

# Letter of Notification for the Shannon-Astor 138 kV Transmission Line Rebuild Project



PUCO Case No. 23- 0040-EL-BLN

Submitted to:  
The Ohio Power Siting Board  
Pursuant to Ohio Administrative Code  
Section 4906-6-05

Submitted by:  
AEP Ohio Transmission Company, Inc.

January 20, 2023

LETTER OF NOTIFICATION

AEP Ohio Transmission Company, Inc.

Shannon-Astor 138 kV Transmission Line Rebuild Project

**4906-6-05 Accelerated Application Requirements**

AEP Ohio Transmission Company, Inc. (“AEP Ohio Transco” or the “Company”) provides the following information to the Ohio Power Siting Board (“OPSB”) in accordance with the accelerated application requirements of Ohio Administrative Code Section 4906-6-05.

**4906-6-05(B) General Information**

**B(1) Project Description**

**The name of the project and applicant's reference number, names and reference number(s) of resulting circuits, a brief description of the project, and why the project meets the requirements for a Letter of Notification.**

The Company proposes the Shannon – Astor 138 kilovolt (“kV”) Transmission Line Rebuild Project (the “Project”), located in the cities of Columbus and Reynoldsburg, as well as the village of Brice, within Truro Township, Franklin County, Ohio. The Company proposes to rebuild 2.2 miles of the existing –Shannon – Astor 138 kV Transmission Line between the existing Astor Substation and a point where the existing Shannon – Astor 138 kV Transmission Line intersects with the proposed Groves Road – Shannon 138 kV Transmission Line (approved in Case No. 21-0199-EL-BTX), just north of the intersection of Refugee Road and Brice Road. The Project will require replacing aging wood monopole structures with steel monopole structures for the entire 2.2 miles. The Project will primarily be rebuilt within existing right-of-way (ROW). However, approximately 0.1 mile of the Project along Astor Avenue will be rebuilt slightly off-centerline to move structures outside of residential properties and minimize impacts to existing buildings along Astor Avenue. Additionally, an approximately 0.2-mile portion of the Project between Gender Road and Chantry Drive will be rebuilt off-centerline but within the existing ROW to minimize impacts to an existing building. An approximately 0.1-mile portion of the existing Shannon – Astor 138 kV Transmission Line over Interstate 70 (I-70) will not be rebuilt as part of the Project, as it was previously rebuilt as part of a separate project (approved in Case No. 18-1170-EL-BLN). Figures 1 and 2 show the location of the Project.

The Project meets the requirements for a Letter of Notification (“LON”) as defined by Items 2(b) of Appendix A to Ohio Administrative Code Section 4906-1-01, *Application Requirement Matrix for Electric Power Transmission Lines*:

(2) *Adding new circuits on existing structures designed for multiple circuit use, replacing conductors on existing structures with larger or bundled constructors, adding structures to an existing transmission line, or replacing structures with a different type of structure, for a distance of:*

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*(b) More than two miles.*

The Project has been assigned Case No. 23-0040-EL-BLN.

### **B(2) Statement of Need**

**If the proposed Letter of Notification project is an electric power transmission line or gas or natural gas transmission line, a statement explaining the need for the proposed facility.**

Regardless of which route is selected for the Groves Road – Shannon 138 kV Transmission Line Project, the entirety of the Shannon – Astor 138 kV Transmission Line must be rebuilt. The Shannon – Astor 138 kV Transmission Line was originally constructed in 1950s with wood poles, the majority of which are still in service along with the original conductor.

There are several open conditions on this line, including split/rotted poles, missing/broken guying and ground leads, and several ROW encroachments. A recent engineering analysis of the line identified that 42 percent of the line structures are physically overloaded under the National Electrical Safety Code (NESC) heavy loading conditions. These overloaded structures parallel public roads and pose a threat to public safety if not addressed. Rebuilding this line is also necessary to enable the installation of telecommunications fiber for Supervisory Control and Data Acquisition (SCADA), fiber networking, and relaying requirements. The required telecom fiber installed along the Shannon – Astor line supports AEP's data center in the area and supports communication between the Shannon, Brice, and Astor substations. If the line is not rebuilt, 53 percent of the line's existing structures would fail under NESC heavy loading conditions and additional structures would need to be installed to support the new telecom fiber. The Project supports 106 megavolt amperes (MVA) of customer peak load at Ohio Power Company's Shannon Station and South Central Power's Shannon Road Station.

