

# Staff Report of Investigation

OSU Combined Heat and Power Facility  
The Ohio State University

Case No. 19-1641-EL-BGN

June 15, 2020



Power Siting  
Board

Mike DeWine, Governor | Sam Randazzo, Chairman

**In the Matter of the Application of The Ohio State )  
University for a Certificate of Environmental )  
Compatibility and Public Need to Construct a ) Case No. 19-1641-EL-BGN  
Combined Heat and Power Facility in Franklin )  
County, Ohio )**

**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 The Ohio State** )  
**University for a Certificate of Environmental** )  
**Compatibility and Public Need to Construct a** ) **Case No. 19-1641-EL-BGN**  
**Combined Heat and Power Facility in Franklin** )  
**County, Ohio** )

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

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, and the U.S. Fish and Wildlife Service.

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,



Theresa White  
Executive Director  
Ohio Power Siting Board

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## **I. POWERS AND DUTIES**

### **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.<sup>1</sup> 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.<sup>2</sup>

Within 60 days of receiving an application, the Chairman must determine whether the application is sufficiently complete to begin an investigation.<sup>3</sup> 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 official filing date of the completed application.<sup>4</sup> At the public hearing, any person may provide written or oral testimony and may be examined by the parties.<sup>5</sup>

#### **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.<sup>6</sup> The report sets forth the nature of the investigation and contains the findings and conditions recommended by Staff.<sup>7</sup> The Board's Staff, which consists of career professionals drawn from the staff of the Public Utilities Commission of Ohio (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

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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).

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).

and is made available to any person upon request.<sup>8</sup> Record of the public hearings and all evidence, including the Staff Report, may be examined by the public at any time.<sup>9</sup>

### **Board Decision**

The Board may approve, modify and approve, or deny an application for a certificate of environmental compatibility and public need.<sup>10</sup> 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.<sup>11</sup>

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.<sup>12</sup> 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.<sup>13</sup> 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.<sup>14</sup> 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.<sup>15</sup>

## **OHIO POWER SITING BOARD**

The authority of the Ohio Power Siting Board (Board or OPSB) 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 5 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 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

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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.

Board members include two members (with alternates) from each house of the Ohio General Assembly.

### **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 section 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**

The Ohio State University (Applicant) is a state institution of higher education, founded in 1870 as a land grant university in Columbus, Ohio. The university entered into a 50-year partnership with Ohio State Energy Partners (OSEP) via the Long-Term Lease and Concession Agreement for the Ohio State University Utility System (the Concession Agreement). OSEP is a 50/50 joint venture between Axiom Infrastructure and ENGIE North America. Headquartered in Montreal, Quebec, Canada, Axiom Infrastructure is an independent investment firm with over \$1.5 billion invested. Headquartered in Houston, Texas, ENGIE North America is a power generation, marketing, and energy services firm that develops, builds, and operates renewable energy assets, combined heat and power (CHP) facilities, direct heating and cooling systems (DHC), and provides energy services. ENGIE North America is a fully owned subsidiary of the global energy firm ENGIE S.A., headquartered in Paris, France, with operations in 70 countries. ENGIE owns and operates over 100 GW of power generation assets including more than a dozen CHP facilities.

### **HISTORY OF THE APPLICATION**

Prior to formally submitting its application, the Applicant consulted with Staff and representatives of the Board, regarding application procedures. The following history of the application is a summary and does not contain every document listed in the public docket for this case.

On September 11, 2019, the Applicant filed a pre-application notification letter regarding the project.

On September 26, 2019, the Applicant held a public informational meeting for the project.

On November 6, 2019, the Applicant filed the application for the proposed facility.

On November 6, 2019, the Applicant filed a motion for a waiver of Ohio Adm.Code 4906-4-08(A)(3)(c) to allow for a modification of the identification of noise sensitive locations within one mile of the facility, as well as Ohio Adm.Code 4906-4-08(D)(3) and (D)(4) to allow for a modification of the visual impact study because of the urban nature of the project.

On November 27, 2019, the Applicant filed a supplement to the application.

On January 6, 2020, the Director, Rates and Analysis, PUCO issued a letter to the Applicant stating that the application, as supplemented, had been found to comply with the requirements of Ohio Adm. Code 4906-01, et seq.

On January 7, 2020, the Administrative Law Judge (ALJ) granted the motion for waiver.

On January 23, 2020, the Applicant filed a certificate of service of the accepted, complete application on local public officials and libraries, and notice of the application fee as being paid.

On January 29, 2020, the ALJ issued an entry scheduling a local public hearing for this case to be held on Thursday, April 9, 2020, at 6:00 p.m., at the Ohio History Center, 800 E. 17th Ave., Cardinal Classroom, Columbus, Ohio. The adjudicatory hearing was scheduled to commence on

Thursday, April 23, 2020, at 10:00 a.m., 11th Floor, Hearing Room 11-D, at the offices of the PUCO, 180 E. Broad St., Columbus, Ohio.

On March 6, 2020, the Sierra Club filed a petition for leave to intervene and memorandum in support.

On March 12, 2020, the ALJ issued an entry suspending the procedural schedule for the case.

On May 22, 2020, the ALJ issued an entry rescheduling the procedural schedule for the case. A local public hearing for this case is to be held on Tuesday, June 30, 2020, beginning at 6:00 p.m. The adjudicatory hearing is scheduled to commence on Tuesday, July 14, 2020, at 10:00 a.m. The local public and adjudicatory hearings will both be held using remote access technology that facilitates participation by telephone and/or live video on the internet.

This summary of the history of the application does not include every filing in case number 19-1641-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 develop, construct, own, and operate a natural gas fired CHP plant with a net plant output capacity of 105.5 MW and 285,000 pounds per hour (lbs/hr) of superheated steam in Columbus, Franklin County, Ohio. A CHP facility, also known as cogeneration, simultaneously produces electricity and useful thermal energy, in the form of steam.

### **Project Site**

The proposed location of the facility is a 1.18-acre parcel of land on the northeast corner of John H. Herrick Drive and Vernon L. Tharp Street. This location is on the grounds of the Ohio State University, within the City of Columbus, Ohio. The project area and proposed facilities are shown on the map in this report.

### **Construction Laydown Areas**

The Applicant intends to deliver construction materials directly to the construction site where practicable. The Applicant would also use a nearby additional approximately 8.53-acres site as a temporary construction laydown area. The proposed 8.53-acre temporary construction laydown area is located on the northeast corner of the intersection of Kenny Road and Woody Hayes Boulevard. This laydown area would be shared with the simultaneous construction of the district heating and cooling project, which is a separate and distinct project. The shared laydown area would be used as a temporary construction laydown/staging area for parts, material and equipment storage, construction trailers, and parking. The Applicant may install lighting in its temporary construction parking area. Site security measures such as gates and fencing would also be utilized for the CHP facility and laydown area.

### **Electric and Steam Generating Equipment**

The Applicant states that all equipment, except for the service water tank, would be housed within a single building which will be 60 feet tall. Cooling towers would extend 27 feet above the roof and two steel exhaust stacks would extend to a height of 115 feet above ground level. The preliminary architectural design is shown in Exhibit D of the application. The Applicant states that

the CHP building design would comply with the university's extensive building design standards contained in Exhibit C of the application.

A CHP plant is comprised of similar equipment to a natural gas fired combined cycle plant and would be capable of year-round operation with an anticipated annual capacity factor of 95 percent. The heat rate for the CHP plant would be approximately 8,758 British thermal units (BTU) per kilowatt-hour. Heat rate is a measure of the efficiency of electric power generation.

The CHP facility would utilize two 33.8 MW Siemens SGT700 model combustion turbine generators (CTG). The combustion turbines would include water cooled chillers as an inlet air cooling system, which would improve performance on hot summer days.

