl	*Bubo virginianus*	
Green heron	*Butorides virescens*	
Green-winged teal	*Anas crecca*	
Hairy woodpecker	*Picoides villosus*	
Hermit thrush	*Catharus guttatus*	
Herring gull	*Larus argentatus*	
Hooded merganser	*Lophodytes cacullatus*	
Horned lark	*Eromophila alpestris*	
House finch	*Carpodacus mexicanus*	
House sparrow	*Passer domesticus*	
House wren	*Troglodytes aedon*	
Indigo bunting	*Passerina cyanea*	
Kentucky warbler	*Oporornis formosus*	
Killdeer	*Charadrius vociferus*	
Lapland longspur	*Calcarius lapponicus*	
Lesser scaup	*Aythya affinis*	
Mourning dove	*Zenaida macroura*	
Northern bobwhite	*Colinus virginiana*	
Northern cardinal	*Cardinalis cardinalis*	
Northern flicker	*Colaptes auratus*	
Northern harrier	*Circus cyaneus*	OH-E
Northern mockingbird	*Mimus polyglottos*	
Northern pintail	*Anas acuta*	
Northern rough-winged swallow	*Stelgidopteryx serripennis*	
Northern saw-whet owl	*Aegolius acadicus*	
Northern shoveler	*Anas clypeata*	
Northern shrike	*Lanius excubitor*	
Osprey	*Pandion haliaetus*	

Common Name	Scientific Name	Status[1]
Ovenbird	*Seiurus aurocapillus*	
Peregrine falcon	*Falco peregrinus*	
Pied-billed grebe	*Podilymbus podiceps*	
Pileated woodpecker	*Dryocopus pileatus*	
Pine siskin	*Carduelis pinus*	
Purple finch	*Carpodacus purpureus*	
Purple martin	*Progue subis*	
Red-bellied woodpecker	*Melanerpes carolinus*	
Red-breasted merganser	*Mergus serrator*	
Red-breasted nuthatch	*Sitta canadensis*	
Red-eyed vireo	*Vireo olivaceus*	
Red-headed woodpecker	*Melanerpes erythrocephalus*	
Red-tailed hawk	*Buteo jamaicensis*	
Red-winged blackbird	*Agelaius phoeniceus*	
Ring-billed gull	*Larus delawarensis*	
Ring-necked duck	*Aythya collaris*	
Ring-necked pheasant	*Phasianus colchicus*	
Rock pigeon	*Columba livia*	
Rose-breasted grosbeak	*Pheucticus ludovicianus*	
Rough-legged hawk	*Buteo lagopus*	
Ruby-throated hummingbird	*Archilochus colubris*	
Ruddy duck	*Oxyura jamaicensis*	
Rusty blackbird	*Euphagus carolinus*	
Sandhill crane	*Grus canadensis*	OH-T
Savannah sparrow	*Passerculus sandwichensis*	
Scarlet tanager	*Piranga olivacea*	
Sedge wren	*Cistothorus platensis*	
Sharp-shinned hawk	*Accipiter striatus*	OH-SC
Short-eared owl	*Asio flammeus*	
Snow bunting	*Plectrophenax nivalis*	
Snow goose	*Chen caerulescens*	
Snowy owl	*Bubo scandiacus*	
Song sparrow	*Melospiza melodia*	
Spotted sandpiper	*Actitus macularia*	
Tree swallow	*Tachycineta bicolor*	
Tufted titmouse	*Parus bicolor*	
Turkey vulture	*Cathartes aura*	

