Staff Report of Investigation

Vinton Solar Energy Facility
Vinton Solar Energy LLC

Case No. 17-0774-EL-BGN

July 5, 2018

Ohio | Power Siting Board

John R. Kasich, Governor | **Asim Z. Haque,** Chairman

In the Matter of the Application of Vinton Solar Energy LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Vinton County, Ohio.	**)** **)** **)** **)**	**Case No. 17-0774-EL-BGN**

Staff Report of Investigation

Submitted to the
OHIO POWER SITING BOARD

BEFORE THE POWER SITING BOARD OF THE STATE OF OHIO

In the Matter of the Application of Vinton Solar Energy LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Vinton County, Ohio.	**)** **)** **)** **)**	**Case No. 17-0774-EL-BGN**

Chairman, Public Utilities Commission
Director, Department of Agriculture
Director, Development Services Agency
Director, Environmental Protection Agency
Director, Department of Health
Director, Department of Natural Resources
Public Member
Ohio House of Representatives
Ohio Senate

To the Honorable Power Siting Board:

In accordance with the Ohio Revised Code (R.C.) 4906.07(C) and rules of the Ohio Power Siting Board (Board), the staff of the Public Utilities Commission of Ohio (Staff) has completed its investigation in the above matter and submits its findings and recommendations in this Staff Report for consideration by the Board.

The findings and recommendations contained in this report are the result of Staff coordination with the following agencies that are members of the Board: Ohio Environmental Protection Agency, the Ohio Department of Health, the Ohio Development Services Agency, the Ohio Department of Natural Resources, and the Ohio Department of Agriculture. In addition, Staff coordinated with the Ohio Department of Transportation, the Ohio Historic Preservation Office, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the Federal Aviation Administration.

In accordance with R.C. 4906.07(C) and 4906.12, copies of this Staff Report have been filed with the Docketing Division of the Public Utilities Commission of Ohio and served upon the Applicant or its authorized representative, the parties of record, and pursuant to Ohio Administrative Code 4906-3-06, the main public libraries of the political subdivisions in the project area.

The Staff Report presents the results of Staff's investigation conducted in accordance with R.C. Chapter 4906 and the rules of the Board, and does not purport to reflect the views of the Board nor should any party to the instant proceeding consider the Board in any manner constrained by the findings and recommendations set forth herein.

Respectfully submitted,

Tamara S. Turkenton
Director, Rates and Analysis
Public Utilities Commission of Ohio

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I. POWERS AND DUTIES

OHIO POWER SITING BOARD

The authority of the Ohio Power Siting Board (Board) is prescribed by Ohio Revised Code (R.C.) Chapter 4906. R.C. 4906.03 authorizes the Board to issue certificates of environmental compatibility and public need for the construction, operation, and maintenance of major utility facilities defined in R.C. 4906.01. Included within this definition of major utility facilities are: electric generating plants and associated facilities designed for, or capable of, operation at 50 megawatts (MW) or more; electric transmission lines and associated facilities of a design capacity of 100 kilovolts (kV) or more; and gas pipelines greater than 500 feet in length and more than nine inches in outside diameter, and associated facilities, designed for transporting gas at a maximum allowable operating pressure in excess of 125 pounds per square inch. In addition, pursuant to R.C. 4906.20, the Board authority applies to economically significant wind farms, defined in R.C. 4906.13(A) as wind turbines and associated facilities with a single interconnection to the electrical grid and designed for, or capable of, operation at an aggregate capacity of five MW or greater but less than 50 MW.

Membership of the Board is specified in R.C. 4906.02(A). The voting members include: the Chairman of the Public Utilities Commission of Ohio (PUCO) who serves as Chairman of the Board; the directors of the Ohio Environmental Protection Agency (Ohio EPA), the Ohio Department of Health, the Ohio Development Services Agency, the Ohio Department of Agriculture, and the Ohio Department of Natural Resources (ODNR); and a member of the public, specified as an engineer, appointed by the Governor from a list of three nominees provided by the Ohio Consumers' Counsel. Ex-officio Board members include two members (with alternates) from each house of the Ohio General Assembly.

NATURE OF INVESTIGATION

The Board has promulgated rules and regulations, found in Ohio Administrative Code (Ohio Adm.Code) 4906:1-01 et seq., which establish application procedures for major utility facilities and economically significant wind farms.

Application Procedures

Any person that wishes to construct a major utility facility or economically significant wind farm in this state must first submit to the Board an application for a certificate of environmental compatibility and public need.[1] The application must include a description of the facility and its location, a summary of environmental studies, a statement explaining the need for the facility and how it fits into the Applicant's energy forecasts (for transmission projects), and any other information the Applicant or Board may consider relevant.[2]

Within 60 days of receiving an application, the Chairman must determine whether the application is sufficiently complete to begin an investigation.[3] If an application is considered complete, the Board or an administrative law judge will cause a public hearing to be held 60 to 90 days after the

1. R.C. 4906.04 and 4906.20.
2. R.C. 4906.06(A) and 4906.20(B)(1).
3. Ohio Adm.Code 4906-3-06(A).

official filing date of the completed application.[4] At the public hearing, any person may provide written or oral testimony and may be examined by the parties.[5]

Staff Investigation and Report

The Chairman will also cause each application to be investigated and a report published by the Board's Staff not less than 15 days prior to the public hearing.[6] The report sets forth the nature of the investigation and contains the findings and conditions recommended by Staff.[7] The Board's Staff, which consists of career professionals drawn from the staff of the PUCO and other member agencies of the Board, coordinates its investigation among the agencies represented on the Board and with other interested agencies such as the Ohio Department of Transportation (ODOT), the Ohio Historic Preservation Office (OHPO), and the U.S. Fish and Wildlife Service (USFWS).

The technical investigations and evaluations are conducted pursuant to Ohio Adm.Code 4906-1-01 et seq. The recommended findings resulting from Staff's investigation are described in the Staff Report pursuant to R.C. 4906.07(C). The report does not represent the views or opinions of the Board and is only one piece of evidence that the Board may consider when making its decision. Once published, the report becomes a part of the record, is served upon all parties to the proceeding and is made available to any person upon request.[8] A record of the public hearings and all evidence, including the Staff Report, may be examined by the public at anytime.[9]

Board Decision

The Board may approve, modify and approve, or deny an application for a certificate of environmental compatibility and public need.[10] If the Board approves, or modifies and approves an application, it will issue a certificate subject to conditions. The certificate is also conditioned upon the facility being in compliance with applicable standards and rules adopted under the Ohio Revised Code.[11]

Upon rendering its decision, the Board must issue an opinion stating its reasons for approving, modifying and approving, or denying an application for a certificate of environmental compatibility and public need.[12] A copy of the Board's decision and its opinion is memorialized upon the record and must be served upon all parties to the proceeding.[13] Any party to the proceeding that believes its issues were not adequately addressed by the Board may submit within 30 days an application for rehearing.[14] An entry on rehearing will be issued by the Board within 30 days and may be appealed within 60 days to the Supreme Court of Ohio.[15]

4. R.C. 4906.07(A) and Ohio Adm.Code 4906-3-08.
5. R.C. 4906.08(C).
6. R.C. 4906.07.
7. Ohio Adm.Code 4906-3-06(C).
8. R.C. 4906.07(C) and 4906.10.
9. R.C. 4906.09 and 4906.12.
10. R.C. 4906.10(A).
11. R.C. 4906.10.
12. R.C. 4906.11.
13. R.C. 4906.10(C).
14. R.C. 4903.10 and 4906.12.
15. R.C. 4903.11, 4903.12, and 4906.12.

CRITERIA

Staff developed the recommendations and conditions in this *Staff Report of Investigation* pursuant to the criteria set forth in R.C. 4906.10(A), which reads, in part:

> The board shall not grant a certificate for the construction, operation, and maintenance of a major utility facility, either as proposed or as modified by the board, unless it finds and determines all of the following:
>
> (1) The basis of the need for the facility if the facility is an electric transmission line or gas pipeline;
>
> (2) The nature of the probable environmental impact;
>
> (3) That the facility represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, and other pertinent considerations;
>
> (4) In the case of an electric transmission line or generating facility, that the facility is consistent with regional plans for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems and that the facility will serve the interests of electric system economy and reliability;
>
> (5) That the facility will comply with Chapters 3704, 3734, and 6111 of the Revised Code and all rules and standards adopted under those chapters and under sections 1501.33, 1501.34, and 4561.32 of the Revised Code. In determining whether the facility will comply with all rules and standards adopted under section 4561.32 of the Revised Code, the board shall consult with the office of aviation of the division of multi-modal planning and programs of the department of transportation under section 4561.341 of the Revised Code;
>
> (6) That the facility will serve the public interest, convenience, and necessity;
>
> (7) In addition to the provisions contained in divisions (A)(1) to (6) of this section and rules adopted under those divisions, what its impact will be on the viability as agricultural land of any land in an existing agricultural district established under Chapter 929 of the Revised Code that is located within the site and alternative site of the proposed major utility facility. Rules adopted to evaluate impact under division (A)(7) of this section shall not require the compilation, creation, submission, or production of any information, document, or other data pertaining to land not located within the site and alternative site; and
>
> (8) That the facility incorporates maximum feasible water conservation practices as determined by the board, considering available technology and the nature and economics of the various alternatives.