The facility would also include two heat recovery steam generators (HRSG) with auxiliary duct burners. The facility would also include one Siemens SST400 model steam turbine generator with an output of 50.5 MW. The steam turbine generator would be connected to the HRSG.<sup>16</sup> The sum of the two combustion turbines (33.8 MW each) and one steam turbine generator (50.5 MW) yields a gross power output of 118.1 MW. Some of this power would be used to operate equipment on-site (e.g. auxiliary loads). The nominal net electrical output of the facility would be 105.5 MW.

#### *Steam Production*

The steam produced in the CHP facility would be used in any of the following combinations: to produce electrical power in the steam turbine generator, supplement the existing main campus steam network, or produce hot water heating through a heat exchanger to feed a new district heating and cooling network. The CHP facility combustion turbine and duct burner/HRSG would be capable of producing a maximum of 356,400 lbs/hr of superheated steam with the duct burners firing at full rate. The CHP facility is designed to use this steam in the steam turbine generator. The nominal net maximum steam capacity will be 285,000 lbs/hr. The average steam production would be 150,000 lbs/hr with different extraction rates for summer and winter operations.

#### **Water Supply, Treatment, Storage, and Discharge**

According to the Applicant, the CHP facility would obtain process water through a tie into the university's existing domestic water distribution system directly at the plant and indirectly through the McCracken power plant at a maximum flow rate of up to 787 gallons per minute and an average flow rate of 550 gallons per minute.<sup>17</sup> Water would be stored on site in a 274,000-gallon service water tank.

Potable water, service water, cooling tower make-up water, and fire water would be delivered from the university's McCracken power plant's existing water treatment facility. Some of the water would be further treated through a reverse osmosis filter for cycle make-up.

Reverse osmosis reject water and HRSG drains/blowdown would be recycled to the cooling tower basin. HRSG blowdown would be quenched and recycled to the cooling tower basin. Cooling tower blowdown would be discharged directly to the existing university campus sewer system.

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16. A HRSG is a heat exchanger that recovers heat from a hot gas stream and produces steam.

17. Ohio State University's McCracken power plant provides steam, hot water, and chilled water for campus consumption.

Output from the CHP building sumps would be collected and directed to an oil/water separator for processing and offsite disposal.

Wastewater would be discharged to the university's campus sewer system and ultimately the City of Columbus' wastewater treatment plants. The wastewater discharge would consist of cooling tower blowdown, HRSG blowdown, equipment drains, reverse osmosis rejection water, and sanitary wastewater.

### **Electrical System**

The electric power generated by each CTG and the steam turbine generator would be at a nominal voltage of 13.8 kV. The generators would be connected to the existing Ohio State University Buckeye substation, located at 1735 Cannon Drive, through three feeder lines of approximately 4,000 feet in length each. The power generated at the CHP facility would serve the load on the existing 13.8 kV campus electrical distribution system that powers campus facilities.

The Applicant states that the electrical power output of the CHP facility is essential to provide resilience to campus critical buildings. Also, the thermal energy, or steam, produced from the facility would be the primary source of heating to three new buildings scheduled to require utility service in the fourth quarter of 2021. The three new buildings are the West Campus Ambulatory Services, Energy Innovation Center, and Interdisciplinary Research Facility.

### **Gas Supply**

The procurement of adequate natural gas supplies and pipeline delivery capacity are necessary for the successful operation of the facility. Natural gas supply for the CHP facility would come from the Columbia Gas of Ohio's Olentangy River Gashouse 22 – an existing regulator and metering building located on campus. This regulator/metering building is a delivery point from Columbia Gas of Ohio to the university's natural gas distribution system on campus that currently serves the McCracken Power Plant and its boilers. The Applicant has an existing gas transportation service agreement with Columbia Gas of Ohio for that metering facility pursuant to a tariff. The Applicant provided a letter from Columbia Gas of Ohio indicating that the regulator/metering building facility is sufficiently designed and rated to meet the forecasted maximum fuel consumption of the CHP facility and McCracken Power Plant together. The proposed CHP facility would require/consume up to approximately 905 MMBTU per hour of natural gas. The Applicant stated that the natural gas will be split in varying proportions between McCracken Power Plant and the CHP facility to optimize the system to best meet the campus needs. The Applicant also has an agreement with a PUCO certified competitive retail natural gas service provider for supply of the actual natural gas commodity.

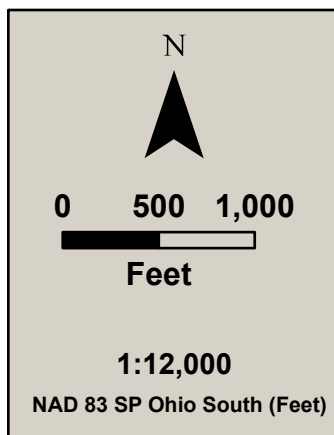
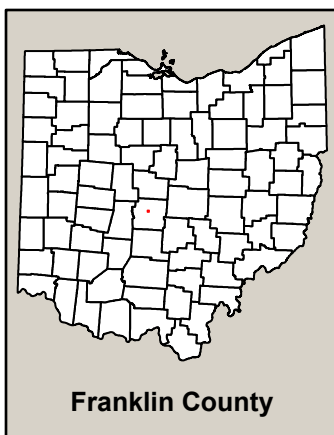
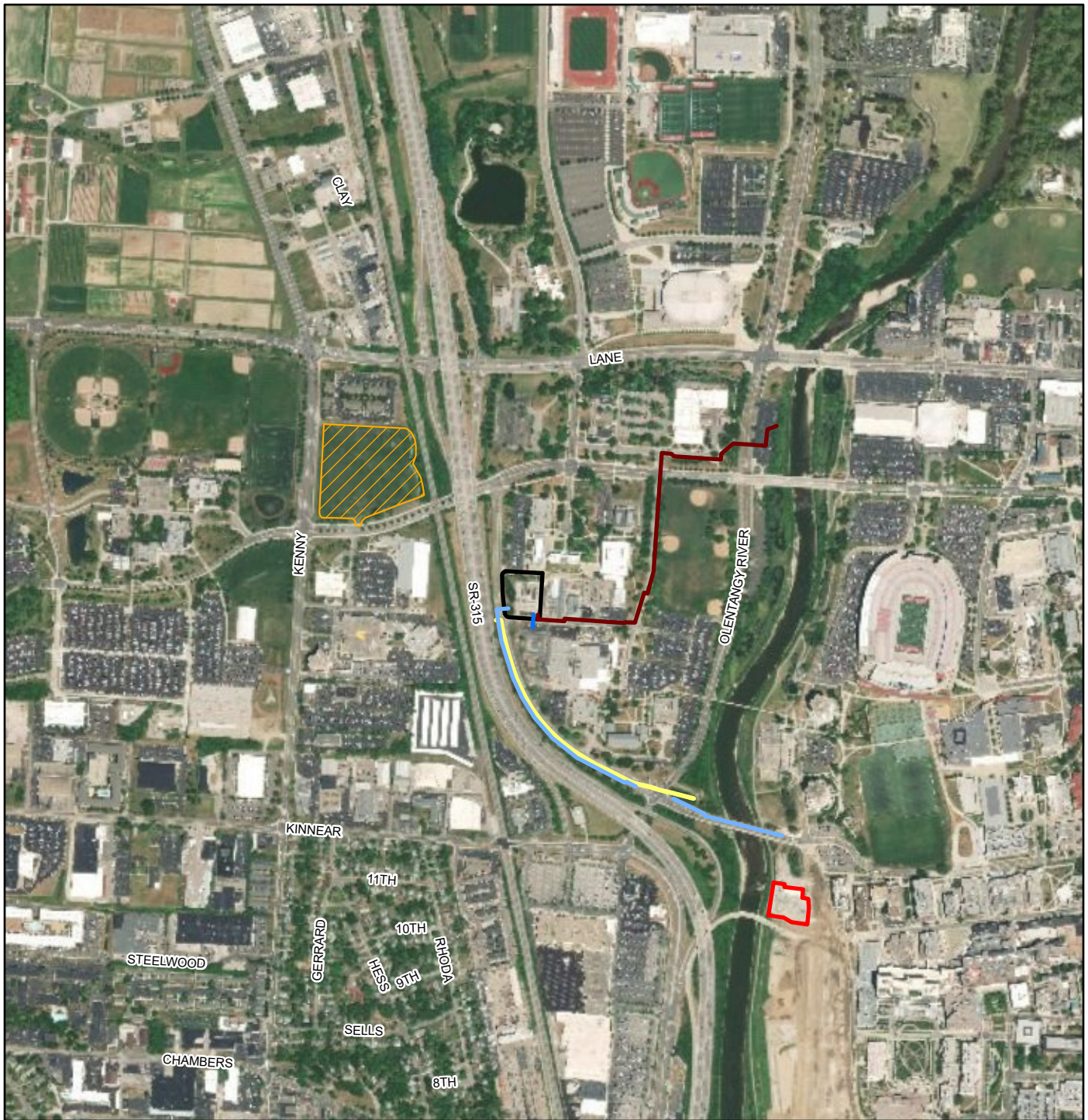
The CHP facility would interconnect to that natural gas supply from the existing Columbia Gas of Ohio Gashouse 22 master meter via a new pipeline. The proposed new interconnecting pipeline would be 12 inches in diameter, with a maximum allowable operating pressure of 75 pounds per square inch gauge (psig), and approximately 3,500 feet in length. Inside the CHP building the natural gas will be processed, mechanically filtered, and compressed to increase pressure to meet the requirements of the combustion turbines.