Common Name	Scientific Name	Status[1]
Upland sandpiper	*Bartramia longicauda*	OH-E
Vesper sparrow	*Pooecetes gramineus*	
Warbling vireo	*Vireo gilvus*	
White-breasted nuthatch	*Sitta carolinensis*	
White-crowned sparrow	*Zonotrichia leucophrys*	
Wild turkey	*Meleagris gallopavo*	
Willow flycatcher	*Epidonax traillii*	
Winter wren	*Troglodytes troglodytes*	
Wood duck	*Aix sponsa*	
Wood thrush	*Hylocichla mustelina*	
Yellow warbler	*Dendroica petechia*	
Yellow-bellied sapsucker	*Sphyrapicus varius*	
Yellow-billed cuckoo	*Coccyzus americanus*	
Yellow-breasted chat	*Icteria virens*	
Yellow-rumped warbler	*Dendroica coronata*	
Yellow-throated vireo	*Vireo flavifrons*	
Bat		
Big brown bat	*Eptesicus fuscus*	OH-SC
Eastern red bat	*Lasiurus borealis*	OH-SC
Evening bat	*Nycticeius humeralis*	
Hoary bat	*Lasiurus cinereus*	OH-SC
Indiana ba	*Myotis sodalis*	OH-E, FED-E
Little brown bat	*Myotis lucifugus*	OH-SC
Northern-long eared bat	*Myotis septentrionalis*	OH-T, FED-T
Seminole bat	*Lasiurus seminolus*	
Silver-haired bat	*Lasionycteris noctivagans*	OH-SC
Tri-colored bat	*Perimyotis subflavus*	OH-SC
Fish		
Bigmouth buffalo	*Ictiobus cyprinellus*	
Black bullhead catfish	*Ameiurus melas*	
Black crappie	*Poxomis nigromaculatus*	
Black redhorse	*Moxostoma duquesnei*	
Blacknose dace	*Rhinicthys atratulus*	
Blackside darter	*Percina maculata*	
Bluegill	*Lepomis macrochirus*	
Bluntnose minnow	*Pimephales notatus*	

Common Name	Scientific Name	Status[1]
Bowfin	*Amia calva*	
Brook silverside	*Labidesthes sicculus*	
Brown bullhead catfish	*Ameiurus nebulosus*	
Bullhead minnow	*Pimephales vigilax*	
Central mudminnow	*Umbra limi*	
Central stoneroller minnow	*Campostoma anomalum*	
Channel catfish	*Ictalurus punctatus*	
Common shiner	*Luxilus cornutus*	
Creek chubsucker	*Erimyzon oblongus*	
Dusky darter	*Percina sciera*	
Emerald shiner	*Notropis atherinoides*	
Fantail darter	*Etheostoma flabellare*	
Fathead minnow	*Pimephales promelas*	
Flathead catfish	*Pylodictis olivaris*	
Freshwater drum	*Aplodinotus grunniens*	
Ghost shiner	*Notropis buchanani*	
Gizzard shad	*Dorosoma cepedianum*	
Golden redhorse	*Moxostoma erythurum*	
Golden shiner	*Notemigonus crysoleucas*	
Grass pickerel	*Esox americanus*	
Greater redhorse	*Moxostoma valenciennesi*	OH-T
Green sunfish	*Lepomis cyanellus*	
Greenside darter	*Etheostoma blennioides*	
Johnny darter	*Etheostoma nigrum*	
Largemouth bass	*Micropterus salmoides*	
Logperch darter	*Percina caprodes*	
Longear sunfish	*Lepomis megalotis*	
Longnose gar	*Lepisosteus osseus*	
Mimic shiner	*Notropis volucellus*	
Mottled sculpin	*Cottus bairdii*	
Northern hogsucker	*Hypertelium nigricans*	
Northern pike	*Esox lucis*	
Orangespotted sunfish	*Lepomis humilis*	
Orangethroat darter	*Etheostoma spectabile*	
Pumpkinseed	*Lepomis gibbosus*	
Quillback carpsucker	*Carpioides cyprinus*	
Rainbow darter	*Etheostoma caeruleum*	