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II. APPLICATION

APPLICANT

On July 5, 2017, Vinton Solar Energy, LLC (the Applicant), a wholly-owned subsidiary of Invenergy Solar Development North America LLC, filed an application with the Board to construct a solar-powered electric generation facility of up to 125 MW, located in Vinton County, Ohio. Invenergy Solar Development North America LLC is an affiliate of Invenergy Renewables LLC, which in turn is an affiliate of Invenergy LLC (Invenergy).

Invenergy develops, builds, owns, and operates power generation and energy storage projects in North America and Europe. Its portfolio includes wind, solar and natural gas-fueled power generation and energy storage facilities. It is one of the six largest owners of wind generation in the United States and is North America's largest independent wind power generation company.[16]

According to Invenergy, the company has developed 10,071 MW of wind farms; 5,519 MW of natural gas-fueled facilities; 231 MW of solar projects; and, 94 MW of energy storage facilities. The company also has nearly 4,000 MW of renewable and clean energy projects under contract or in construction.

HISTORY OF THE APPLICATION

On March 20, 2017, the Applicant filed a pre-application notification letter regarding the project.

On April 5, 2017, the Applicant held a public informational meeting for the project in McArthur, Ohio.

On July 5, 2017, the Applicant filed the application for the Vinton Solar Facility.

On August 16, 2017, the Applicant filed a supplement to the Vinton Solar Facility application providing additional information. Specifically, the Applicant provided information on a decommissioning report, construction and operational sound levels, location of noise-sensitive areas within 1 mile of the facility, and the mitigation of sound emissions during construction and operation.

On September 5, 2017, the Director of the Rates and Analysis Department of the Public Utilities Commission of Ohio (PUCO) issued a letter of compliance regarding the application to the Applicant.

On October 3, 2017, the Applicant filed responses to Staff's first set of interrogatories.

On October 17, 2017, the Ohio Farm Bureau Federation filed a Motion to Intervene. This Motion was granted by the Administrative Law Judge on June 21, 2018.

On October 26, 2017, the Applicant filed responses to Staff's second set of interrogatories.

16. "Company Overview of Invenergy LLC," *Bloomberg*, accessed November 7, 2017, https://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=4850990&goback=.cps_12367151001 55_1.

On November 13, 2017, the Applicant filed responses to Staff's third set of interrogatories.

On November 16, 2017, the Applicant filed a motion to toll the procedural time line, which was granted by the Administrative Law Judge on November 17, 2017.

On February 28, 2018, the Applicant filed a supplement to the Application, adding the option of utilizing a tracking system for the solar panels, in addition to the previously filed fixed panel option.

On June 18, 2018, the Applicant filed a supplement to the Application, specifically the System Impact Study (SIS) for the project.

On June 21, 2018, the Applicant filed responses to Staff's fourth set of interrogatories.

On June 21, 2018, the Administrative Law Judge issued a revised procedural timeline for the project. A local public hearing for this case is to be held on Tuesday, July 24, 2018 at 6:00 p.m., at the Vinton County Community Building, 31935 State Route 93, McArthur, Ohio 45651. The adjudicatory hearing will commence on Wednesday, August 1, 2018 at 10:00 a.m., 11th floor, Hearing Room 11-D, at the offices of the Public Utilities Commission of Ohio, 180 E. Broad St., Columbus, Ohio 43215-3793.

This summary of the history of the application does not include every filing in case number 17-0774-EL-BGN. The docketing record for this case, which lists all documents filed to date, can be found online at http://dis.puc.state.oh.us.

PROJECT DESCRIPTION

The Applicant proposes to construct, own, and operate a solar-powered electric generation plus advanced battery storage facility of up to 125 megawatt (MW) in Vinton County, Ohio. The proposed facility would interconnect to the regional electrical system through an adjacent substation (AEP Ohio's Elk 138 kV Substation).

The proposed project area layout is shown in the maps in this report. The maps depict the layouts for both the solar panel fixed array and tracking systems.

Project Area

The proposed project would be located on approximately 1,950 acres of pasture land near the village of McArthur in Vinton County, Ohio. The project area and proposed facilities are shown on the map on pages 9 and 10 of this report. Although the entire site encompasses approximately 1,950 total acres, 658 acres would be utilized for the solar farm (maximum amount to be utilized if the fixed array panel system were chosen by the Applicant). Slightly less acreage would be utilized for the tracking system layout if chosen by the Applicant.

Facility Description

The proposed facility would consist of multiple photovoltaic arrays connected to a network of electrical infrastructure that would transmit generated electricity to a substation. The electrical infrastructure would consist of inverters, transformers, buried collection conductors, and a collector substation. The proposed facility would also include access roads, fencing, and an operations and maintenance building.

Pile driving would be used to install the racking system to which the photovoltaic panels would be mounted. Two types of racking systems would be considered and evaluated for installation. The first racking system proposed would not have sun-tracking capabilities, but would be oriented in east-west rows facing south with a fixed tilt. The second racking system would consist of a single axis tracking system. The facility would be oriented north-south arrays enabling the panels to follow the sun from east to west. Cables would carry direct current to the terminus of each racking system to a combiner box. The cables from the combiner boxes would transmit the direct current to inverters. Once the direct current is converted to alternating current, it would be passed through a transformer and transmitted at 34.5kV through buried conductors to the project substation.

The project substation would contain all the necessary components to deliver the generated electricity into the interconnection transmission system. The substation would be located within the project boundary. The point of interconnection would connect directly to AEP Ohio's Elk 138kV Substation.

The estimated net capacity factor for the facility would be approximately 22%, and the projected annual generation is estimated to be 241,200 MWh.

Generation Equipment

The facility would generate direct current power using Tier-1 photovoltaic modules. The dimensions of each module would be 3.25 feet by 6.5 feet by 1.6 inches thick. The modules would be no less than 18 inches from the ground.

Battery Storage

The Project would include a large-scale advanced battery system up to 42 MW. The battery storage facility would complement the solar farm by regulating frequency, balancing variations in solar production, energy shifting, and digital peaking and/or transmission and distribution deferral. The advanced battery system will consist of lithium-ion battery racks (or equivalent) housed in a custom building or prefabricated shipping containers and interconnect to the AEP Ohio Elk substation.

Water Usage

Water would be used for site preparation, grading activities, concrete foundations, and dust control. Both potable and non-potable water would come from an off-site source as needed.

Electric Transmission Lines

From the photovoltaic modules, strings of collector wires would be consolidated to a single conductor inside a combiner box. The conductors leaving the combiner boxes would be buried, and would connect to inverters, and then to transformers. The conductors downstream of the inverters and transformers would also be buried, and connect to the project substation. A 138kV transmission line would connect the project substation to a point of interconnection at the existing AEP Ohio Elk Substation. This approximately 0.2 mile transmission line would be the subject of a separate OPSB filing, and is not considered in this Staff Report of Investigation.

Permanent Meteorological Towers

The facility would include 1 meteorological tower for every 15MW of solar capacity. Each tower would be 10 feet tall and include various weather monitoring equipment such as anemometers,

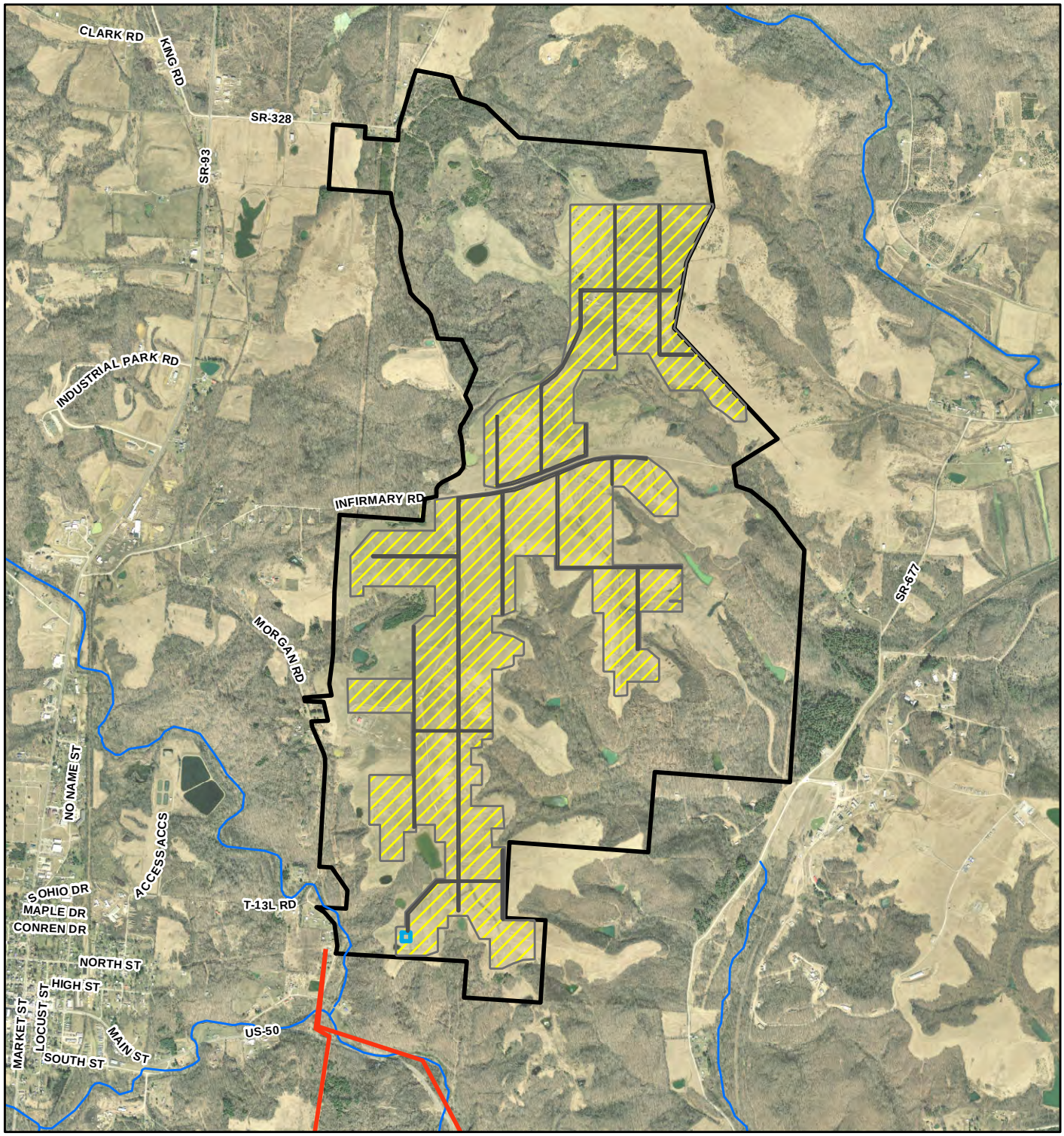
wind vanes, pyranometers, pressure sensors, and thermometers. These towers would be located within the project area, and typically would be installed next to the inverters.