The Applicant's proposed location for the new 12-inch diameter gas pipeline is shown in the map of this report.

**Project Timeline**

The Applicant proposed to commence construction in the late summer or early fall of 2020 and begin commissioning equipment in October 2021 and place the CHP facility in-service on December 2021. The Applicant has stated that it is crucial that it meet the proposed commissioning date of October 2021 and in-service operation date of December 2021. The Applicant has indicated that a delay would jeopardize the CHP facility's ability to serve the new campus buildings mainly the West Campus Ambulatory Services, Energy Innovation Center, and Interdisciplinary Research Facility.





## Overview Map

### 19-1641-EL-BGN

**OSU Combined Heat and Power Facility**

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 The Ohio State University, 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. Therefore, Staff has found an analysis of R.C. 4906.10(A)(1) to be inapplicable to the facility in question.

##### **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 facility, as 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**

##### *Regional Planning*

The proposed facility is compatible with regional planning documents and will have negligible impact on regional development and external areas outside of the university's control. The purpose of the proposed facility is to cut down on energy use of the university, thereby aligning with the targets contained within the Franklin County Energy Study from 2018, The City of Columbus' energy reduction goals, as well as the university's own energy reduction targets. The Franklin County Energy Study conducted jointly by the Mid-Ohio Regional Planning Commission (MORPC) and Franklin County recommends the use of CHP facilities as one strategy for meeting their energy reduction targets.

##### *Demographics*

The Applicant included demographic data surrounding the proposed facility in the application. The proposed facility would be located within the City of Columbus, within Franklin County. The City of Columbus has a 2019 estimated population of 879,456 people within Franklin County, and a combined total of 902,674 people inside and outside the bounds of Franklin County. The 2018 population estimate for Franklin County is 1,310,300. By 2030, the population of Franklin County is projected to increase to approximately 1,394,980.

##### *Land Use*

The proposed facility would be completely within and adjacent to the Applicant's property. Structures adjacent to the proposed facility location are all controlled and managed by the Applicant. The Applicant states that impacts to adjacent and nearby land uses will be negligible. The current land use of the proposed facility site is for educational purposes and comprised of non-permanent greenhouse and garden structures on top of a gravel pad. The Applicant states these would be removed and relocated to a different location on the university's campus. Any material produced from this removal process will be disposed of in accordance with the university's Recycling of Construction/Demolition Waste policy (Section 01 40 00) of the university's Building Design Standards, as included in the application. Areas proposed for pipelines and cabling is also categorized as an educational land use type and would be immediately returned to its pre-construction land use after installation of the facilities. The land surrounding the proposed CHP facility is highly developed as part of the university's facilities.

##### *Cultural Resources*

The Applicant's cultural resources consultant performed a literature review (archaeology and history/architecture) for the generation project, including the laydown yard site. The review included an analysis of National Register of Historic Places (NRHP) and sites that may be eligible for the NRHP, as well as archaeological resources and known sites, landmarks, historical structures, bridges, cemeteries and historic districts. Thousands of archaeological and architectural

resources are located within 10 miles of the project site, as the site is surrounded by dense urban development. However, only 197 sites were located within 5 miles of the project, and no previously recorded cultural sites were identified within the project footprint. The records review identified six architectural resources on the NRHP within one mile of the project. The proposed facility site is surrounded by multi-story buildings, a highway, cell towers, and light poles, thus limiting the visibility of the project area.

The Applicant's cultural resources consultant determined that the project would not involve or impact any significant cultural resources or landmarks, and that no further cultural resource management work was considered to be necessary.

The findings were submitted to the OHPO. The OHPO responded to the consultant in concurrence that this generation project would not affect historic properties, and that no further coordination with OHPO was required unless the project changes or archaeological remains are discovered during construction of the project. In such a case, OHPO and Staff should be contacted immediately.

### *Aesthetics*

The Applicant provided a Visual Impact Assessment report with a two-mile viewshed analysis of the proposed facility, showing nearly no visibility past a two-mile radius of the site. OHPO agreed that this study scope was sufficient and there would be no need for further study. The analysis showed that given the urban context of the site and its surroundings, visual impact would be minimal and compatible with the surrounding urban landscape. The exterior appearance of the facility would be designed to be compatible with surrounding campus facilities. The lighting would be compliant with FAA requirements and similar to that on the McCracken Plant stacks that are also on campus. The visibility of the facility would be largely obstructed by existing structures, with most visibility being obstructed beyond one mile. Most of the clearest views of the facility would be from campus, where visual impacts have been dealt with internally, given the facility would be controlled by the Applicant. The Applicant's consultant conducted a viewshed analysis of 181 publicly accessible key observation point locations within a two-mile radius of the proposed facility. These observation points included locations such as schools, recreational areas, and churches. From one to ten of the 181 locations were determined to potentially be able to view the proposed facility in two different models that were used by the consultant. These results show that from 0.6 percent to 5.5 percent of the key observation points would potentially have a view of the facility.

### *Economics*

The Applicant states that it would own the facility and the entire project area. The Applicant states that their total estimated capital and intangible costs would be expected to be nearly \$197 million for the proposed CHP facility. This total includes \$181 million for engineering, procurement, and construction, and \$16 million for owner's cost and contingency.

Total cost comparisons between the proposed facility and other comparable facilities have been provided in the application. The Applicant stated that the average cost for similar CHP facilities ranges between \$1,500 to \$3,500/kW and that the proposed facilities' cost will be approximately \$1,638/kW. Staff verified that the reported average cost of similar facilities is not substantially different from Applicant's estimated costs for the proposed facility. The Applicant also included capital costs under an alternate scenario where the proposed CHP project would not be built. In

this scenario, the Applicant anticipates having to install in-building heating and cooling equipment, upgrade steam lines, and replace two boilers at a capital cost of \$126 million. Staff believes the estimated capital costs under the alternative scenario appear to be a reasonable estimated amount.

The Applicant provided its estimates of the monthly cost of delays in permitting and construction of the proposed facility, although some of these estimated costs have been filed under seal. The Applicant characterized the costs of delays as being associated with installing and operating temporary heating and cooling equipment for a new hospital building, extending construction contracts, as well as lost procured electricity commodity savings. The total estimated costs of delays are \$4.03 million per month.

Operation and maintenance expense comparisons between the proposed facility and other comparable facilities were provided in the application. The estimated operation and maintenance for the proposed facility would be approximately \$50/kW annually. These estimated costs are lower than some similar facilities operated by the Applicant due to economies of scale, given that the proposed facility at Ohio State is 105 MW whereas the Applicant's similar facilities range between 25 and 27 MW.