Common Name	Scientific Name	Status[1]
Redfin shiner	*Lythrurus umbratilis*	
River chub	*Nocomis micropogon*	
River redhorse	*Moxostoma carinatum*	
Rock bass	*Ambloplites rupestris*	
Rosyface shiner	*Notropis rubellus*	
Sand shiner	*Notropis stramineus*	
Shorthead redhorse	*Moxostoma macrolepidotum*	
Silver redhorse	*Moxostoma anisurum*	
Silverjaw minnow	*Notropis buccatus*	
Smallmouth buffalo	*Ictiobus bubalus*	
Spotfin shiner	*Cyprinella spiloptera*	
Spotted sucker	*Minytrema melanops*	
Stonecat madtom	*Noturus flavus*	
Striped shiner	*Luxilus chrysocephalus*	
Suckermouth minnow	*Phenacobius mirabilis*	
Tadpole madtom	*Noturus gyrinus*	
Trout perch	*Percopsis omiscomaycus*	
Walleye	*Sander vitreus*	
Warmouth	*Lepomis gulosus*	
White bass	*Morone chrysops*	
White sucker	*Catostomus commersoni*	
Yellow bullhead	*Ameiurus natalis*	
Yellow perch	*Perca flavescens*	
Mollusks		
Black sandshell	*Ligumia recta*	
Clubshell	*Pleurobema clava*	OH-E, FED-E
Creek heelsplitter	*Lasmigona compressa*	OH-SC
Creeper	*Strophitus undulates*	
Cylindrical papershell	*Anodontoides ferussaciamus*	
Deertoe	*Truncilla truncate*	OH-SC
Elktoe	*Alasmidonta marginata*	OH-SC
Fatmucket	*Lampsilis radiata*	
Flat floater	*Anodonata suborbiculata*	
Fluted shell	*Lasmigona costata*	
Fragile papershell	*Leptodea fragilis*	
Giant floater	*Pyganodon grandis*	

Common Name	Scientific Name	Status[1]
Grooved fingernail	*Sphaerium simile*	
Kidneyshell	*Ptychobranchus fasciolar*	OH-SC
Lilliput	*Toxolasma parvus*	
Long fingernail clam	*Musculium transversum*	
Mapleleaf	*Quadrula quadrula*	
Mucket	*Actinonaias ligamentina*	
Paper pondshell	*Utterbackia imbecillus*	
Pimpleback	*Quadrula pustulosa*	
Pink heelsplitter	*Potamilus alatus*	
Purple wartyback	*Cyclonaias tuberculata*	OH-SC
Rabbitsfoot	*Quadrula cylindrical*	OH-E, FED-T
Rainbowshell	*Villsa iris*	
Rayed bean	*Villosa fabalis*	OH-E, FED-E
Ridgeback peaclam	*Pisidium compressum*	
Salamander mussel	*Simposonaias ambigua*	OH-SC
Slippershell mussel	*Alasmidonta viridis*	
Spike	*Elliptio dilatata*	
Striated fingernailclam	*Sphaerium striatinum*	
Threehorn wartyback	*Obliquaria reflexa*	OH-T
Threeridge	*Amblema plicata*	
Ubiquitous peaclam	*Pisidium casertanum*	
Wabash pigtoe	*Fusconaia flava*	
Wavyrayed lampmussel	*Lampsilis fasciola*	OH-SC
Crayfish		
Devil crayfish	*Cambarus diogenes*	
Papershell crayfish	*Orconectes immunis*	
Rusty crayfish	*Orconectes rusticus*	
White river crayfish	*Procambarus acutus*	

[1] OH-E = Ohio-listed endangered, OH-T = Ohio-listed threatened, OH-SC = Ohio-listed species of special concern, FED-E = Federal-listed endangered, FED-T = Federal-listed threatened.

(2) Construction Impacts

Construction-related impacts to wildlife are anticipated to be very limited, but could include incidental injury and mortality due to vegetation clearing and vehicular movement, potential silt and sedimentation impacts to aquatic organisms, and disturbance and displacement associated with clearing and earth-moving activities. Based on the studies conducted to date, none of the construction-related impacts will be significant enough

to affect local populations of any resident or migratory wildlife species. Each of these potential impacts are described below.