Failure to move forward with this Project could lead to structure failures, resulting in future outages to customers as the line continues to deteriorate.

The need and solution for the Shannon – Astor 138 kV Transmission Line rebuild were presented and reviewed with stakeholders at the November 29<sup>th</sup>, 2018 and June 19<sup>th</sup>, 2020 PJM Subregional Regional Transmission Expansion Plan (SRRTEP) Western meetings. The Project was subsequently assigned PJM s2282. The Project is listed in the Company's 2022 Long Term Forecast Report on page 87 (Table FE-T9, Planned Transmission Lines), see **Appendix B**.

### **B(3) Project Location**

**The applicant shall provide the location of the project in relation to existing or proposed lines and substations shown on an area system map of sufficient scale and size to show existing and proposed transmission facilities in the Project area.**

The location of the Project in relation to existing transmission lines and substations is shown on Figure 1 in **Appendix A**. Figure 2, in **Appendix A**, identifies the Project components on a 2019 aerial photograph.

#### **B(4) Alternatives Considered**

**The applicant shall describe the alternatives considered and reasons why the proposed location or route is best suited for the proposed facility. The discussion shall include, but not be limited to, impacts associated with socioeconomic, ecological, construction, or engineering aspects of the project.**

The majority of the proposed Project will be rebuilt on centerline and entirely within existing ROW. Therefore, major route alternatives were not considered for the existing transmission line. Based on desktop and field examinations, the Company concluded that only minor deviations from the existing alignment were necessary and presented the most reasonable alternative for the Project. The Project route is short, direct, and uses existing ROW to minimize impacts. Further, the Project route minimizes viewshed impacts, parallels a road for nearly the entire length of its route, minimizing access impacts, and would not limit future development in the area. Additionally, the design provides for proper clearances within the existing ROW and existing ROW easements permit rebuilding and upgrading the existing line. Ecological and cultural surveys were conducted within the existing easement, and it was determined that no cultural or wetland features would be permanently impacted by the Project.

#### **B(5) Public Information Program**

**The applicant shall describe its public information program to inform affected property owners and tenants of the nature of the project and the proposed timeframe for project construction and restoration activities.**

The Company will inform affected property owners and tenants about this Project through several different mediums. Within seven days of filing this LON, the Company will issue a public notice in a newspaper of general circulation in the Project area. The notice will comply with all requirements of OAC Section 4906-6-08(A)(1-6). Further, the Company will mail a letter via first class mail to affected landowners, tenants, contiguous owners, and any other landowner the Company may approach for an easement necessary for the construction, operation, or maintenance of the Project. The letter will comply with all requirements of OAC Section 4906-6-08(B). The Company maintains a website (<http://aeptransmission.com/ohio/>) which hosts an electronic copy of this LON and the public notice of this LON. An electronic and paper copy of the LON will be served to the public library in each political subdivision affected by this Project. In addition, the Company retains ROW land agents that discuss Project timelines, construction and restoration activities and convey this information to affected owners and tenants.

#### **B(6) Construction Schedule**

**The applicant shall provide an anticipated construction schedule and proposed in-service date of the project.**

Construction of the Project is planned to begin in April 2023 with an anticipated in-service date of May 2024.



**B(7) Area Map**

**The applicant shall provide a map of at least 1:24,000 scale clearly depicting the facility with clearly marked streets, roads, and highways, and an aerial image.**

Figure 1, in **Appendix A**, identifies the location of the Project area on a United States Geological Survey 1:24,000 quadrangle Reynoldsburg map. **Appendix A**, Figure 2 is a 2019 aerial map of the Project area.