In order to estimate the direct and indirect economic impacts of the proposed project, the Applicant utilized engineering, procurement and construction estimates and proposals as well as *The Economic, Social, and Community Impact of The Ohio State University* report.<sup>18</sup> Based on the results of the analysis conducted by the Applicant, the Ohio State CHP project is expected to have the following impacts for the state of Ohio:

#### *Jobs*

- Between 150 and 175 construction jobs
- 4 long-term operational jobs

#### *Earnings*

- \$20 million in new local earnings during construction
- \$0.5 million in earnings resulting from annual operation

#### *Output*

- \$27 million in local output during construction
- \$1.2 million in local annual output derived from operations

#### *Taxes*

The Applicant is designated a public institution of higher education and, as a result, is exempt from most property and sales taxation. Thus, there would not be an appreciable increase in tax revenue as a result of the construction and operation of the proposed project.

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18. <https://oaa.osu.edu/sites/default/files/uploads/irp/economic-impact/The-Ohio-State-University-Economic-Impact-FINAL-Report-3-4-19.pdf>.

## *Recommendations*

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**

### Physiographic Region

The proposed project area is on the main Ohio State University campus in Columbus, Ohio (Franklin County). This area is in the Columbus Lowland physiographic region. This region is characterized by lowland terrain surrounded by relative uplands. There is a broad slope towards the Scioto Valley and many large streams throughout the region. The geology of the region consists of loamy Wisconsinan-age till and extensive outwash in the Scioto Valley covering underlying bedrock.<sup>19</sup>

### *Surficial/Glacial Geology*

The project area lies within the glaciated margin of the state and includes several Wisconsinan-aged glacial features. In the study area, to the west of the Olentangy River, is a low-level valley train outwash deposit, which consists primarily of sand and gravel. To the east of the Olentangy River is a ground moraine made up of Late Woodfordian ice deposits. This area consists primarily of silty loam till. There are modern alluvial deposits adjacent to the river throughout much of the center of the project area.<sup>20</sup> Glacial drift throughout most of the study area is between 65 and 95 feet thick.<sup>21</sup>

### *Bedrock Geology*

The uppermost bedrock unit in the project area is the Delaware Limestone. This unit is Devonian-aged and consists of blueish gray limestone with argillaceous partings. The unit may be cherty in places. Underlying the Delaware Limestone is the Devonian-aged Columbus Limestone. This unit is characterized by bluish gray to brown fossiliferous limestone. The unit may be dolomitic in places and frequently contains solution features. There is a north-south trending geologic contact between the Delaware and Columbus limestones located approximately beneath the Ohio State University stadium with the Delaware Limestone to the east and the Columbus Limestone covering most of the project area west of the stadium. It should be noted that bedrock is not exposed at the surface within the boundaries of the project area due to significant glacial drift.<sup>22</sup>

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19. Ohio Department of Natural Resources, Division of Geological Survey, (1998). Physiographic Regions of Ohio. Ohio Department of Natural Resources, Ohio Department of Natural Resources, Division of Geological Survey, map with text, 2 p., scale 1:2,100,000.

20. Pavey, R., Goldthwait, R., Brockman, C.S. Hull, D., Swinford, E.M., and Van Horn, R. (1999). Quaternary Geology of Ohio, Ohio Department of Natural Resources, Division of Geological Survey, map, scale 1:500,000.

21. Powers, D.M., and Swinford, E.M. (2004). Shaded drift-thickness map of Ohio, Ohio Department of Natural Resources, Division of Geological Survey, map, scale 1:500,000.

22. Slucher, E., Swinford, E., Larsen, G., Schumacher, G., Shrake, D., Rice, C., Caudill, M., Rea, R. and Powers, D. (2006). Bedrock Geologic Map of Ohio, Ohio Department of Natural Resources, Division of Geological Survey, map, scale 1:500,000.

### *Oil, Gas and Mining*

ODNR has record of four oil and gas wells within one mile of the proposed project area. Three of these wells are listed as abandoned with one well listed as “final restoration.”<sup>23</sup> ODNR does not have record of any mining operations within the project area. The nearest mining operation to the project area is the Shelley Materials, Inc. limestone quarry, located approximately 3 miles from the project area.<sup>24</sup>

### *Seismic Activity*

Several small earthquakes have historically been recorded near the site. The three events closest to the site are listed in the chart below.<sup>25</sup>

<b>Distance to Site Boundary</b>	<b>Date</b>	<b>Magnitude</b>	<b>County</b>	<b>Township</b>
13.5 miles	January 4, 1873	3.8	Delaware	Orange
23 miles	October 21, 2013	2.0	Pickaway	Jackson
30 miles	January 16, 1870	2.9	Fairfield	Berne

### *Karst*

While there are no known or suspected sinkholes within the project area, it should be noted that there are three known and field verified sinkholes approximately four miles west of the project area near the Scioto River. There is a larger concentration of known and suspected sinkholes north of the project area near the Franklin-Delaware county border. These occur near the Scioto River, but there are some located near the banks of the Olentangy River in Delaware County. These features are formed within the Columbus and Delaware limestones, the same units which underly the project area.<sup>26</sup>

While there are no known or suspected sinkholes within the project area, nearby well logs indicate cavernous limestone on the Ohio State University campus. These wells were drilled as part of a geothermal heating and cooling project. Drillers identified two high permeability zones in the bedrock while drilling based on consistent loss of air pressure to their air rotary drill rig at depths of 140 to 150 ft. and 280 to 360 ft. These cavernous voids allow water to be transmitted quickly through the bedrock aquifer system. The shallower of these zones lies within the Columbus and Delaware limestone units, while the deeper zone can be placed with the Salina Undifferentiated and the Tymochtee, Greenfield and Lockport dolomites. These cavernous zones created many

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23. Ohio Department of Natural Resources, Division of Oil and Gas, Ohio Oil and Gas Wells Locator, online interactive map, <https://gis.ohiodnr.gov/MapView/?config=oilgaswells>.

24. Ohio Department of Natural Resources, Division of Mineral Resources, Mines of Ohio, online interactive map, <https://gis.ohiodnr.gov/MapView/?config=OhioMines>.

25. Ohio Department of Natural Resources, Division of Geological Survey, Ohio Earthquake Epicenters, online interactive map, <https://gis.ohiodnr.gov/MapView/?config=earthquakes>.

26. Ohio Department of Natural Resources, Division of Geological Survey, Ohio Karst, online interactive map, [https://gis.ohiodnr.gov/website/dgs/karst\\_interactivemap/](https://gis.ohiodnr.gov/website/dgs/karst_interactivemap/).

problems during well development for this geothermal project, including geysers spouting out of previously drilled holes while drilling new wells.<sup>27</sup>

### *Soils*

According to the United States Department of Agriculture (USDA) Web Soil Survey, the project area consists primarily of soils derived from glacial till. Celina, Miamian, Eldean and Ross are the most common soil series found within the boundaries of the project area. Most of the project area is mapped as urban land, however the mapped soils that are present are primarily glacially derived except for the Ross soil series which is derived from alluvial deposits. The Celina and the Miamian both list loamy till as the parent material with Celina having a silty clay loam texture and Miamian having a silt loam texture. The Eldean soil series is derived from silty and clayey outwash over sand and gravel. It has a silt loam texture. The Ross soil series is derived from the alluvial deposits of the Olentangy River and has a silt loam texture.<sup>28</sup>

There is a low to moderate risk of shrink-swell potential in these soils. Other limiting factors include frost action and risk of corrosion to uncoated steel and concrete. Slope remains relatively flat, with slope seldom exceeding a 12 percent grade.<sup>29</sup>

### *Groundwater*

Groundwater resources are plentiful throughout the study area. Wells developed in bedrock are likely to yield between 100 and 500 gallons per minute. The Columbus Limestone is the primary bedrock aquifer in this area. Yields of up to 250 gallons per minute can be expected from wells drilled up to 300 feet. Wells drilled deeper than 300 feet will likely have a greater yield, but quality of water at this depth will be less desirable for most uses.<sup>30</sup> Wells developed in unconsolidated glacial and alluvial material are likely to yield between 5 and 500 gallons per minute. The Olentangy River Buried Valley Aquifer runs through the center of this project area. This aquifer is known to yield between 100 and 500 gallons per minute. To the west is the West Columbus Complex Aquifer which yields 25 to 100 gallons per minute. To the east is the Worthington Ground Moraine Aquifer which only yields 5 to 25 gallons per minute.<sup>31</sup>

ODNR has record of 347 water wells drilled within one mile of the study area. These wells range in depth from 10 to 554 feet deep with an average depth of 68.5 feet. The deepest of these wells were drilled as part of the Ohio State University geothermal project noted above. The most

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27. Torres, M. (2012). Origins and Characteristics of Two Paleokarst Zones in Northwest and Central Ohio. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/> and Ohio Department of Natural Resources, Division of Water, Ohio Water Wells, online interactive map, <https://gis.ohiodnr.gov/MapView/?config=waterwells>.