Incidental Injury and Mortality: Incidental injury and mortality should be limited to sedentary/slow moving species such as small mammals, reptiles, and amphibians that are unable to move out of the area being disturbed by construction. If construction occurs during the nesting season, wildlife subject to mortality could also include the eggs and young offspring of nesting birds, as well as immature mammalian species that are not yet fully mobile. More mobile species and mature individuals should be able to vacate areas that are being disturbed. Furthermore, because most Facility components are sited in active agricultural land that provides limited wildlife habitat, which currently (and historically) experiences frequent agricultural-related disturbances, such impacts are anticipated to be minor.

Siltation and Sedimentation: Earth-moving activities associated with Facility construction have the potential to cause siltation and sedimentation impacts down slope of the area of disturbance. Facility components will be sited away from wetlands and streams. To prevent adverse effects to water quality and aquatic habitat during construction, runoff will be managed under an National Pollutant Discharge Elimination System (NPDES) construction storm water permit and the associated SWP3. An erosion and sediment control plan will be developed prior to construction that will use appropriate runoff diversion and collection devices. Also, because the majority of Facility components are being sited in active agricultural land, soil disturbance/exposure due to Facility construction will generally occur in areas already subject to regular plowing, tilling, harvesting, etc.

Disturbance/Displacement: Some wildlife displacement will also occur due to increased noise and human activity as a result of Facility, resulting in a temporary loss of habitat. The significance of this impact will vary by species and the seasonal timing of construction activities. The Facility will be built on agricultural land, which generally provides habitat for only a limited number of wildlife species. In addition, these areas are already subject to periodic disturbance in the form of mowing, plowing, harvesting, etc. Displaced species are expected to return to the area after construction is complete.

(3) Operation and Maintenance Impacts

Impacts as a result of operations and maintenance of the Facility are not anticipated to significantly adversely affect plant or wildlife species. The proposed Facility was sited to minimize forest clearing/conversion impacts. Both the Preferred and Alternate Routes are sited almost entirely within active agricultural land. The laydown yard is also sited in agricultural land. To minimize the potential for bird and power line collisions and/or electrocutions, Facility design will incorporate best practices described by the Avian Power Line Interaction

Committee (e.g., ALPIC, 2012; ALPIC & USFWS, 2005). Infrequent maintenance activities may temporarily displace resident wildlife from agricultural habitat within the ROW, but ample similar habitat is located in adjacent fields and throughout the general area in the vicinity of the Facility.

(4) Mitigation Procedures

No significant impacts to commercial, recreational, or protected wildlife species are anticipated as a result of Facility construction or operation. Therefore, no mitigation measures are proposed.

(D) DESCRIPTION OF SITE GEOLOGY AND SOILS

The information provided in this section and below in response to the requirements of OAC Rule 4906-5-08(D) is largely based on a report prepared by Hull & Associates, Inc. (Hull) in support of the Timber Road II Wind Farm certificate application. The 2010 Groundwater Hydrogeology Desktop Review Summary Report was submitted as Exhibit G to the certificate application for Timber Road II Wind Farm in Case No. 10-369-EL-BGN. This report summarized information from available on-line databases and/or documents produced by the following federal, state, and local agencies: FEMA; the USGS, the USDA Soil Conservation Service Soil Survey of Paulding County; the ODOT District 1 and the Office of Geotechnical Engineering; the Paulding County Engineer and Health Department; the Ohio EPA; the Ohio Department of Agriculture (ODA); the ODNR; and the Ohio State University Agricultural Extension Office. The study area evaluated by Hull includes the entirety of the Preferred Transmission Route, Alternate Route, and laydown yard.

Description of the Site Geology

The proposed Facility lies entirely within the glaciated Maumee Lake Plains Region of the Huron-Erie Lake Plains Section of the Central Lowland Physiographic Province. The region is characterized as a flat-lying Ice-Age lake basin containing beach ridges, bars, dunes, deltas, and clay flats. The region formerly contained Black Swam, which was a regional wetland extending southwest from present-day western Lake Erie through northwest Ohio into extreme northeastern Indiana. The Black Swam consisted of extensive areas of swamps and marshes, with some higher dry ground interspersed. Low physiographic relief (less than 5 feet) is generally present in the region, which has been slightly dissected by modern streams. Surface elevations in the Maumee Lake Plains Region range from approximately 570 to 800 feet above mean sea level.