To visit the Project from downtown Columbus, Ohio, take I-70 E for 10 miles. Take exit 110B for Brice Road N toward Reynoldsburg for 1.5 miles. Turn left onto Roselawn Avenue for 0.2 mile to arrive at Astor Substation. The address for Astor Station is 5918 Roselawn Avenue, Columbus, Ohio 43232, at latitude 39.946437, longitude -82.834232.

**B(8) Property Agreements**

**The applicant shall provide a list of properties for which the applicant has obtained easements, options, and/or land use agreements necessary to construct and operate the facility and a list of the additional properties for which such agreements have not been obtained.**

The Project will be constructed primarily within existing ROW. **Appendix C** provides a table of property parcel numbers with an indication as to whether the easement/option necessary to construct and operate the facility has been obtained.

**B(9) Technical Features**

**The applicant shall describe the following information regarding the technical features of the project:**

**B(9)(a) Operating characteristics, estimated number and types of structures required, and right-of-way and/or land requirements.**

The rebuilt Shannon – Astor 138 kV Transmission Line is estimated to include the following:

Voltage:	138 kV
Conductors:	795 KCM 26/7 ACSR Drake
Static Wire:	One (1) 7#8 Alumoweld
Insulators:	Polymer
ROW Width:	60 feet
Structure Types:	Five (5) single circuit steel monopole running angles Four (4) single circuit steel monopole dead ends One (1) double circuit davit arm Steel Monopole Thirty-three (33) single circuit steel monopole braced post structures

**B(9)(b) Electric and Magnetic Fields**

**For electric power transmission lines that are within one hundred feet of an occupied residence or institution, the production of electric and magnetic fields during the operation of the proposed electric power transmission line.**

**B(9)(b)(i) Calculated Electric and Magnetic Field Strength Levels****i) Calculated Electric and Magnetic Field Levels**

Three loading conditions were examined: (1) Normal Maximum Loading, (2) Emergency Loading, and (3) Winter Normal Conductor Rating, consistent with the OPSB requirements. Normal Maximum Loading represents the peak flow expected with all system facilities in service; daily/hourly flows fluctuate below this level. Emergency loading is the maximum current flow during unusual (contingency) conditions, which exist only for short periods of time. Winter normal (WN) conductor rating represents the maximum current flow that a line, including its terminal equipment, can carry during winter conditions. It is not anticipated that this circuit would operate at its WN rating in the foreseeable future.

EMF levels were computed one meter above ground under the line and at the ROW edges (30/30 feet, left/right, of centerline).

The Company's results, calculated using EPRI's EMF Workstation 2015 software, are summarized below.

<b>Astor-Brice 138 kV Line</b>					
<b>Condition</b>	<b>Load (A)</b>	<b>Phasing Arrangements</b>	<b>Sag (feet)</b>	<b>Electric Field (kV/m)*</b>	<b>Magnetic Field (mG)*</b>
<b>(1) Normal Max. Loading<sup>^</sup></b>	143.25	A-B-C	5.74	0.21/0.38/0.27	2.67/3.64/3.08
<b>(2) Emergency Line Loading<sup>^^</sup></b>	442.74	A-B-C	6.51	0.21/0.39/0.27	6.65/9.11/7.69
<b>(3) Winter Conductor Rating<sup>^^^</sup></b>	1361.31	A-B-C	5.74	0.21/0.38/0.27	25.36/34.6/29.26

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Brice - Shannon 138 kV Line with distribution (13.2 kV)					
Condition	Load (A) Transmission/ distribution	Phasing Arrangements	Sag (feet) Transmission/ distribution	Electric Field (kV/m)*	Magnetic Field (mG)*
(1) Normal Max. Loading <sup>^</sup>	92.15/0.04	A-B-C	5.52/6.79	0.1/0.13/0.14	1.74/2.31/1.98
(2) Emergency Line Loading <sup>^^</sup>	297.39/0.04	A-B-C	7.21/8.77	0.1/0.14/0.14	5.81/7.78/6.63
(3) Winter Conductor Rating <sup>^^^</sup>	1361.31/0.04	A-B-C	5.52/6.79	0.1/0.13/0.13	25.73/34.13/29.24

\*EMF levels (left ROW edge/maximum/right ROW edge) computed one meter above ground at the point of minimum ground clearance, assuming balanced phase currents and 1.0 P.U. Voltages. ROW width is 30 feet (left) and 30 feet (right) of centerline, respectively.