28. USDA Web Soil Survey, (Last modified 2019). Web Soil Survey Interactive Map, United States Department of Agriculture, National Resources Conservation Service, online interactive map, <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.

29. McLoda, N. and Parkinson, R. (1980). Soil Survey of Franklin County, Ohio. United States Department of Agriculture, Natural Resources Conservation Science. Retrieved from [nrcs.usda.gov](https://nrcs.usda.gov) and USDA Web Soil Survey.

30. Schmidt, J. (1993). Groundwater Resources of Franklin County, Ohio Department of Natural Resources, Division of Geological Survey, map and Ohio Department of Natural Resources, Division of Water, (2000). Statewide Bedrock Aquifer Map, GIS coverage.

31. Ohio Department of Natural Resources, Division of Water, (2000). Statewide Unconsolidated Aquifer Map, GIS coverage.

common aquifer listed is sand and gravel and limestone. Based on 16 well log records containing sustainable yield information, a sustainable yield of 12 to 250 gallons per minute is expected from wells drilled in this area. The average sustainable yield from these records was 95 gallons per minute.<sup>32</sup>

#### *Surface Waters*

No streams, wetlands, lakes, reservoirs, or floodplains would be impacted by the proposed facility.

The Applicant stated that it would obtain coverage under the Ohio EPA General National Pollutant Discharge Elimination System (NPDES) Permit. Sedimentation that may occur as a result of construction activities would be minimized through best management practices (BMP), such as silt fences. BMPs would be outlined in the Applicant's Stormwater Pollution Prevention Plan required as part of the NPDES Permit.

#### *Threatened and Endangered Species*

A small amount of tree clearing would be necessary within the proposed project area. The project is within the range of state and federal endangered Indiana bat (*Myotis sodalis*) and the state and 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 three inches or greater in diameter, unless coordination efforts with the ODNR and the USFWS allows a different course of action. The project would not impact any bat hibernacula.

The project site and associated facilities consist of graveled and paved areas, maintained lawn and ornamental woody vegetation. The laydown area is a recently tilled agricultural field. Impacted areas are devoid of surface water resources and other unique habitat features. Due to lack of suitable habitats, impacts to other state and federal listed species are not anticipated.

#### *Vegetation*

The total area that would be impacted by construction and operation of the facility would be approximately 18 acres. No forested areas would be cleared, and tree clearing would be limited to a select few mature trees in the project area. The majority of the project area consists of paved and graveled areas, recently farmed agricultural field, and maintained lawn. No sensitive plant species would be impacted.

#### *Recommendations*

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**

#### *Roads and Bridges*

There are several ways the proposed site can be accessed. Roads cited by the Applicant as viable options include John H. Herrick Drive, Woody Hayes Drive, Cannon Drive, Vernon L. Tharp

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32. Ohio Department of Natural Resources, Division of Water, Ohio Water Wells, online interactive map, <https://gis.ohiodnr.gov/MapView/?config=waterwells>.

Street, Coffey Road, and Olentangy River Road. Routes utilized for access to the site would vary for standard equipment. However, deliveries of large equipment such as electric generation turbines and cranes would utilize the northbound exit of State Route 315 to Lane Avenue.

Traffic patterns would be minimally disrupted during construction. The Applicant stated that John H. Herrick Drive would be reduced to two lanes during construction. Traffic would be maintained in both directions utilizing the remaining two lanes. Other disruptions would include momentary delays as large equipment is delivered to and removed from the construction site. The Applicant stated that it would provide the pertinent authorities with advanced notification and updates concerning the temporary disruptions to traffic.

No damage to roads or bridges is expected. The Applicant is coordinating with the City of Columbus and the ODOT to minimize impacts to traffic flow and infrastructure. The Applicant would submit the road use agreements and permits to the OPSB once they are obtained. If any damage to roadways occurs, the Applicant stated that it will make repairs to restore the infrastructure to previous or better condition.

Once the facility is operational, no changes or disruptions to traffic, roads, or bridges are expected.

#### *Noise*

Noise impacts from construction activities would include site clearing and grading, placement of major structural foundations, erection of structural steel, installation of mechanical and electrical equipment, and commissioning and testing of equipment. However, the adverse impact of construction noise would be temporary and intermittent, would occur away from 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 and according to manufacturers' specifications, personal protective equipment such as hearing protection devices, and limitations on duration of noise exposure in high noise areas in order to reduce noise impacts.

The Applicant conducted a background ambient noise level study in order to understand the existing noise levels near the proposed facility. The study included measurements at four locations on May 6 and 7, 2019. The results of that study showed that for measurement location 1, the equivalent continuous noise level ( $L_{eq}$ ) for the two-day monitoring period was 61.5 decibel A-weighting (dBA) for daytime hours and 55.5 dBA for nighttime hours. For measurement location 2, the  $L_{eq}$  for the two-day monitoring period was 65.5 dBA for daytime hours and 57.5 dBA for nighttime hours. For measurement location 3, the  $L_{eq}$  for the two-day monitoring period was 62 dBA for daytime hours and 61.5 dBA for nighttime hours. For measurement location 4, the  $L_{eq}$  for the two-day monitoring period was 68 dBA for daytime hours and 58.5 dBA for nighttime hours.

The Applicant estimated noise levels from the operation of the proposed facility. The project would use noise reduction mitigation such as enclosing noisy equipment inside buildings, and equipment specific noise reduction mitigation. The Applicant has committed to using noise mitigation measures that would reduce operational noise impacts to 61 dBA at 150 feet from the facility. Noise levels during operation would fall to the nighttime ambient  $L_{eq}$  levels of the closest ambient measurement location (No. 2) within 300 feet of the facility. The Applicant owns all property



within 300 feet of the facility, with the exception of an adjacent freeway. The Applicant has no residential units within 300 feet of the facility.

In order to minimize adverse impacts associated with increased noise levels, Staff recommends that the Applicant use the mitigation measures included in the application, or similar measures, and include procedures in its complaint resolution process for resolving noise complaints.

#### *Wind Velocity*

The Applicant has reviewed historical wind speeds at the University Airport. The Applicant doesn't anticipate adverse impacts from high wind velocities. The Applicant states that it has designed the CHP facility building in accordance with the American Society of Civil Engineers standards. The Applicant has also stated that the facility would use diagonal steel bracing to account for wind and seismic loads.

#### *Recommendations*

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 conducted a feasibility study site analysis that included five potential sites for the proposed CHP facility. Two sites were considered adjacent to the existing McCracken Power Plant on campus, two sites west of the Olentangy River and east of State Route 315, and one site west of Kenny Road and south of Lane Avenue. The Applicant's feasibility study compared configuration options, power capacity, carbon dioxide emission reductions, resiliency, expansion capability, facility footprint, costs, and efficiencies of all five options.

The Applicant determined the best location for the CHP facility would be at the corner of John H. Herrick Drive and Vernon L. Tharp Street. The proposed site is centrally located on campus, minimizes the footprint of the facility, is distant from the majority of the campus' student facilities, close to State Route 315, and is close to existing utility infrastructure and an existing duct bank underneath the Olentangy River which the Applicant could utilize for crossing the river without impacting the river. The other four options were eliminated for several reasons, including being a greater distance from campus and having limited space for construction, with others being too close to dense parts of campus such as Ohio Stadium, and being too far from the Ohio State University Wexner Medical Center and Comprehensive Cancer Center.