The surface topography in the vicinity of the proposed Facility is the result of ice-deposited ground moraine, which was planed by waves in glacial lakes following deposition. Depths-to-bedrock estimates range from approximately 27 feet to 40 feet below ground surface, based on water wells that have been documented in the area. Underlying bedrock is

composed on the Salina Group (Upper and Lower Silurian age), the Detroit River Group, the Middle Devonian Dundee Limestone, and the Ten Mile Creek Dolomite and Silica Formation.

A review of geologic structural and seismic information indicates that there are no structural features or earthquake epicenters documented in the vicinity of the Facility. The closest documented earthquake epicenter occurred in north-central Mercer County, Ohio, located approximately 22 miles south of the Facility. Other structural features including faults and fault systems near the Facility include the Anna Champaign Fault, situated approximately 26 miles south and the Bowling Green Fault System, located approximately 50 miles east of the Facility.

Suitability of the Soils for Foundation Construction

Although the report did not specifically analyze transmission line structures, Hull (2010) concluded that soils and geology within the study area are suitable for grading, compaction, and drainage of wind turbine foundations, access roads, and substations. The report also concluded that construction of the wind turbine foundations is not expected to have a significant impact on the local geology and hydrogeology (Hull, 2010). Since wind turbines and their foundations are much larger than any structures proposed as part of the Facility, the conclusions regarding geologic suitability also apply to the proposed Transmission Line structures and their foundations, as well as the laydown yard.

Steep Slopes and Highly Erodible Soils

OAC Rule 1501:15-1-01 defines highly erodible soils as the "portion of land surface which is very susceptible to erosive forces and is characterized by steep slopes of long slopes." According to the NRCS Web Soil Survey (USDA NRCS, 2018), terrain in the vicinity of the proposed Facility is generally fairly level. Slopes are less than 1% for approximately 90% of the 2.9-mile Preferred Transmission Route, and never exceed 2%. The NRCS data shows that slopes are 0 to 1% across the entirety of the laydown yard. Table 08-5 summarizes the slopes found at the proposed Facility.

Table 08-5. Slopes at the Proposed Facility

Preferred Transmission Route			
Slope	**Linear Feet**	**Percent of Route**	**Soil Series**
0-1%	1,3757	90%	Hoytville silty clay Hoytville silty clay loam
0-2%	1,345 feet	9%	Nappanee loam Nappanee silty clay loam
Alternate Transmission Route			
Slope	**Linear Feet**	**Percent of Route**	**Soil Series**
0-1%	19,837 feet	98%	Hoytville clay loam Hoytville silty clay loam
0-2%	381 feet	2%	Nappanee loam Nappanee silty clay loam
Laydown Yard			
Slope	**Acres**	**Percent of Site**	**Soil Series**
0-1%	17.8 acres	100%	Hoytville silty clay

Plans for Test Borings

Initial geotechnical investigation and test borings will be conducted prior to construction of the Facility to confirm/refine the information presented above and to facilitate final design and engineering. A Generalized Geotechnical Exploration Work Plan was submitted as Exhibit G to the Wind Farm Certificate Application in Case No. 18-91-EL-BGN. This report consists of a work plan describing the planned test borings to be conducted prior to Facility construction, along with the subsurface exploration procedures to be used, the field and laboratory testing to be performed, and the geotechnical engineering report to be prepared. The report also includes preliminary earthwork recommendations.

Terracon plans to conduct test borings at the locations of proposed transmission tower structures, as well as at each proposed wind turbine locations, meteorological towers, and substation. The borings will be conducted with a track-mounted Diedrich D-50 rotary drill rig using continuous flight hollow stem augers, owned and operated by Ohio Testbor.