Construction Laydown Areas

The Applicant intends to utilize approximately seven to ten acres as the project laydown area. The potential sites for the laydown area would be located within the project area. The laydown area would contain contractor trailers, parking, and a graveled staging area for construction equipment and material. Best Management Practices would be used in the management of the laydown area. Once the project is completed, the laydown area would be removed and the land would be reclaimed.

Access Roads and Security

Access roads would be graded into the terrain and covered with four inches of aggregate. The roads would be approximately 20 feet wide. A seven foot chain link fence would be used to enclose the facility, and would surround a maximum of 658 acres of solar equipment (not the entire 1,950 acres of land). Gates would control access to the site, and high voltage equipment would be isolated within the project area using fencing and warning signage. A control enclosure (O&M building) would be used to house protective relay and communications equipment as well as project documents.



Vinton County

NORTH

0 1,500 3,000

Feet

1:30,000

NAD 83 SP Ohio South (Feet)

- Existing Transmission Lines
- Access Roads
- Rivers
- Fixed Solar Array
- Substation
- Project Boundary

Fixed Array Overview Map

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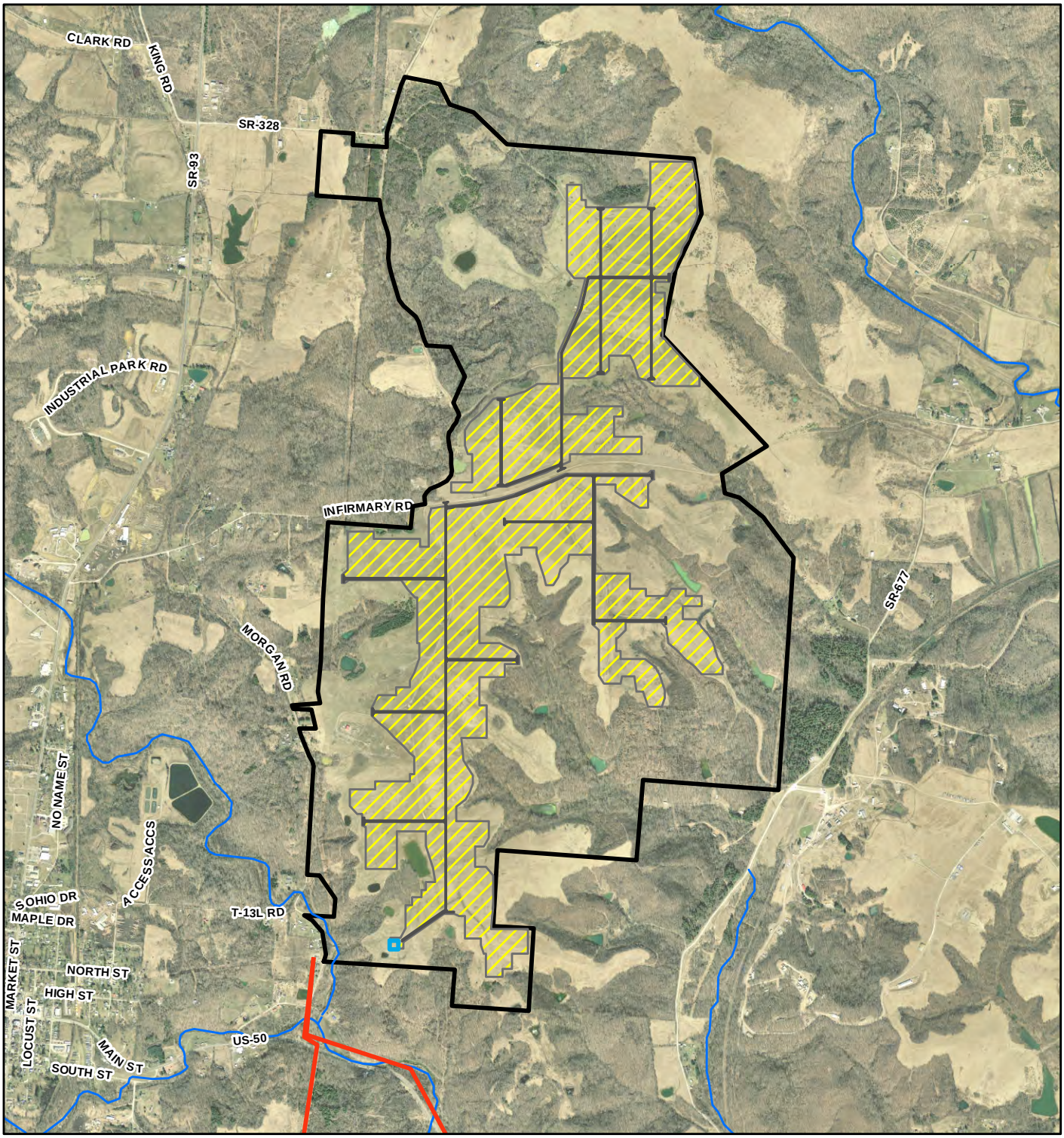
Vinton Solar Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



Vinton County

NORTH

0 1,500 3,000

Feet

1:30,000

NAD 83 SP Ohio South (Feet)

- Access Roads
- Existing Transmission Lines
- Rivers
- Substation
- Proposed Solar Tracking System
- Project Boundary

Tracking System Overview Map

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Vinton Solar Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.

III. CONSIDERATIONS AND RECOMMENDED FINDINGS

In the Matter of the Application of Vinton Solar Energy LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Vinton County, Ohio, Staff submits the following considerations and recommended findings pursuant to R.C. 4906.07(C) and 4906.10(A).

Considerations for R.C. 4906.10(A)(1)

BASIS OF NEED

Pursuant to R.C. 4906.10(A)(1), the Board must determine the basis of the need for the facility only if the facility is an electric transmission line or gas pipeline. Staff has found this requirement inapplicable to this application.

Recommended Findings

Staff recommends that the Board find that the basis of need as specified under R.C. 4906.10(A)(1) is not applicable to this proposed electric generating facility, because the facility is neither an electric transmission line nor a gas pipeline.

Considerations for R.C. 4906.10(A)(2)

NATURE OF PROBABLE ENVIRONMENTAL IMPACT

Pursuant to R.C. 4906.10(A)(2), the Board must determine the nature of the probable environmental impact of the proposed facility. Staff has found the following with regard to the nature of the probable environmental impact:

Socioeconomic Impacts

Demographics

The proposed facility is located in Vinton County. In 2010, the population of Vinton County was 13,430, and the population density was 32.6 per square mile.[17] The 2010 population of Ohio was 11,536,725, and the population density was 282.3 per square mile. Further, the population of Vinton County is only projected to increase approximately 0.014 percent between 2010 and 2020.[18] The facility is unlikely to limit future population growth or have a measurable impact on the demographics of the region as the project area would be limited to a single property.

Regional Planning

Vinton County is a member of the Ohio Valley Regional Development Commission (OVRDC).[19] Overall, the Project is consistent with the goals highlighted by the OVRDC's Comprehensive Economic Development Strategy Performance Report. The Project is not expected to significantly impact housing, transportation system development, or other public services and facilities.

Land Use

The Applicant proposes to construct the project on a parcel totaling approximately 1,950 acres of leased land. The Applicant plans to utilize a maximum of 658 acres for the solar modules. The project would include access roads, 7-foot-high fencing, racking posts, a racking system, PV modules, inverters/transformers, an underground alternating AC collection system, a collector substation, and an O&M building. The access roads would be approximately 20 feet wide and would have aggregate as cover, adequate to support the size and weight of construction, maintenance, and rescue vehicles.

Throughout the construction period, the Applicant's contractor would provide temporary construction facilities: contractor construction trailer(s), space for subcontractor trailers and parking, and a graveled laydown area. The laydown area will be approximately 7-10 acres and would be reclaimed at the end of construction.

Of the land uses on the Project Site, all parcels are designated by Vinton County as either Other Agricultural Use or Agricultural Vacant Land. The Applicant would use the majority of this agricultural land for the purposes of generating solar energy. Approximately 33% of the project

17. United States Census Bureau, "State and County Quick Facts: Vinton County, OH," accessed August 17, 2017, https://www.census.gov/quickfacts/fact/table/vintoncountyohio/PST045216.