<sup>^</sup>Peak line flow expected with all system facilities in service.

<sup>^^</sup>Maximum flow during a critical system contingency

<sup>^^^</sup>Maximum continuous flow that the line, including its terminal equipment, can withstand during winter conditions.

For power-frequency EMF, IEEE Standard C95.6TM-2002 recommends the following limits:

	General Public	Controlled Environment
	-----	-----
Electric Field Limit (kV/m)	5.0	20.0
Magnetic Field Limit (mG)	9040	27,100

The above EMF levels are well within the limits specified in IEEE Standard C95.6TM-2002. Those limits have been established to "prevent harmful effects in human beings exposed to electromagnetic fields in the frequency range of 0-3 kHz."

**B(9)(b)(ii) Design Alternatives**

**A discussion of the applicant's consideration of design alternatives with respect to electric and magnetic fields and their strength levels, including alternate conductor configuration and phasing, tower height, corridor location, and right-of-way width.**

Design alternatives were not considered due to EMF strength levels. Transmission lines, when energized, generate EMF. Laboratory studies have failed to establish a strong correlation between exposure to EMF and effects on human health. However, some people are concerned that EMF have impacts on human health. Due to these concerns, EMF associated with the new circuits was calculated and set forth in the table above. The EMF was computed in a manner to maximize the estimate, assuming the highest reasonable input values based on conditions along the proposed transmission line rebuild. Normal daily EMF levels would be less than these, which were calculated at maximum load conditions. Based on studies from the National Institutes of Health, the magnetic field (measured in milliGauss, or mG) associated with emergency loading at the highest EMF value for this transmission line is lower than those associated with normal household appliances like microwave ovens, electric shavers, and hair dryers. For additional information regarding EMF, the National Institutes of Health has posted information on their website:

<http://www.niehs.nih.gov/health/topics/agents/emf/>.

Additionally, information on electric and magnetic fields is available on the Company's website: <https://www.aepohio.com/info/projects/emf/OurPosition.aspx>. The information found on the Company's website describes the basics of electromagnetic field theory, scientific research activities, and EMF exposures encountered in everyday life. Similar material will be made available for those affected by the construction activities for this Project.

**B(9)(b)(ii)(c) Project Cost**

**The estimated capital cost of the project.**

The capital costs estimate for the proposed Project, which is comprised of applicable tangible and capital costs, is approximately \$16.5 million using a Class 4 estimate. Pursuant to the PJM OATT, the costs for this Project will be recovered in the AEP Ohio Transmission Company's FERC formula rate (Attachment H-20 to the PJM OATT) and allocated to the AEP Zone.

**B(10) Social and Economic Impacts**

**The applicant shall describe the social and ecological impacts of the project:**

**B(10)(a) Operating Characteristics**

**Provide a brief, general description of land use within the vicinity of the proposed project, including a list of municipalities, townships, and counties affected.**

The Project is located in the cities of Columbus and Reynoldsburg, as well as the village of Brice, within Truro Township, Franklin County, Ohio. Land use in the Project area is predominantly commercial

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and residential, as classified by the Franklin County Auditor. Large residential subdivisions and properties are located in the northern and southern portions of the Project area. Commercial development is concentrated in the western and eastern portions of the Project area. There are three churches within 1,000 feet of the centerline of the Project, including: Faithway Baptist Church, New Faith Ministries, and Calvary Chapel of Columbus. Faithway Baptist Church is located adjacent southwest of Old Refugee Road and Brice Road; New Faith Ministries is located adjacent to Brice Road within the Project area; and Calvary Chapel of Columbus is located adjacent to Livingston Avenue. Shelbourne Parkland is located adjacent northwest of Old Refugee Road and Brice Road. No additional impacts are anticipated as the existing transmission line will be rebuilt within existing ROW and thereby minimizes effects on the existing viewshed and existing land use. There are no schools, cemeteries, wildlife management areas, or nature preserve lands located within 1,000 feet of the centerline of the Project.