Continuous soil sampling will typically be performed from a depth of about 1 foot to 11 feet below the existing site grades. At greater depths, soil sampling will be performed at approximate 5-foot intervals to the terminal depth of the test borings. Soil sampling will be performed using split-barrel soil sampling procedures, wherein a standard 2-inch outer diameter split-barrel sampling spoon is driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. When split-barrel refusal is encountered in bedrock, the number of inches of penetration into the rock for 50 hammer blows will be recorded. In addition to

conducting split-barrel sampling, thin-walled (Shelby) tube samples will be obtained if medium stiff or softer cohesive formations are obtained. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge is pushed hydraulically into the soil to obtain a relatively undisturbed sample.

Groundwater levels will be observed and recorded while drilling and at the completion of each boring. To better establish longer-term groundwater information, temporary piezometers are installed at each turbine location. The temporary piezometers generally extended to a depth of about 15 feet and consisted of 10 feet of slotted well screen at the bottom and 10 feet of solid riser pipe above the well screen. Sand will be used to backfill the annular space between the well screen and the bore hole. Above the sand pack, bentonite chips will be used as backfill up to the ground surface to prevent surface water infiltration. Terracon intends to measure the water level within the piezometers monthly over a period of six months.

The sampling depths, penetration distances, and other sampling information will be recorded on the field boring logs. The samples will be placed in appropriate containers and taken to Terracon's soil laboratory for testing and classification by a geotechnical engineer. Field boring logs will be prepared as part of the drilling operations. The field logs will include visual classifications of the materials encountered during drilling and interpretation of the subsurface conditions between samples. Additional field tests to be performed as a subset of test borings include seismic refraction testing and electrical earth resistivity. Field thermal conductivity sampling will also be performed to evaluate underground collection cabling and falling weight deflectometer testing will be performed along designed paved roadways to evaluate the condition of the proposed delivery routes.

The laboratory testing program will include examination of soil samples by an engineer. All laboratory testing will be performed in accordance with ASTM or other specified standards. Based on the material's texture and plasticity, Terracon will describe and classify the soil samples in accordance with the Unified Soil Classification System. Final boring logs will be prepared that will include both field observations and results of the laboratory tests. A report will be prepared documenting the findings of the borings and laboratory testing, including subsurface soil properties, static water levels, rock quality descriptions, percent recovery, and depth and description of bedrock contact. This report will be provided to OPSB Staff prior to commencement of Facility construction.

(E) ENVIRONMENTAL AND AVIATION COMPLIANCE INFORMATION

(1) List and Description of Permits, Licenses, and Authorizations

The Applicant anticipates submitting a Notice of Intent (NOI) to the Ohio EPA for authorization of storm water discharges associated with construction activity under the NPDES. In addition, multiple highway crossing permits will be required.

As described in Section 4906-5-08(B), the field delineation effort did not identify any wetlands within100 feet of the Preferred Transmission Route, the Alternate Route, and the laydown yard. The Preferred Transmission Route has been designed to minimize impacts to waterbodies to the extent practicable, by placing poles in uplands and spanning wetlands.

The Applicant will be responsible for obtaining all applicable permits and authorizations prior to the commencement of construction activities. Copies of the permits and authorizations will be provided to Staff within seven days of issuance or receipt by the Applicant.

(2) Debris

A variety of debris will be generated during construction of the Facility; these waste materials will be properly disposed of in accordance with any local, state, or federal requirements. As construction work proceeds, the ROW and area surrounding the laydown yard will be kept clean of all rubbish and debris resulting from Transmission Line construction activities. Debris associated with construction of the Transmission Line is expected to consist of conductor scrap, construction material packaging (including pallets, cartons, boxes, insulator crates, conductor reels and wrapping), wire scraps, and used storm water erosion control materials. Construction materials with salvage value will be removed from the construction area for reuse or salvage. Construction debris will be hauled away in construction dumpsters and disposed of in accordance with state and federal requirements. It is estimated that construction of the Transmission Line will only result in minimal debris (e.g., packaging materials).