18. Ohio Development Services Agency, "Population Characteristics and Projections: 2010 to 2040 Projected Population for Ohio Counties," accessed August 17, 2017, https://development.ohio.gov/files/research/P6090.pdf.

19. Application at p. 74-75.

area would be temporarily impacted during construction, while 1.6% of the project area would be permanently impacted after construction.[20]

The majority of land to be used for the project is agricultural in nature, none of which is listed as an Agricultural District in Vinton County. The project area boundary is located approximately 1,500 feet east of the Village of McArthur, at its closest point. There is a substantial land buffer between the perimeter of the project boundary and the perimeter fence of the project. In some locations the buffer is as wide as 2,000 to 3,000 feet.

There are 46 residences located within 1,000 feet of the project boundary, 11 of which are actually within 1,000 feet of the fenceline. No residences are located within 100 feet of the fenceline. The residence located nearest to the surrounding fenceline is approximately 440 feet away. [21]

There are no residences, parks, commercial or institutional structures, nor places of worship located within the project site. According to Table 8 of the application, four structures are located within the project site. Three of these structures, all sheds and small barns used for cattle production, would be removed from the site for the construction and operation of this project. The fourth structure, also a shed, may remain. No residential structures would be removed for this project.

Zaleski State Forest and the Vinton Furnace State Forest are located east of the project. The Applicant states that it is unlikely that the project would be visible from these areas due to its low profile, density of surrounding woodlots and terrain.

Cultural Resources

The Applicant enlisted a consultant to complete a cultural resources records review for the Area of Potential Effect (APE), defined as the 658 acre area of disturbance. This review was based on data provided by the Ohio Historic Preservation Office's (OHPO) online GIS mapping, Ohio Historic Inventory (OHI), the Ohio Archaeological Inventory (OAI), and National Register of Historic Places (NRHP) files. Additionally, information was obtained on historic cemeteries from the Ohio Genealogical Society (OGS). The consultant found that four Phase I archaeology surveys had previously been performed within the two mile project study area. The Applicant identified 434 archaeological resources that were previously documented within the five mile radius of the project. Of the 434 resources, 101 were located within one mile of the project area, and 22 were located within the APE.

The APE for architectural resources was defined as a five-mile radius around the proposed solar project. There were five NRHP listed architectural resources within the five mile radius, and 351 resources listed in the AOI. The majority of these architectural resources are located within the town of Zaleski and the village of McArthur. None of the architectural resources are located within the project site. [22]

Due to the nature of the project site as a previously disturbed mining property, and due to the wooded and sloped nature of the surrounding area, the Applicant states that the project is expected

20. Ibid., p. 73.
21. Second set of Interrogatories filed by the Applicant, October 26, 2017.
22. Application at Exhibit M: TRC Cultural Resources Records Report.

to have a minimal impact on architectural and archaeological landmarks. No inhabited dwellings (NRHP or otherwise) would need to be removed as part of this project.

In order to ensure minimal effects from the construction and operation of this project on cultural resources, a limited archaeological and architectural Phase I survey is planned for those portions of the project area where previous surveys were not performed, and where architectural resources may be visible from the site. As of the writing of this report, the Applicant was in the process of designing a systematic Phase I survey program for the project in conjunction with input from the OHPO. Staff concurs that a Phase I study should be performed for both archaeological and adjacent architectural resources of this project in order to ensure minimal impacts.

Aesthetics

The project site is elevated from the surrounding community and is generally along the ridgetop of a network of hills approximately centered between State Route 93 to the west of the project, U.S. Highway 50 to the south of the Project, and State Route 667 to the east of the project. The primary landscape alteration would be the facility itself, which would consist of solar panels less than 15 feet tall.[23]

The project area is generally surrounded by dense forest and rolling hills, which naturally would reduce visibility of the facility. The expected visibility impact would be minimal, but the solar panel modules would employ anti-glare coating which would reduce the potential for glare. Glare is discussed more extensively in the next section of this report.

The highest elevation of the solar panels would be fifteen feet above ground level. Based on the results of a viewshed analysis conducted by the Applicant, the solar panels would likely not be visible at locations beyond two miles of the perimeter of the project. [24] Whether viewing the solar panels has a positive or negative impact on the receptor is subjective, and likely to vary by viewer. Steps to be taken by the Applicant to minimize the visibility of the project include fencing and using minimal lighting necessary to satisfy safety requirements. Staff recommends the Applicant incorporate a landscape and aesthetics plan to reduce impacts in areas where an adjacent non-participating parcel contains a residence with a direct line of sight to the project area. Staff recommends that aesthetic impact mitigation include native vegetative plantings, good neighbor agreements, or other methods subject to Staff review.

Glare

Glare is the phenomenon where sunlight reflects from a solar panel to create a long duration of bright light. Glare also encompasses glint, which is a momentary flash of bright light. The potential impacts of this reflection from solar panels can cause a brief loss of vision, a safety risk to pilots, or be a nuisance to neighbors.

The Applicant contracted with Forge Solar to conduct a glare analysis. Observation points were selected to examine the potential for glare relative to the nearby roadways and the Vinton County Airport. The Applicant has located the project in a remote rural location, which minimizes potential visual impacts. The Applicant states that the coating will maximize the amount of solar energy that the panels capture, which it expects to reduce the potential for glare. The anti-reflective coating is a thin, silicon-based film applied to the top surfaces of both the individual solar cells

23. Ibid., 78-79.
24. Ibid., 77.

and the glass during the manufacturing process. Also during the manufacturing process, the solar cells and glass receive a light texture to help scatter light into the cells.

In accordance with R.C. 4906.10(A)(5), Staff contacted the ODOT Office of Aviation during the review of this application in order to coordinate review of potential impacts of the facility on local airports. The ODOT Office of Aviation staff stated that it is likely this proposed solar farm development will not be an airspace permit issue. In addition, they stated that they were reasonably satisfied with the glare analysis.

Staff's previously recommended landscape and aesthetics plan would also help to reduce the potential for negative impacts from glare.

Economics

The Applicant filed the applicable capital and intangible costs, as well as estimated annual operation and maintenance costs, under seal. It appears that the economic data submitted under seal meet the requirements set forth in Ohio Adm. Code 4906-4-06. An Economic Impact Report submitted as Exhibit H in the application, provided further review that included estimated impacts of the construction and operation phases of the facility. These estimated impacts include:

- The project could create 225 on-site construction jobs in Vinton County plus four annual operations jobs.[25]
- Construction wages or earnings could produce $10.6 million in income to the Vinton County area, plus operations could add an additional annual area impact of $210,000.[26]
- The construction phase of the project would add $29.9 million in economic output to the Vinton County area. Operation of the facility would add approximately $460,000 on an annual basis.[27]
- The estimated annual tax revenue from the project, based on an assumed payment in lieu of taxes (PILOT) agreement, would be $780,000, to be distributed among various taxing districts in the area.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the **Socioeconomic Conditions** heading of the Recommended Conditions of Certificate section.

Ecological Impacts

Geology and Seismology

The bedrock that underlies Vinton County consists of sedimentary rock of Mississippian and Pennsylvanian age. The Mississippian System formed as early as 345 million years ago and is comprised of the Cuyahoga and Logan Formations. The Cuyahoga Formation consists of Cuyahoga shale overlain by Blackhand sandstone. The Logan Formation is made up of a combination of sandstone, shale, and conglomerate. Overlying the Mississippian age rocks, the Pennsylvanian System formed about 325 million years ago and consists of the Conemaugh,

25. Ibid., Exhibit H: Economic Impact Report.
26. Ibid., Exhibit H, p. 12.
27. Ibid., p. 13.

Allegheny, and Pottsville Formations. These formations consist of sandstone, shale, limestone, and coal.

The older Mississippian rock is exposed in the western part of Vinton County. The younger Pennsylvanian rock is exposed in the eastern part and is the dominant rock that outcrops in the county. Pennsylvanian age rocks are the rocks exposed at the project area.

The project area has been affected in the past by both surface and underground mining for coal. Coal seams mined in this area were the Brookville (#4) coal, Clarion (#4a) coal, Lower Kittanning (#5) coal, and the Middle Kittanning (#6) coal. There are no active mining operations within the project area.

Staff reviewed the state of Ohio database and interactive map for oil and gas drilling and exploration in Vinton County for this project site. Although there are a few abandoned and plugged wells in the vicinity of the project area, there are no current oil and gas drilling operations within the project area.

Soil Suitability and Test Borings

The soils in the project area, as characterized in the *Soil Survey of Vinton County, Ohio* generally consist predominantly of silt loam. The BhB – Bethesda silt loam, 0 to 8 percent slopes, reclaimed, is the largest mapped unit in the project area and it consists of a very deep, well drained soil generally found on summits. In other areas to a lesser amount, the mapped soil unit is the BhC – Bethesda silty clay loam, 8 to 20 percent slope; and the WhE – Wharten-Latham silt loam, 25 to 40 percent slopes.

These soils were stripped and then resurfaced in most of the project area. The Applicant noted that even though much of the project site is currently used as pasture, less than 1% of the project area is considered prime farmland. These soils have moderately slow permeability, low shrink-swell potential, and moderate frost action. Bethesda soils in particular are not prone to flooding. The Wharton-Latham soil is similar in soil properties with the exception that it has a high shrink-swell potential and a high potential for frost action.