### **B(10)(b) Agricultural Land Information**

**Provide the acreage and a general description of all agricultural land, and separately all agricultural district land, existing at least sixty days prior to submission of the application within the potential disturbance area of the project.**

No properties registered as agricultural district land are crossed by the Project based on email coordination with the Franklin County Auditor's Office on January 18, 2023. The Project does not occupy agricultural land, including row crop land or pasture/hay field and old field land use. The existing land use in the vicinity of the Project is predominately residential and commercial development.

### **B(10)(c) Archaeological and Cultural Resources**

**Provide a description of the applicant's investigation concerning the presence or absence of significant archaeological or cultural resources that may be located within the potential disturbance area of the project, a statement of the findings of the investigation, and a copy of any document produced as a result of the investigation.**

The Company's consultant completed Phase I Archaeological and Phase I History/Architectural surveys to be coordinated with the State Historic Preservation Office ("SHPO"). The Company's consultant recommended that the Project will have no adverse effect on historic properties and no further cultural resource work would be necessary. The results were coordinated with SHPO and responses were received on May 23, 2020 and May 21, 2021. SHPO concurred with the recommendations that the Project will have no effect on historic properties, no further cultural resource work is necessary, and no further coordination with SHPO is necessary (see **Appendix D**).

**B(10)(d) Local, State, and Federal Agency Correspondence**

**Provide a list of the local, state, and federal governmental agencies known to have requirements that must be met in connection with the construction of the project, and a list of documents that have been or are being filed with those agencies in connection with siting and constructing the project.**

A Notice of Intent (“NOI”) will be filed with the Ohio Environmental Protection Agency for authorization of construction storm water discharges under General Permit OHC000005. The Company will also submit a Storm Water Pollution Prevention Plan (SWPPP) to the City of Columbus that adheres to the City’s permit requirements. The Company will implement and maintain best management practices as outlined in the Project-specific SWPPP to minimize erosion sediment to Project surface waters during storm events.

The Company’s consultant identified two wetlands, three streams, one freshwater pond, and two retention basins within the project area. No PFO wetlands were identified; therefore, no permanent impacts (tree clearing) from PFO wetland conversion is anticipated. No proposed structures will be installed in any streams or ponds (see **Appendix E**).

The Project is not located within the Federal Emergency Management Agency’s (“FEMA”) 100-year floodplain. No floodplain permitting is therefore required for the Project. A local stormwater permit will be obtained from Franklin County, the City of Columbus, and/or the City of Reynoldsburg, prior to the start of construction.

There are no other known local, state, or federal requirements that must be met prior to commencement of the Project.

**B(10)(e) Threatened, Endangered, and Rare Species**

**Provide a description of the applicant's investigation concerning the presence or absence of federal and state designated species (including endangered species, listing, and species of special interest) that may be located within the potential disturbance area of the project, a statement of the findings of the investigation, and a copy of any document produced as a result of the investigation.**

On February 17, 2019, the Company’s consultant submitted coordination letters to the United States Fish and Wildlife Service (“USFWS”) and the Ohio Department of Natural Resources (“ODNR”) Ohio Natural Heritage Program (“ONHP”) and Division of Wildlife (“DOW”), seeking an environmental review of the Project for potential impacts to threatened or endangered species. The USFWS provided a response on March 12, 2020 (TAILS# o3E15000-2020-TA-1006) and ODNR provided a response on April 14, 2020, see **Appendix D**.