(3) Stormwater and Erosion Control Plans

A stringent soil erosion and sedimentation control plan will be developed and implemented as part of the SWP3 required by the NPDES General Permit for the Facility. The SWP3 will address all minimum components of the NPDES permit, and conform to the specifications of the Rainwater and Land Development manual, which describes Ohio's standards for storm water management, land development, and urban stream protection. The SWP3 will identify potential sources of pollution that may reasonably be expected to affect

the quality of storm water discharges associated with construction activities. If applicable, the SWP3 will clearly identify all activities that will be authorized under Section 401 of the Clean Water Act and be subject to an anti-degradation review.

The SWP3 will also describe and ensure the implementation of best management practices that reduce pollutants in storm water discharges during construction. To protect surface waters, wetlands, groundwater, and storm water quality, erosion and sediment control measures will be installed and maintained throughout site development. Such measures could include silt fence, hay bales, and/or temporary siltation basins. The location of these features will be detailed on the construction drawings, approved by the Ohio EPA as part of the NPDES review, and reviewed by the contractor prior to construction. A duly qualified, Staff-approved environmental specialist will inspect these features throughout the period of construction to assure that they are functioning properly until completion of all restoration work (final grading and seeding). Based upon field conditions, additional sediment and erosion control measures may be required, beyond what is depicted on the drawings.

(4) Disposition of Contaminated Soil and Hazardous Materials

All materials stored on-site shall be kept in a neat, orderly manner in appropriate tightly sealed and clearly labeled containers. Manufacturer's recommendations for proper use and disposal will be followed. Material Safety Data Sheets (MSDS) will be retained and available on-site at all times. All sanitary waste will be collected in portable units and emptied regularly by a licensed sanitary waste management contractor.

In addition, a Spill Prevention, Control, and Countermeasure (SPCC) Plan will be prepared that outlines procedures to be implemented to prevent the release of hazardous substances into the environment. This plan will not allow refueling of construction equipment within 100 feet of any stream or wetland, and contractors will be required to keep materials on hand to control and contain a petroleum spill, including a shovel, tank patch kit, and oil-absorbent materials. Any spills will be cleaned up immediately after discovery and reported in accordance with Federal and Ohio EPA Division of Emergency and Remedial Response regulations. In addition, any contaminated soil or hazardous material generated from clearing of land would be disposed of in accordance with the SPCC Plan.

(5) Height of Tallest Structure

As described above, aboveground pole heights will range from 100 to 130 feet. Additionally, no structures associated with either the Transmission Line or laydown yard are anticipated to exceed 130 feet in above ground height, and therefore, FAA/ODOT jurisdiction will not apply.

(6) Plans for Construction during Dusty or Muddy Soil Conditions

The SWP3 will include provisions that address construction during both excessively dusty and excessively muddy conditions. These measures are briefly described below.

Dust Control

Best management practices will be utilized and implemented to comply with fugitive dust control rules and minimize the amount of dust generated by construction activities. In addition, the extent of exposed/disturbed areas on the site at any one time will be minimized and restored/stabilized as soon as possible. Water or a dust suppressant such as calcium carbonate will be used to suppress dust on unpaved roads (public roads as well as Facility access roads) as needed throughout the duration of construction activities. Any unanticipated construction-related dust problems will be identified and immediately reported to the construction manager and contractor.

Excessively Muddy Conditions

Construction entrances will be established and maintained to a condition which will prevent tracking or flowing of sediment onto public roads and ROWs. The SWP3 will provide guidance on the need to grade construction entrances to provide positive drainage and avoid the formation of standing water. Should muddy soils develop, stabilization measures may be employed, including the placement of dry materials, such as soil or gravel, to lower the overall water content. Any sediment spilled, dropped, washed, or tracked onto public roads or ROWs will be removed immediately.

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Summary: Application Part 1 of 4, Letter, Affidavit, Narrative electronically filed by Christine M. T. Pirik on behalf of Paulding Wind Farm IV LLC