The Applicant would provide Staff a preliminary geotechnical engineering report prior to the development of the final design. The test borings and report for the project site would include but not be limited to subsurface soil properties, static water level, rock quality description (RQD), percent recovery, and depth and description of bedrock contact. Mine spoil is the dominant soil type at the project site. With the variable depth around the project site, settlement issues may arise. The anticipated settlement considered at the project site is differential settlement that could cause serious damage and distortion to structures.

Differential settlement has a number of factors to consider including variability of fill quality, non-uniform distribution of loading and variations in depth of fill. Methods to address these factors are undercutting and replacement of mine spoil material, deep dynamic compaction, and deep soil mixture, etc., among other best management practices. Although additional drilling will be necessary for site-specific detailed information to incorporate into the final design and engineering, present site conditions should not adversely effect or prevent the construction, and future operation of this solar facility.

Surface Waters

The Applicant delineated 17 streams within the project area including five perennial streams, 11 intermittent streams, and one ephemeral stream. No stream crossings would be required for this project. Stream impacts would be limited to two streams totaling 935 linear feet of temporary impacts, such as stormwater runoff caused by construction activities.

The Applicant delineated 17 wetlands within the project area including five Category 2 wetlands and twelve Category 1 wetlands. Wetlands would not be crossed during construction. However, seven Category 1 and 2 wetlands totaling 2.18 acres may be temporarily impacted by such things as stormwater runoff caused by construction related activities.

The Applicant found 17 very small ponds within the project area. No ponds would be crossed during construction. However a total of 0.59 acre of temporary impacts to ponds may occur due to construction related activities. Additionally, the Applicant intends to utilize some or all of the ponds in the project area as stormwater basins where applicable.

The Applicant is currently coordinating with the Ohio Environmental Protection Agency (Ohio EPA) and the United States Army Corps of Engineers (USACE) to ensure that all anticipated wetland and stream impacts are properly permitted. The Applicant states the following permit(s) would be obtained as determined to be necessary after final engineering of the project is completed: an individual or nationwide permit under Section 404 of the Clean Water Act, a Water Quality Certification Section 401 permit from the Ohio EPA and, an Ohio Isolated Wetland Permit.

Additional measures to reduce water quality impacts would be taken through the development of a Storm Water Pollution Prevention Plan (SWPPP). If determined to be necessary, the Applicant would obtain a National Pollutant Discharge Elimination System (NPDES) permit from the OhioEPA for storm water discharge associated with construction activities, to help control potential sedimentation, siltation, and run-off. No proposed facility components are within the 100-year floodplain of the nearby streams.

Threatened and Endangered Species

The Applicant requested information from the ODNR and the USFWS regarding state and federal listed threatened and endangered plant and animal species. Staff gathered additional information through field assessments and review of published ecological information. The following table provides the results of the information requests, field assessments, and document review.

MAMMALS				
Common Name	**Scientific Name**	**Federal Status**	**State Status**	**Presence in Project Area**
Indiana bat	*Myotis sodalis*	Endangered	Endangered	Historical range includes the project area. Impacts not anticipated.
northern long-eared bat	*Myotis septentrionalis*	Threatened	N/A	Historical range includes the project area. Impacts not anticipated.
Black bear	*Ursus americanus*	N/A	Endangered	Historical range includes the project area. Impacts not anticipated.

REPTILES				
Common Name	**Scientific Name**	**Federal Status**	**State Status**	**Presence in Project Area**
Timber rattlesnake	*Crotalus horridus horridus*	Species of concern	Endangered	Historical range includes the project area. Impacts not anticipated.
AMPHIBIANS				
Common Name	**Scientific Name**	**Federal Status**	**State Status**	**Presence in Project Area**
Eastern hellbender	*Cryptobranchus alleganiensis alleganiensis*	Species of concern	Endangered	Historical range includes the project area. Potentially located in perennial streams within the project area.
Mud salamander	*Pseudotriton montanus*	N/A	Threatened	Historical range includes the project area. Impacts not anticipated.
MUSSELS				
Common Name	**Scientific Name**	**Federal Status**	**State Status**	**Presence in Project Area**
little spectaclecase	*Villosa lienosa*	N/A	Endangered	Historical range includes the project area. Impacts not anticipated.
FISH				
Common Name	**Scientific Name**	**Federal Status**	**State Status**	**Presence in Project Area**
Ohio lamprey	*Villosa lienosa*	N/A	Endangered	Historical range includes the project area. Potentially located in perennial streams within the project area.
Tippecanoe darter	*Etheostoma tippecanoe*	N/A	Threatened	Historical range includes the project area. Potentially located in perennial streams within the project area.
INSECTS				
Common Name	**Scientific Name**	**Federal Status**	**State Status**	**Presence in Project Area**
American burying beetle	*Nicrophorus americanus*	Endangered	Endangered	Historical range includes the project area. Impacts not anticipated.

The Applicant did not identify any listed plant or animal species during field surveys. Further, the ODNR and the USFWS did not identify any concerns regarding impacts to listed plant species. In the unexpected event that the Applicant encounters listed plant or animal species during construction, Staff recommends that the Applicant contact Staff, the ODNR, and the USFWS, as applicable. Staff also recommends that if the Applicant encounters any listed plant or animal species prior to construction, the Applicant include the location and how impacts would be avoided in the final access plan to be provided to Staff.

The project area is within the range of state and federal endangered Indiana bat (*Myotis sodalis*) and the federal threatened northern long-eared bat (*Myotis septentrionalis*). As tree roosting

species in the summer months, the habitat of these species may be impacted by the project. In order to avoid impacts to the Indiana bat and northern long-eared bat, Staff recommends the Applicant adhere to seasonal tree cutting dates of October 1 through March 31 for all trees 3 inches or greater in diameter, unless coordination efforts with the ODNR and the USFWS reflects a different course of action. The Applicant states that no tree clearing will be necessary for this project and therefore no impacts to these species are anticipated.

The project is within the range of several listed aquatic species. The ODNR Division of Wildlife (DOW) recommends no in-water work in perennial streams from April 15 through June 30 to reduce impacts to indigenous aquatic species and their habitat. The Applicant states that no in-water work is necessary for this project. Therefore no significant impacts to these species are anticipated.

The project lies within the range of the federal species of concern and state endangered timber rattlesnake (*Crotalus horridus horridus*), the state endangered black bear (*Ursus americanus*), and the federal and state endangered American burying beetle (*Nicrophorus americanus*). Due to the mobility of the species and lack of suitable habitat, no impacts to these species are anticipated.

Vegetation

The following table reflects the different vegetative communities present in the project area.

Vegetation Community Type	Total Disturbance (Acres)	Percent of Total Area (%)
Hay/Pasture	1,109	89
Forest	102	8
Roads	22	1
Wetlands	14	1
Open water	2	<1
Shrub/Scrub	1	<1
Total	1,250	100

The estimated vegetative cover includes the entire project area presented within the application. However permanent impacts associated with the project as planned to be developed in this filing would be limited to approximately 710 acres. Permanent vegetative impacts would occur primarily within grazed pastureland.

Additionally, the final design of the project would include the planting and maintenance of pollinator-friendly, native plantings in selected locations along the outside border of the solar fields. These features not only would enhance the visual appeal of the project. Pollinator-friendly plantings also would help reduce erosion, reduce fertilizer, herbicide and pesticide use, and discourage invasive species.

Staff recommends that the Applicant be required to provide a vegetation management plan for review prior to the preconstruction conference. The plan would identify all areas of proposed vegetation clearing for the project, specifying the extent of the clearing, and describing how such clearing work would be done as to minimize removal of woody vegetation. The plan would

describe how trees and shrubs along access routes, at construction staging areas, during maintenance operations, and in proximity to any other project facilities would be protected from damage. The plan would also describe the implementation of pollinator-friendly plantings and describe any planned herbicide use.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the **Ecological Conditions** heading of the Recommended Conditions of Certificate section.

Public Services, Facilities, and Safety

High Winds

The Applicant compiled wind velocity data collected by Ohio State University's Ohio Agricultural Research and Development Center (OSU-OARDC). The measurements were recorded at the OSU-OARDC site in Jackson, the site closest to the project area. The sensor height was higher than the height of the proposed facility's components. The Applicant found that there is a low probability of extreme high wind speeds in the project area. This low probability does not warrant that the Applicant mitigate for anticipated adverse impact from extreme high wind velocities.

Public Services and Traffic

The principal impact on public services would be minimal increases in traffic on routes leading to the project area. Some traffic management during the construction phase may be necessary in the immediate vicinity of the project area to ensure safe and efficient maintenance of existing traffic patterns and usages. The Applicant has committed to coordinating with local officials to ensure that the impacts associated with the increase in traffic will be minimal.

Once the proposed facility is operational, related traffic would be minimal and would not be expected to significantly impact local roadways. Potential emergency service requirements would be coordinated with local officials.

Roads and Bridges

Due to the location of the project, the Applicant anticipates that all project components would be delivered via truck. Access to the project area for most construction traffic would be from Highway 93. The Applicant completed a road survey that identified concerns associated with township and other local roads.

Staff recommends a requirement for the Applicant to develop a final Transportation Management Plan. Under such a plan, any damaged public roads and bridges would be repaired promptly to their previous condition by the Applicant under the guidance of the appropriate regulatory agency. Any temporary improvements would be removed unless the appropriate regulatory agency requests that they remain in place.