The Applicant states that it designed the proposed project layout to minimize disruption to the location and to existing facilities adjacent to the proposed site. The footprint of the facility has been minimized with a multi-story vertical design and placement of the cooling towers on the roof of the building. The final design of the facility would not disrupt any roads or neighboring buildings.

The Applicant followed a reasonable process for site selection and its determination of a proposed layout for the facility.

##### **Minimizing Impacts**

The Applicant has sited and designed the CHP facility in a way that minimizes potential adverse impacts. The proposed project site is located on the campus of the Ohio State University on an approximate 1.18 acres parcel of land owned by the Applicant. The immediate surrounding area is made up of urban landscape including campus buildings, State Route 315, utility infrastructure, and parking lots. One temporary construction laydown area would be required for the construction of the project. The laydown area would be located on the northeast corner of Kenny Road and Woody Hayes Boulevard. The site is approximately 8.53 acres and will be fenced and gated for security and safety purposes.

Based on the review conducted by the Applicant's cultural resource consultant, no previously recorded cultural resources were identified at the project site. The site has no known cultural resources within it, and the site is surrounded by previously developed campus infrastructure, a highway, and dense urban development. The OHPO responded in concurrence that this project

would not affect historic properties listed on or eligible for the NRHP and recommended that no further cultural resources work was needed for this project.

Construction of the proposed facility would not directly impact any streams, wetlands, lakes, reservoirs, or floodplains. The Applicant stated that it will file a Notice of Intent with the Ohio EPA for coverage under the General National Pollutant Discharge Elimination System Permit for stormwater discharges as the project would impact greater than one acre of land.

Impacts to state and federal listed species can be avoided by following seasonal restrictions for the limited amount of tree clearing required on the project site during the seasonal tree cutting dates of October 1 through March 31 in order to avoid impacts to the Indiana bat and Northern long-eared bat as detailed by the USFWS and the ODNR.

Noise impacts are expected during construction and operation of the facility. The adverse impact of construction noise would be temporary and intermittent, would occur away from all residential structures, and would be limited to daytime working hours. A requirement for the Applicant to adhere to its noise model noise mitigation measures during operation would assure minimization of noise impacts.”

During the construction period, local and state roads would experience a temporary increase in truck traffic due to deliveries of equipment and materials. No damage to roads and bridges is expected. One road, John H. Herrick Drive, would be temporarily reduced to two lanes during construction in order to maintain traffic in both directions. The Applicant stated that it will develop a final traffic plan with local officials. The final traffic plan would be submitted to Staff and docketed in the case docket prior to the preconstruction conference for review and confirmation that the Applicant developed the plan with local officials.

Due to existing viewshed impacts from other nearby campus buildings, a cell tower, and State Route 315, and the fact that tree clearing would be limited, the visual impacts would be minimum and most prominent to campus facilities in the immediate vicinity of the facility. Through measures committed to by the Applicant, the proposed facility would be compatible with the surrounding facilities and 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. Due to the low potential to impact land use, cultural resources, surface water resources, wildlife, and Staff’s recommended conditions to mitigate these impacts further, 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 ORC SECTION 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 would serve the interests of electric system economy and reliability.

The purpose of this section is to evaluate the impact of integrating the proposed facility into the existing regional transmission grid. The Applicant proposes to construct a CHP electric generating facility, capable of producing 105.5 MW. The electric power generated by the facility would be at a nominal voltage of the university's 13.8 kV distribution system. The generators would be connected to the existing Ohio State University Buckeye substation through three separate feeders of approximately 4,000 feet in length.

The proposed facility would not be connected to the regional grid and would instead entirely serve the load of the university's campus facilities.

#### **PJM Interconnection**

The Applicant is not required to initiate a new service request for generation interconnection with PJM Interconnection, LLC (PJM).<sup>33</sup> The proposed facility is behind-the-meter and not subject to the regulations of PJM.<sup>34</sup> The Applicant would be required to initiate a new service request for generation interconnection with PJM should it later decide to export power to the bulk power system.'

#### **American Electric Power Interconnection**

The Applicant submitted a "Short Form Application" interconnection request with American Electric Power (AEP) on June 3, 2019. The request was submitted in accordance with the PUCO's interconnection rules for distributed generation.<sup>35</sup>

AEP analyzed the proposed project as a 118.1 MW injection from the Ohio State University Buckeye substation to AEP at the Ohio State University 138 kV substation. A 2024 summer peak power flow model was used to evaluate the regional reliability impacts. The study revealed no reliability issues.

The proposed facility is behind-the-meter and no energy would be exported to the bulk power system. The Applicant states there would be metering and protection, such as reverse power relaying, to prevent the export of energy to the bulk power system.

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33. PJM Interconnection, LLC is the regional transmission organization charged with planning for upgrades and administering 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.

34. Behind-the-meter means an electrical generating system is connected on the user's side of a utility meter, primarily for energy usage on site instead of for sale to energy retailers.

35. Ohio Administrative Code 4901:1-22 Interconnection Services. <http://codes.ohio.gov/oac/4901:1-22>.

## **Conclusion**

The proposed 105.5 MW CHP facility would be connected to the university's internal 13.8 kV distribution system and would not be integrating into the existing regional transmission grid. The Applicant would ensure that energy cannot flow to the bulk power system by using metering and protection, such as reverse power relaying.

If the Applicant plans to export power to the bulk power system in the future, a filing must be made with the Board. In addition, the Applicant would need to initiate a new service request for generation interconnection with PJM.

## **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 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**

The proposed project site is within Franklin County which is an area classified as having better than the National Ambient Air Quality Standards. Franklin County is also designated as attainment or unclassified for the following criteria pollutants: particulate matter emissions less than 10 microns in size (PM<sub>10</sub>), particulate matter emissions less than 2.5 microns in size (PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), ozone, and lead. Staff found that Franklin County/Columbus-area is referred to as a maintenance area for ozone.<sup>36,37</sup> These assessments are based on data from a suite of air quality monitoring stations operated by the Ohio EPA throughout Franklin County.

Air pollution controls are proposed for the facility to minimize impacts to air quality. To control particulate matter (i.e., PM<sub>10</sub> and PM<sub>2.5</sub>) and SO<sub>2</sub> emissions, the Applicant would employ measures to efficiently combust pipeline quality natural gas, which the Ohio EPA air permit-to-install (PTI) defines as best available technology (BAT) for the CHP units 1 and 2.

The Applicant proposes cooling towers for the steam turbine generator (STG) condenser and DHC chiller systems. Each cooling tower would have high efficiency water mist drift eliminators and impingement baffles and other design features to minimize/eliminate offsite drift of water vapor and particulates.

The proposed combustion turbines would utilize dry low nitrogen oxides (DLN) burners integrated within the combustion turbines. The DLN burners would control the formation of NO<sub>x</sub> by pre-mixing fuel and air immediately prior to combustion. Pre-mixing inhibits formation of NO<sub>x</sub> by minimizing the flame temperature and the concentration of oxygen at the flame.

Selective catalytic reduction (SCR) is an air pollution control technology that is used to remove NO<sub>x</sub> from the flue gases that are produced during combustion of fossil fuels in turbines or boilers. SCR removes NO<sub>x</sub> through a catalyzed chemical reduction of NO<sub>x</sub> by ammonia that is introduced as a reactant in the flue gas in the presence of excess oxygen. This reaction generates nitrogen gas and water as the end products that are emitted from the stack into the atmosphere. The SCR systems would be installed in the HRSGs and would reduce emissions of NO<sub>x</sub> to four parts per million by volume. The unit would have minimal ammonia slip, limited to ten parts per million.