Noise

Noise impacts from construction activities would include site clearing, installation of mechanical and electrical equipment, and commissioning and testing of equipment. Many of the construction activities would generate significant noise levels during the 12-18 months of construction. However, the adverse impact of construction noise would be temporary and intermittent, would occur away from most residential structures, and would be limited to daytime working hours. The Applicant would use equipment mitigation practices such as maintaining engines and mufflers in

good operating order, limiting construction activities to daylight hours, and establishing a complaint resolution process.

Operational noise impacts for a solar generation facility would be small compared to a wind or fossil fuel generation facility and occur only during the day. Operational noise sources include inverters located within a group of solar panels, the step up transformer at the new substation, and tracking motors, if the applicant uses the proposed single axis tracking system.

The Applicant conducted a background ambient noise level study in order to understand the existing noise levels near the proposed facility. A solar generation facility only operates in the daytime. The average daytime ambient noise level for the project area is 43 dBA. The largest operational noise impact to a noise sensitive receptor is predicted to be 34 dBA for both the fixed-tilt racking option and the single axis tracking option. For the single axis tracking option, six receptors are modeled to have a 1 dBA increase compared to the fixed-tilt racking option. Therefore, with either racking option, the project would be expected to have minimal adverse noise impacts on the adjacent community.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the **Public Services, Facilities, and Safety Conditions** heading of the Recommended Conditions of Certificate section.

Recommended Findings

Staff recommends that the Board find that the Applicant has determined the nature of the probable environmental impact for the proposed facility, and therefore complies with the requirements specified in R.C. 4906.10(A)(2), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(3)

MINIMUM ADVERSE ENVIRONMENTAL IMPACT

Pursuant to R.C. 4906.10(A)(3), the proposed facility must represent the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, along with other pertinent considerations.

Site Selection

The Applicant evaluated key factors such as statewide transmission line locations and availability, landowner interest, community interest, competitive analysis, and evaluation of site suitability. The proposed site showed positive results from initial transmission studies, and the landowner showed interest in the project. Land rights were acquired in October 2016. In addition, the site's former use as a strip mine minimized potential environmental issues and limited the disruption of sensitive habitat. The proposed site received a positive reception from area landowners and community leaders, as evidenced at the public information meeting, where attendees were positive and no written comments were received.

Minimizing Impacts

The Applicant has sited and designed the Vinton Solar Center to minimize potential impacts. Of the approximately 1,950 acres of leased land, approximately 658 acres would be used for facility structures. Agricultural pasture land accounts for all of the land that would be impacted by the proposed facility.

Relatively few previously recorded cultural resources were identified in the immediate vicinity of the project. The Applicant is currently in the process of designing a systematic Phase I survey program for the project in conjunction with input from the OHPO to assure impacts to cultural resources would be minimized.

The proposed facility would have an overall positive impact on the local economy due to the increase in construction spending, wages, purchasing of goods and services, annual lease payments to the local landowner, and payment in lieu of taxes (PILOT) revenue. Estimated PILOT revenue could generate $780,000 annually for the 125 MW facility.

In order to minimize impacts to wetlands and streams, the Applicant has committed to using Horizontal Directional Drilling (HDD) to install the underground electric collection cable under most streams and wetlands as an avoidance measure, where possible. Construction of the facility would not require work within mapped 100-year floodplains.

Impacts to any state and federal listed species can be avoided by following seasonal restrictions for construction in certain habitat types as detailed by the USFWS and the ODNR.

Noise impacts are expected to be limited to construction activities. The adverse impact of construction noise would be temporary and intermittent, would occur away from most residential structures, and would be limited to daytime working hours.

During the construction period, local, state, and county roads would experience a temporary increase in truck traffic due to deliveries of equipment and materials. A final delivery route plan would be developed through discussions with local officials

Due to the low profile of the project combined with vegetation in the area, the visual impacts would be most prominent to landowners in the immediate vicinity of the facility itself. Through measures committed to by the Applicant as well as the Staff recommended landscape and aesthetics plan, aesthetic impacts would be minimized.

Conclusion

Staff concludes that the proposed project would result in both temporary and permanent impacts to the project area and surrounding areas. Based upon the low potential to adversely impact land use, cultural resources, surface water resources, wildlife, and Staff's recommended conditions to further mitigate these impacts, Staff concludes that the project represents the minimum adverse environmental impact.

Recommended Findings

Staff recommends that the Board find that the proposed facility represents the minimum adverse environmental impact, and therefore complies with the requirements specified in R.C. 4906.10(A)(3), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

CONSIDERATIONS FOR R.C. 4906.10(A)(4)

ELECTRIC GRID

Pursuant to R.C. 4906.10(A)(4), the Board must determine that the proposed electric facilities are consistent with regional plans for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems, and that the facilities will serve the interests of electric system economy and reliability. The purpose of this section of the report is to evaluate the impact of integrating the proposed Facility into the bulk power system (BPS).

The facility proposed by the Applicant is a solar photovoltaic generating facility located in Vinton County, capable of producing 125 megawatts (MW). The proposed Facility would interconnect to AEP Ohio's Elk 138 kV Substation.

NERC Planning Criteria

The North American Electric Reliability Corporation (NERC) is responsible for the development and enforcement of the federal government's approved reliability standards, which are applicable to all owners, operators, and users of the BPS. As an owner, operator, and/or user of the BPS, the Applicant is subject to compliance with various NERC reliability standards. NERC reliability standards are included as part of the system evaluations conducted by PJM.[28]

PJM

The Applicant submitted its generation interconnection request for the proposed Facility to PJM Interconnection, LLC (PJM) on October 10, 2016. PJM gave the application a queue position of AC1-194. The System Impact Study (SIS) was released by PJM in June 2018.

PJM studied the interconnection as an injection into American Electric Power's electric grid via the Elk 138 kV substation. The Applicant requested an injection of 125 MW, of which 47.5 MW could be available in the PJM capacity market. The capacity market ensures the adequate availability of necessary generation resources can be called upon to meet current and future demand.[29]

28. PJM Interconnection, LLC is the regional transmission organization charged with planning for upgrades and administrating the generation queue for the regional transmission system in Ohio. Generators wanting to interconnect to the bulk electric transmission system located in the PJM control area are required to submit an interconnection application for review of system impacts. The interconnection process provides for the construction of expansions and upgrades of the PJM transmission system, as needed to maintain compliance with reliability criteria with the addition of generation in its footprint.

29. PJM Interconnection, LLC, "System Impact Study, Queue Number AC1-194," accessed June 13, 2018, http://pjm.com/planning/generation-interconnection/generation-queue-active.aspx.

PJM Network Impacts

PJM analyzed the bulk electric system with the proposed facility interconnected to the BPS. A 2020 summer peak power flow model was used to evaluate the regional reliability impacts. The studies revealed no reliability problems. The below chart displays the results of the PJM SIS for the PJM regional footprint.[30]

PJM REGIONAL SYSTEM IMPACTS	
Generator Deliverability - System Normal & Single Contingency Outage	
Plant Output: Capacity Level – 47.5 MW	No problems identified
Category C and D - Multiple Contingency Outages	
Plant Output: 125 MW	No problems identified

Contribution to Previously Identified Overloads - Network Impacts

PJM studied overloading where the proposed Facility may affect earlier projects in the PJM Queue. The results identified no network impacts.

Potential Congestion due to Local Energy Deliverability- Energy Delivery Impacts

PJM studied the delivery of the energy portion. Network upgrades under this section would allow for the delivery of energy with operational restrictions. The upgrades are at the discretion of the Applicant. The results identified no energy delivery impacts.

Short Circuit Analysis

The short circuit analysis study, which is part of the System Impact Study, evaluates the interrupting capabilities of circuit breakers that would be impacted by the proposed generation addition. The results identified no circuit breaker problems.

Conclusion

PJM analyzed the bulk electric system, with the facility interconnected to the BPS, for compliance with NERC reliability standards and PJM reliability criteria. The PJM system studies indicated that no reliability violations would occur during single and multiple contingencies. In addition, no potential violations were found in the short circuit analysis.

The facility would provide additional electrical generation to the regional transmission grid, would be consistent with plans for expansion of the regional power system, and would serve the interests of electric system economy and reliability.

Recommended Findings

Staff recommends that the Board find that the proposed Facility is consistent with regional plans for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems, and that the Facility would serve the interests of electric system economy and reliability. Therefore, Staff recommends that the Board find that the Facility complies with the requirements specified in R.C. 4906.10(A)(4), provided that any certificate issued by the Board

30. PJM Interconnection, LLC, "System Impact Study, Queue Number AC1-194," accessed June 13, 2018, http://pjm.com/planning/generation-interconnection/generation-queue-active.aspx.

for the proposed facilities include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(5)

AIR, WATER, SOLID WASTE, AND AVIATION

Pursuant to R.C. 4906.10(A)(5), the facility must comply with Ohio law regarding air and water pollution control, withdrawal of waters of the state, solid and hazardous wastes, and air navigation.

Air

Air quality permits are not required for construction of the proposed facility. However, fugitive dust rules adopted under R.C. Chapter 3704 may be applicable to the construction of the proposed facility. The Applicant would control fugitive dust through dust suppression techniques such as application of water or dust suppressant, or temporary paving. These methods of dust control are typically used to comply with fugitive dust rules.

This project would not include any stationary sources of air emissions and, therefore, would not require air pollution control equipment.

Water

Neither construction nor operation of the proposed facility would require the use of significant amounts of water Therefore, the requirements under R.C. 1501.33 and 1501.34 are not applicable to this project.

Although the project area is large, storm water pollution from the project's construction activities would be limited in scope. The Applicant would obtain coverage under the Ohio EPA General National Pollutant Discharge Elimination System (NPDES) permit. Sedimentation in the local watercourse may occur because of construction activities, but would be minimized through best management practices (BMP) such as silt fences or sedimentation ponds. BMP would be outlined in the Applicant's Stormwater Pollution Prevention Plan, which is required as part of the NPDES permit.

If the following permits or authorizations are determined to be needed after the finalization of project engineering design, then the Applicant anticipates obtaining them:

- National Pollutant Discharge Elimination System (NPDES) Construction Storm Water General Permits from Ohio EPA;
- U.S. Army Corps of Engineer's (USACE) Section 404 individual permit or nationwide permit for limited stream crossings;
- Ohio EPA Section 401 water quality certification of those same USACE permits;
- Ohio EPA Isolated Wetland Permit;
- Storm Water Pollution Prevention Plan (SWPPP) that identifies potential sources of pollution and describes and ensures the implementation of BMPs;
- Spill Prevention, Control, and Countermeasure (SPCC) plan, to prevent the release of hazardous substances.

For operation of the facility, the project would not need an individual NPDES permit, because solar panels generate electricity without water discharge.

With these measures, construction and operation of this facility would comply with requirements of R.C. Chapter 6111, and the rules and laws adopted under that chapter.

Solid Waste

Debris generated from construction activities would include items such as plastic, wood, cardboard and metal packing/packaging materials, construction scrap, and general refuse. The Applicant intends that all construction-related debris would be disposed of at a licensed solid waste disposal facility.

Operation of the facility would generate small amounts of non-hazardous, solid waste, which will be disposed of in accordance with federal, state, and local requirements.

The Applicant's solid waste disposal plans would comply with solid waste disposal requirements set forth in R.C. Chapter 3734.

Aviation

The Vinton County Airport is approximately 3 miles north of the project site. On May 25, 2017, the Applicant notified the Vinton County Pilots and Boosters Association, the manager of the airport, about the proposed facility. The Applicant does not anticipate that the Vinton Solar Center would impact landing/approach procedures, air navigation, or air traffic communications at the airport. The Applicant found that there are no other public use airports, helicopter pads, or landing strips within five miles of the project.

In accordance with R.C. 4906.10(A)(5), Staff contacted the ODOT Office of Aviation during the review of this application in order to coordinate review of potential impacts of the facility on local airports. The ODOT Office of Aviation has stated that it is likely this proposed solar farm development will not be an Airspace Permit issue.

All Staff recommendations for the requirements discussed in this section can be found under the **Air, Water, Solid Waste, and Aviation Conditions** heading of the Recommended Conditions of Certificate.

Recommended Findings

Staff recommends that the Board find that the proposed facility complies with the requirements specified in R.C. 4906.10(A)(5), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(6)

PUBLIC INTEREST, CONVENIENCE, AND NECESSITY

Pursuant to R.C. 4906.10(A)(6), the Board must determine that the facility will serve the public interest, convenience, and necessity.

Public and Private Water Supplies

The Applicant has indicated that no public or private water supplies would be impacted by the construction and operation of this solar energy facility. Staff's review confirms this analysis.

Public Safety

The Applicant stated that it would comply with safety standards set by the Occupational Safety and Health Administration and National Fire Protection Association. In addition, the Applicant has indicated that it would use equipment compliant with applicable Underwriters Laboratories, Institute of Electrical and Electronics Engineers, National Electrical Code, National Electrical Safety Code, and American National Standards Institute standards.

The Applicant stated that it intends to restrict public access to the facility during construction by enclosing the project area with either a 6-foot chain-link fence with an additional 1-foot of barbed wire, or a 7 feet tall chain-link fence without barbed wire. Additionally, construction activities would occur on mainly private land away from roads and residences

The Applicant plans to work with local fire departments and other emergency responders to provide training for response to emergencies related to a solar farm. The Applicant intends to develop an implement an emergency action plan prior to construction, and consult with all necessary local emergency responders.

Public Interaction

The Applicant hosted a public informational open house for this project on April 5, 2017. Attendees were provided the opportunity to speak with the Applicant about the proposed project and to provide feedback.

The Applicant served copies of the complete application on officials representing Vinton County and Elk Township, and the villages of McArthur and Zaleski. The Applicant also sent a copy of the complete application to the Herbert Wescoat Memorial Library. Additionally, copies of the complete application are available for public inspection at the offices of the PUCO and on the PUCO online Docketing Information System website.[31] The Applicant maintains a project website where visitors can obtain information about the project and access the application.[32]

During the construction and operation of the project, the Applicant would make representatives available to respond to questions and concerns regarding the project. The Applicant would implement the complaint resolution plan described in Exhibit I of the application. In the complaint resolution plan, the Applicant has committed to file all complaints received, and their resolutions,

31. "Case record for: 17-0774-EL-BGN," Public Utilities Commission of Ohio, accessed November 3, 2017, http://dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=17-0774.

32. Invenergy, "Vinton Solar Energy Center," accessed November 3, 2017, https://invenergyllc.com/public-filings/vinton-energy-center.

with the Board on a quarterly basis. Staff recommends the Applicant file these quarterly reports in the case record.

The Applicant has also committed to provide notice to adjacent landowners immediately surrounding the proposed site regarding construction information and its complaint resolution process at least seven days prior to the start of any construction activities.[33] Staff recommends that this notice also be provided to tenants of any adjacent property immediately surrounding the proposed site.

The Administrative Law Judge issued an entry on June 21, 2018 rescheduling a local public hearing and an adjudicatory hearing for this proceeding. The local public hearing, at which the Board will accept written or oral testimony from any person, is scheduled for July 24, 2018, at 6:00 p.m., at the Vinton County Community Building, 31935 State Route 93, McArthur, Ohio 45651. The adjudicatory hearing is scheduled for August 1, 2018 at 10:00 a.m., at the offices of the PUCO, 11th floor, Hearing Room 11-D, 180 E. Broad St., Columbus, Ohio 43215.

As of the filing of this Staff Report, the Board has not received any public comments regarding this project. On October 17, 2017, the Ohio Farm Bureau Federation filed a motion to intervene in this case. On June 21, 2018, the Ohio Farm Bureau Federation was granted intervention.

Land Leases

The Applicant has a long-term lease for the property that comprises the project area. The Applicant has not yet secured easements for a transmission line right-of-way from the facility to the point of interconnection.

Liability Compensation Plans

The Applicant indicated that the facility would carry insurance during development, construction, operation, and decommissioning that will ensure proper indemnification for third parties and for the Applicant.[34]

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the Recommended Conditions of Certificate section.

Recommended Findings

Staff recommends that the Board find that the proposed facility would serve the public interest, convenience, and necessity, and therefore complies with the requirements specified in R.C. 4906.10(A)(6), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

33. Application at p. 33.
34. Ibid., p. 34.

Considerations for R.C. 4906.10(A)(7)

AGRICULTURAL DISTRICTS

Pursuant to R.C. 4906.10(A)(7), the Board must determine the facility's impact on the agricultural viability of any land in an existing agricultural district within the project area of the proposed facility. The agricultural district program was established under R.C. Chapter 929. Agricultural district land is exempt from sewer, water, or electrical service tax assessments.

Agricultural land can be classified as an agricultural district through an application and approval process that is administered through local county auditors' offices. Eligible land must be devoted exclusively to agricultural production or be qualified for compensation under a land conservation program for the preceding three calendar years. Furthermore, eligible land must be at least 10 acres or produce a minimum average gross annual income of $2,500.

No agricultural district parcels would be impacted by the construction of the proposed facility. The construction and operation of the proposed facility would disturb 687 acres of agricultural land, 658 acres of which would be occupied by solar panel modules. The remaining land of the 1,950-acre project area would remain available to serve its current function as grazing land.

Agricultural land that has not been classified as an agricultural district in the project area may experience some construction-related activities, such as vehicle traffic and materials storage on agricultural lands that could lead to temporary reductions in farm productivity caused by soil compaction and reduction of available pasture space. The Applicant reports that it has discussed and approved the siting of facility components with the landowner in order to minimize impacts, and also intends to take steps designed to address such potential impacts to farmland, including: soil compaction; removing construction debris; and, restoring temporarily impacted land to its original use. After construction, only the agricultural land associated with solar production and access roads would be removed from farm production.

Recommended Findings

Staff recommends that the Board find that the impact of the proposed facility on the viability of existing agricultural land in an agricultural district has been determined, and therefore complies with the requirements specified in R.C. 4906.10(A)(7), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this report entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(8)

WATER CONSERVATION PRACTICE

Pursuant to R.C. 4906.10(A)(8), the proposed facility must incorporate maximum feasible water conservation practices, considering available technology and the nature and economics of the various alternatives.

Construction of the proposed facility would not require the use of significant amounts of water. Water would be brought from off-site by 3,500 gallon water trucks, and would be used during earthwork activities, foundation construction, and dust control as needed. Potable water would be brought for human consumption in five gallon containers from off-site as well.

Operation of the proposed facility would not require the use of significant amounts of water. No water is needed for any function, and no water or wastewater discharge is expected. Therefore, the requirements under R.C. 1501.33 and 1501.34 are not applicable to this project.