An oxidation catalyst bed would be located within the HRSGs, in order to control emissions of CO and volatile organic compounds (VOC) and hazardous air pollutants (HAPs). Exhaust gases

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36. Ohio EPA Division of Air Pollution Control, Map of the 2015 eight-hour ozone standard designations [https://www.epa.ohio.gov/portals/27/SIP/Nonattain/2015\\_Ozone\\_final\\_082119.pdf](https://www.epa.ohio.gov/portals/27/SIP/Nonattain/2015_Ozone_final_082119.pdf), Accessed May 20, 2020.

37. Maintenance area means an area that was previously designated as nonattainment and has been re-designated to attainment with a Clean Air Act improvement plan. (40 CFR 93.152).

from the turbines would pass over the catalyst bed where excess air would oxidize the CO, VOC, and HAPs.

The air PTI application for the project was submitted to the Ohio EPA in March 2019 and finalized on October 25, 2019. The PTI serves as the air construction permit and the initial operating permit. The Applicant would be required to apply for a Title V Permit-to-Operate within 12 months after initial startup.

Ohio EPA evaluated the air PTI application and concluded that the prevention of significant deterioration (PSD) regulations are not applicable for PM<sub>10</sub>, PM<sub>2.5</sub>, and greenhouse gas (GHG).<sup>38</sup> Ohio EPA established BAT rolling, twelve-month limitations for PM<sub>10</sub> and PM<sub>2.5</sub>. The Applicant performed an air quality analysis and air dispersion modeling analysis in accordance with Ohio EPA's engineering guides. Results indicated acceptable air quality impacts and ammonia values significantly below the maximum acceptable ground level concentration.

Some notable criteria pollutant emission limits with duct burner firing as limited in the Ohio EPA permit to install are:

- PM<sub>10</sub>, and PM<sub>2.5</sub>, shall not exceed 1.67 tons per month averaged over a rolling, 12-month period.
- NO<sub>x</sub> limited by design to 4.0 parts per million by volume at 15 percent oxygen
- CO limited by design to 0.015 lb. / MMBTU
- VOC limited by design to 0.015 lb. / MMBTU
- No BAT SO<sub>2</sub> emissions limitation was established, because the uncontrolled potential to emit for SO<sub>2</sub> is less than 10 tons per year. However, the Applicant is required to comply with the more stringent requirement of SO<sub>2</sub> emissions limitation of 1.50 lb. / MMBTU actual heat input [based on Ohio Adm.Code 3745-18-31(A)(2)] and the limitation of 0.06 lb. / MMBTU (based on the New Source Performance Standard Subpart KKKK).
- Visible particulate emissions (PE) from the stack serving this emissions unit shall not exceed 20 percent opacity as a six-minute average
- PE shall not exceed 0.040 lb. / MMBTU of actual heat input

The Applicant has addressed the possible failure of air pollution control technologies. The Applicant would install proven reliable, safe, and effective technologies used at other natural gas fired power plants. Notably, these are the DLN combustors, the oxidation catalyst, and SCR system. The Applicant has stated that it would perform regularly schedule preventive maintenance.

Within 12 months of startup of the CHP facility, the Applicant is required to apply to the Ohio EPA for a Title V Permit-to-Operate.

The Applicant stated that it intends to demonstrate compliance with emission limits by conducting annual compliance testing in accordance with the air permit. Also, the Ohio EPA would continue

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38. Application, p. 54.

to monitor the impact of the CHP facility after installation and during operation based on the multiple regional air quality monitoring stations.

Construction impacts on air quality primarily consist of relatively minor emissions from the construction equipment and from fugitive dust emissions. Construction vehicles would emit insignificant amounts of VOC, SO<sub>2</sub>, CO, NO<sub>x</sub>, and PM. These emissions are not expected to cause any significant adverse impacts to air quality.

Fugitive dust from construction related activities would be minimized through a combination of vehicle speed control, surface improvement with crushed stone or gravel, routine watering, or spraying with a physical or chemical stabilizing agent (i.e. dust suppressants).

With these measures, construction and operation of this facility would comply with requirements of R.C. Chapter 3704, and the rules and laws adopted under that chapter.

## **Water**

While construction of the proposed facility would not require the use of significant amounts of water, operation of the proposed facility would. During operation the CHP facility would use approximately 550 gallons per minute on average and up to 787 gallons per minute maximum. Water would be obtained through the university's existing domestic water distribution system and ultimately supplied from the City of Columbus. The water would be used for process water, fire protection, and sanitary uses. Staff has reviewed and found acceptable the Applicant's proposed conceptual quantitative flow diagram, which indicates the water balance and water consumption for the facility's operation.

The Applicant has indicated that applicable permits and plans would be limited to:

- Ohio NPDES construction storm water general permit, Ohio EPA Permit No. OHC000003
- Stormwater Pollution Prevention Plan (SWPPP)
- Spill Prevention Control and Countermeasures (SPCC) plan
- A General Stormwater Permit No Exposure Certification, because the CHP facility will be mainly contained within a building.
- A sewer tap permit application to be filed by the city-licensed sewerage contractor to connect the wastewater plumbing to the university's existing wastewater system.

The Applicant indicates that the SPCC and SWPPP plans would be developed 60 to 90 days ahead of the start of construction and can be provided to OPSB once developed.

The construction or operation of the CHP facility are not anticipated to result in any impacts to wetlands or other waters of the United States. Therefore, Clean Water Act Sections 401 and 404 certifications and permits for wetlands are not applicable to this project.

The Applicant expects that effluent wastewater from the CHP process will be of a quality to be able to be discharged into the university's existing wastewater system. The circulation and cooling water blowdowns have integrated water treatment and monitoring systems. The Applicant indicates that if the cooling tower blowdown control system indicates a problem where the wastewater is unable to be discharged, then it would be evaluated and isolated and treated using a



local sump or trucked offsite for disposal. Staff found that the Applicant had multiple discussions with the City of Columbus, which led to the decision to connect the CHP building sanitary lines to the city's sanitary mains with a lateral sewer tap and associated permit.

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 this chapter.

### **Solid Waste**

The project site currently hosts two hoop style greenhouses. The Applicant plans to dismantle these structures. Some of the materials may be reused by the university at another location. The Applicant also indicates that all debris from the demolition of any existing structure would be sent to a recycling facility, composted, or disposed at a licensed facility.

The Applicant estimates that approximately 1,200 cubic yards of construction debris could be generated from construction of the proposed facility. Solid waste generated from construction activities would include packing materials, office waste, scrap lumber, metals, cables, glass, cardboard containers, and other miscellaneous debris. In addition, during construction and pre-operational cleaning, some solvents and flushing materials would be used. During operation, SCR catalysts would be removed and returned to a catalyst vendor for regeneration, salvage, or disposal. Also, some cleaning solvents and flushing materials may be used just prior to facility operation.

Solid waste that can be neither recycled nor reused would be stored in on-site containers for disposal. The Applicant would develop procedures to ensure that potentially hazardous wastes are separated from normal waste, including segregation of storage areas and proper labeling of containers.

During operation of the facility, the Applicant expects that solid waste would consist of office refuse, paper and miscellaneous trash, spent chemical and lubrication oil containers, water treatment waste, spare parts, and packaging.

All solid waste generated would be trucked off site by licensed contractors in accordance with applicable regulatory requirements and managed in licensed facilities. The Applicant would have an SPCC plan in place for any spill cleanup.

The Applicant's solid waste disposal plans comply with solid waste disposal requirements in R.C. Chapter 3734, and the rules and laws adopted under this chapter.

### **Aviation**

The tallest anticipated above ground permanent structures would be the HRSG stacks at 115 feet tall. The Applicant also indicated that it would utilize a 170-foot temporary tower crane during the construction of the proposed facility. A separate temporary construction permit would need to be obtained from the Federal Aviation Administration (FAA), which would detail the height, operating conditions, and duration of the crane work. The Applicant stated it would provide Staff confirmation of the filing after it has been finalized by the construction contractor.