Recommended Findings

The Staff recommends that the Board find that the proposed facility would incorporate maximum feasible water conservation practices, and therefore complies with the requirements specified in R.C. 4906.10(A)(8). Further, the Staff recommends that any certificate issued by the Board for the certification of the proposed facility include the conditions specified in the section of this report entitled Recommended Conditions of Certificate.

IV. RECOMMENDED CONDITIONS OF CERTIFICATE

Following a review of the application filed by Vinton Solar Energy LLC, and the record compiled to date in this proceeding, Staff recommends that a number of conditions become part of any certificate issued for the proposed facility. These recommended conditions may be modified as a result of public or other input received subsequent to the issuance of this report. At this time, Staff recommends the following conditions:

GENERAL CONDITIONS

Staff recommends the following conditions to ensure conformance with the proposed plans and procedures as outlined in the case record to date, and to ensure compliance with all conditions listed in this Staff Report:

(1) The facility shall be installed at the Applicant's proposed site as presented in the application and as modified and/or clarified by supplemental filing, replies to data requests and the recommendations in this *Staff Report of Investigation*.

(2) The Applicant shall conduct a preconstruction conference prior to the start of any construction activities. Staff, the Applicant, and representatives of the prime contractor and all subcontractors for the project shall attend the preconstruction conference. The conference shall include a presentation of the measures to be taken by the Applicant and contractors to ensure compliance with all conditions of the certificate, and discussion of the procedures for on-site investigations by Staff during construction. Prior to the conference, the Applicant shall provide a proposed conference agenda for Staff review. The Applicant may conduct separate preconstruction conferences for each stage of construction.

(3) At least 30 days before the preconstruction conference, the Applicant shall submit to Staff one set of detailed engineering drawings of the final project design, including the facility, temporary and permanent access roads, any crane routes, construction staging areas, and any other associated facilities and access points, so that Staff can determine that the final project design is in compliance with the terms of the certificate. The final project layout shall be provided in hard copy and as geographically-referenced electronic data. The final design shall include all conditions of the certificate and references at the locations where the Applicant and/or its contractors must adhere to a specific condition in order to comply with the certificate.

(4) If the Applicant makes any changes to the project layout after the submission of final engineering drawings, the Applicant shall provide all such changes to Staff in hard copy and as geographically-referenced electronic data. All changes will be subject to Staff review to ensure compliance with all conditions of the certificate, prior to construction in those areas.

(5) Within 60 days after the commencement of commercial operation, the Applicant shall submit to Staff a copy of the as-built specifications for the entire facility. If the Applicant demonstrates that good cause prevents it from submitting a copy of the as-built specifications for the entire facility within 60 days after commencement of commercial operation, it may request an extension of time for the filing of such as-built specifications. The Applicant shall use reasonable efforts to provide as-built drawings in both hard copy and as geographically-referenced electronic data.

(6) Prior to the commencement of construction activities in areas that require permits or authorizations by federal or state laws and regulations, the Applicant shall obtain and comply with such permits or authorizations. The Applicant shall provide copies of permits and authorizations, including all supporting documentation, to Staff within seven days of issuance or receipt by the Applicant. The Applicant shall provide a schedule of construction activities and acquisition of corresponding permits for each activity at the preconstruction conference.

(7) The certificate shall become invalid if the Applicant has not commenced a continuous course of construction of the proposed facility within five years of the date of journalization of the certificate.

(8) As the information becomes known, the Applicant shall docket in the case record the date on which construction will begin, the date on which construction was completed, and the date on which the facility begins commercial operation.

(9) The Applicant shall not commence any construction of the facility until it has a signed Interconnection Service Agreement with PJM Interconnection, LLC, which includes construction, operation, and maintenance of system upgrades necessary to reliably and safely integrate the proposed generating facility into the regional transmission system. The Applicant shall docket in the case record a letter stating that the Agreement has been signed or a copy of the signed Interconnection Service Agreement.

(10) At least 30 days prior to the preconstruction conference, the Applicant shall provide to Staff a copy of its public information program that informs affected property owners and tenants of the nature of the project, specific contact information of Applicant personnel who are familiar with the project, the complaint resolution process, the proposed timeframe for project construction, and a schedule for restoration activities. The Applicant shall give notification of planned construction to affected property owners and tenants at least seven days prior to commencement of construction.

(11) During the construction of and first year of operation of the project, the Applicant shall file a complaint summary report in the case record by the fifteenth day of January, April, July and October of each year. The report should include a list of all complaints received through its complaint resolution process, a description of the actions taken to resolve each complaint, and a status update if the complaint has yet to be resolved.

(12) General construction activities shall be limited to the hours of 7:00 a.m. to 7:00 p.m., or until dusk when sunset occurs after 7:00 p.m. Impact pile driving, hoe ram, and blasting operations, if required, shall be limited to the hours between 10:00 a.m. to 5:00 p.m., Monday through Friday. Construction activities that do not involve noise increases above ambient levels at sensitive receptors are permitted outside of daylight hours when necessary. The Applicant shall notify property owners or affected tenants within the meaning of Ohio Adm.Code 4906-3-03(3)(B)(2) of upcoming construction activities including potential for nighttime construction activities.

SOCIOECONOMIC CONDITIONS

Staff recommends the following condition to address the impacts discussed in the **Socioeconomic Impacts** section of the Nature of Probable Environmental Impact:

(13) Prior to the commencement of construction, the Applicant shall finalize coordination of the assessment of potential effects of the proposed facility on cultural resources, if any, with Staff and the Ohio Historic Preservation Office. If the resulting coordination discloses a find of cultural or archaeological significance, or a site that could be eligible for inclusion in the National Register of Historic Places, then the Applicant shall submit a modification or mitigation plan to Staff. Any such mitigation effort, if needed, shall be developed in coordination with the Ohio Historic Preservation Office and submitted to Staff for review that it complies with this condition.

(14) Prior to commencement of any construction, the Applicant shall prepare a landscape and lighting plan that addresses the aesthetic and lighting impacts of the facility on neighboring residences. The Applicant shall provide the plan to Staff for review and confirmation that it complies with this condition.

(15) The Applicant shall avoid, where possible, or minimize to the extent practicable, any damage to field tile drainage systems and soils resulting from construction, operation, and/or maintenance of the facility in agricultural areas. Damaged field tile systems shall be promptly repaired to at least original requirements at the Applicant's expense.

(16) If applicable, excavated topsoil shall be segregated and restored in accordance with the Applicant's lease agreement with the landowner. Severely compacted soils shall be plowed or otherwise de-compacted, if necessary, to restore them to original condition unless otherwise agreed to by the landowner.

(17) The Applicant shall complete a full detailed geotechnical exploration and evaluation at each pile foundation site to confirm that there are no issues to preclude development of the solar energy facility. The geotechnical exploration and evaluation shall include borings at each pile location to provide subsurface soil description and properties, static water level, and recommendations needed for the final design and construction of each pile foundation, as well as the final location of the approximately 0.2 mile overhead transmission line and battery storage facility. The Applicant must fill all boreholes, and borehole abandonment must comply with state and local regulations. The Applicant shall provide copies of all geotechnical boring logs to Staff and to the ODNR Division of Geological Survey prior to construction.

(18) The Applicant shall provide to Staff a copy of any arrangement or resulting resolution adopted by the county relating to the payment in lieu of taxes (PILOT) program within a reasonable time after issuance or receipt.

ECOLOGICAL CONDITIONS

Staff recommends the following condition to address the impacts discussed in the **Ecological Impacts** section of the Nature of Probable Environmental Impact:

(19) The Applicant shall contact Staff, the ODNR, and the USFWS within 24 hours if state or federal threatened or endangered species are encountered during construction activities. Construction activities that could adversely impact the identified plants or animals shall be halted until an appropriate course of action has been agreed upon by the Applicant, Staff, and the ODNR in coordination with the USFWS. Nothing in this condition shall preclude agencies having jurisdiction over the facility with respect to threatened or endangered species from exercising their legal authority over the facility consistent with law.

(20) The Applicant shall adhere to seasonal cutting dates of October 1 through March 31 for removal of any trees greater than or equal to three inches in diameter, unless coordination efforts with the Ohio Department of Natural Resources and the U.S. Fish and Wildlife Service allow a different course of action.

(21) If any caves or abandoned mines may be disturbed the Applicant shall coordinate with the U.S. Fish and Wildlife Service to determine if fall or spring portal surveys are warranted.

(22) The Applicant shall have a vegetation management plan that addresses the concerns outlined in the *Vegetation* section of this Staff Report. Prior to the preconstruction conference, the Applicant shall submit this plan to Staff, for review and confirmation that it complies with this condition.

PUBLIC SERVICES, FACILITIES, AND SAFETY CONDITIONS

Staff recommends the following conditions to address the requirements discussed in the **Public Services, Facilities, and Safety** section of the Nature of Probable Environmental Impact:

(23) Prior to commencement of construction activities that require transportation permits, the Applicant shall obtain all such permits. The Applicant shall coordinate with the appropriate authority regarding any temporary or permanent road closures, lane closures, road access restrictions, and traffic control as necessary for construction and operation of the proposed facility. Coordination shall include, but not be limited to, the county engineer, the Ohio Department of Transportation, local law enforcement, and health and safety officials. The Applicant shall detail this coordination as part of a final traffic plan submitted to Staff prior to the preconstruction conference for review and confirmation by Staff that it complies with this condition.

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180 E. Broad Street
Columbus, Ohio 43215-3793

Summary: Staff Report of Investigation electronically filed by Mr. Matt Butler on behalf of Staff of OPSB