The Applicant provided notice to public and private-use airports within a five-mile radius of the proposed CHP facility. The Applicant also found that filing Form 7460-1 with the FAA is not

required because the HRSG stack heights and distance from the Ohio State University Wexner Medical Center heliport were not sufficient to require filing, pursuant to 14 CFR Part 77.9(b)(3).

Staff contacted the ODOT Office of Aviation during the review of this application, in accordance with R.C. 4906.10(A)(5) and 4561.341, to consult and determine potential impacts of the proposed HRSG stacks on local airports. Staff and ODOT Office of Aviation found that none of the proposed structures exceed 199 feet above ground level and the project does not meet notification criteria and does not require filing a Form 7460-1 with the FAA.

#### *Recommendations*

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 Safety**

The Applicant states that all equipment, except for the service water tank, would be housed within the CHP building. The Applicant would limit and control access to the CHP facility. The Applicant would install various alarms and control systems to provide an early detection system.

The Applicant stated that the project would be designed in accordance with applicable safety regulations, including Occupational Safety and Health Administration and National Fire Protection Association requirements, and industry standards. Facility personnel would be trained to operate the equipment in a safe and reliable manner. Staff concurs with the Applicant's commitment to secure pertinent federal and state environmental permits, and construct and operate the facility in accordance with all applicable environmental and safety regulations.

The Applicant has committed to develop an emergency response program which would require coordination with local fire, medical, and emergency responders to supplement its existing onsite capabilities. The Applicant has developed, and Staff has reviewed, the Applicant's emergency plan for construction and operation, the Applicant's site-specific safety plan, and Engie's Building Emergency Plan. The Applicant has committed to update the emergency plans as needed through design, construction, and operations. According to the Applicant, the plans comply with university policy, Occupational Health and Safety Policy, applicable Ohio Fire Code sections, and R.C. Chapter 4167, Ohio Employees Risk Reduction Act.

##### **Fire Protection System**

The Applicant states that the CHP building design will comply with the university's extensive building design standards contained in Exhibit C of the Application. A complete fire protection/detection system would be provided for the facility. The system would include a fixed water fire suppression system, fire hose stations, hydrants, portable fire extinguishers, and detection and control systems. The fire protection system would be designed and installed in accordance with National Fire Protection Association standards and insurer's recommendations.

The Applicant has committed to collaborate with local emergency responders to further develop the emergency response plan that would supplement existing onsite emergency response capabilities.

##### **Public Interaction and Participation**

The Applicant hosted a public informational open house on September 26, 2019. Attendees were provided the opportunity to view maps of the project, speak with representatives of the Applicant, and provide feedback.

The Applicant indicated that it served copies of the complete application on the Franklin County Board of Commissioners, the Franklin County Economic Development and Planning Commission, the Franklin County Soil and Water Conservation District, the Franklin County Engineer, the City of Columbus, and the Clinton Township Board of Trustees. The Applicant indicated that it sent an

electronic copy of the complete application to the Columbus Metropolitan Library and the Columbus Metropolitan Library – Northside. Copies of the complete application are also available for public inspection at the offices of the PUCO and on the PUCO online Docketing Information System website.

The Applicant's website at <https://buildingthefuture.osu.edu/combined-heat-and-power-plant> provides information about the project. The Applicant stated that it will notify affected property owners and tenants at least seven days prior to the start of construction and will utilize its existing 24/7/365 one-call service system to receive and process complaints. Staff recommends that the Applicant provide similar notice to affected property owners and tenants at least seven days prior to the start of operation.

The Sierra Club has filed a petition for leave to intervene in the case. The OPSB will conduct a local public hearing for this case on Tuesday, June 30, 2020, beginning at 6:00 p.m. The adjudicatory hearing is scheduled to commence on Tuesday, July 14, 2020, at 10:00 a.m. The local public and adjudicatory hearings will both be held using remote access technology that facilitates participation by telephone and/or live video on the internet.

#### *Recommendations*

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.

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

#### **AGRICULTURAL DISTRICTS AND AGRICULTURAL LAND**

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 lands were identified within the project area (including the laydown area). No agricultural district land would be disturbed in association with the construction of the proposed facility. No impacts to field operations, irrigation, or field drainage systems associated with agricultural district lands would occur as a result of the construction, operation, or maintenance of the proposed facility.

No impacts to field operations, drainage or irrigation systems would occur to agricultural or agricultural district land as a result of this project. The surrounding area is a highly developed campus setting.

#### **Recommended Findings**

Staff recommends that the Board find that because no agricultural district land is present within the project area of the proposed facility, the proposed facility would not impact the viability of agricultural district land, and therefore the application complies with the requirements specified in R.C. 4906.10(A)(7).

### **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.

While construction of the proposed facility would not require the use of significant amounts of water, operation of the proposed facility would require the use of a significant amount of water, approximately 550 gallons per minute on average and up to 787 gallons per minute maximum. Water would be obtained through the university's existing domestic water distribution system ultimately supplied from the City of Columbus. The water would be used for process water, fire protection, and sanitary uses. Staff has reviewed the Applicant's proposed water balance and water consumption analysis, i.e. quantitative flow diagram, for the facility's operation.

The proposed facility design incorporates significant water conservation measures. These measures include maximizing the cycles of concentration to reduce water intake requirements, cooling tower drift elimination system, reclamation of the wastewater streams, in particular from the reverse osmosis system and HRSG blowdown, as cooling tower makeup. This would minimize makeup with domestic water from the City of Columbus. The proposed facility would also be incorporated into the Ohio State University's resource stewardship water conservation goals which include reducing potable water consumption by 5 percent per capita every five years and resetting its baseline every five years.

#### **Recommended Findings**

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), 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.

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#### **IV. RECOMMENDED CONDITIONS OF CERTIFICATE**

Following a review of the application filed by The Ohio State University, 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 Applicant shall comply with the applicable requirements established by the Ohio Administrative Code chapter 4906-1, et seq., and shall install the facility, utilize equipment and construction practices, and implement mitigation measures as described in the application and as modified and/or clarified in supplemental filings, replies to data requests, and recommendations in this *Staff Report of Investigation*.
- (2) The Applicant shall docket a detailed construction project schedule within 7 days of the date of journalization of the certificate.
- (3) The certificate authority provided in this case shall not exempt the facility from any other applicable and lawful local, state, or federal rules or regulations nor be used to affect the exercise of discretion of any other local, state, or federal permitting or licensing authority with regard to areas subject to their supervision or control.
- (4) 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.
- (5) The Applicant shall coordinate with local building code enforcement officials with regard to the construction of any new structures, or modification of any existing structures, not directly related to the operation of the generation facility.
- (6) At least 30 days prior to the preconstruction conference, the Applicant shall submit to Staff, for review and acceptance, one set of detailed engineering drawings of the final project design and mapping in the form of PDF, which the Applicant shall also file on the docket of this case, and geographically referenced data (such as shapefiles or KMZ files) based on final engineering drawings to confirm that the final design is in conformance with the certificate. Mapping shall include the limits of disturbance, permanent and temporary infrastructure locations, areas of vegetation removal and vegetative restoration as applicable, and specifically denote any adjustments made from



the siting detailed in the application. All final geotechnical study results shall be included in this submission.

- (7) During the construction and operation of the facility, the Applicant shall submit to Staff a complaint summary report by the fifteenth day of April, July, October, and January of each year. The report should include a list of all complaints received through the Applicant's complaint resolution program, a description of the actions taken toward a resolution of each complaint, and a status update if the complaint has yet to be resolved.

### **ECOLOGICAL CONDITIONS**

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

- (8) 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.

### **PUBLIC SERVICES, FACILITIES, AND SAFETY CONDITIONS**

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

- (9) The Applicant shall submit to Staff the final traffic plan that provides details of coordination with the pertinent government authorities, prior to the preconstruction conference for Staff's review and confirmation that it complies with the requirements of the certificate. The Applicant shall also file a copy of the final traffic plan on the docket of this case.
- (10) The Applicant shall not have a physical or electrical interconnection with the Transmission System pursuant to the PJM Open Access Transmission Tariff (OATT), Part IV or OATT Part VI.



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