The March 12, 2020 USFWS coordination letter indicated that the Project is within the range of the Indiana bat and northern long-eared bat in Ohio. The ODNR ONHP response indicated that the Project is not located within a 1-mile radius of any state threatened, endangered and protected species.

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The ODNR ONHP response also indicated that the Walter A. Tucker State Nature Preserve, Blacklick Woods Metro Park, Pickerington Ponds Metro Park, and Blacklick Creek Greenway Trail are located within a 1-mile radius of the Project. No impacts are anticipated as these parks, preserves, and trail are not crossed by the Project.

The ODNR DOW indicated that the Project lies within the range of the following state threatened and federally endangered species: the state endangered and federally endangered Indiana bat (*Myotis sodalis*). The DOW recommends seasonal tree cutting for trees  $\geq 3$  inches diameter at breast height (dbh) between October 1 and March 31 to avoid adverse impacts to these species. Only minimal tree clearing (approximately 0.05 acre) is required for the Project. The Company anticipates the need to clear trees to rebuild the line outside of the seasonal restriction period. The Company will coordinate with ODNR and USFWS throughout the construction process to mitigate potential impacts to these species.

The ODNR DOW also indicated the Project lies within range of the following state endangered species: purple cat's paw (*Epioblasma o. obliquata*); clubshell (*Pleurobema clava*); northern riffleshell (*Epioblasma torulosa rangiana*); rayed bean (*Villosa fabalis*); rabbitsfoot (*Quadrula cylindrica cylindrica*); snuffbox (*Epioblasma triquetra*); long solid (*Fusconaia maculate maculata*); Ohio pigtoe (*Pleurobema cordatum*); pocketbook (*Lampsilis ovata*); washboard (*Megaloniaias nervosa*); elephant-ear (*Elliptio crassidens crassidens*); black sandshell (*Ligumia recta*); threehorn wartyback (*Obliquaria reflexa*); pondhorn (*Unio merus tetralasmus*); fawnsfoot (*Truncilla donaciformis*); Scioto madtom (*Noturus trautmani*); popeye shiner (*Notropis ariommus*); northern brook lamprey (*Ichthyomyzon fossor*); spotted darter (*Etheostoma maculatum*); shortnose gar (*Lepisosteus platostomus*); tonguetied minnow (*Exoglossum laurae*); paddlefish (*Polyodon spathula*); and, Tippecanoe darter (*Etheostoma Tippecanoe*). No in-water work is proposed for the Project; therefore, ODNR indicates that no impacts to the above-listed fish and mussel species are likely.

The ODNR DOW also indicated the Project lies within the range of the upland sandpiper (*Bartramia longicauda*), a state endangered bird. Nesting upland sandpipers utilize dry grasslands including native grasslands, seeded grasslands, grazed and ungrazed pasture, hayfields, and grasslands established through the Conservation Reserve Program (CRP). The Project area is primarily commercial and residential land. The Company's consultant did not identify suitable nesting habitat within the Project area (**Appendix E**). No adverse effects to the upland sandpiper or its habitat are anticipated.

**B(10)(f) Areas of Ecological Concern**

**Provide a description of the applicant's investigation concerning the presence or absence of areas of ecological concern (including national and state forests and parks, floodplains, wetlands, designated or proposed wilderness areas, national and state wild and scenic rivers, wildlife areas, wildlife refuges, wildlife management areas, and wildlife sanctuaries) that may be located within the potential disturbance area of the project, a statement of the findings of the investigation, and a copy of any document produced as a result of the investigation.**

In January 2020 and February and May 2021, wetland and stream delineation surveys were completed by the Company's consultant for an approximately 4.8-mile-long Environmental Survey Corridor (ESC), from the Astor Substation to the Shannon Substation (including the Project and a portion of the Groves Road-Shannon 138 kV Transmission Line Project), totaling approximately 69.2 acres (**Appendix E**). During the field surveys, five wetlands, seven streams, one freshwater pond, and seven detention basins were delineated within the ESC. The identified ecological features within the approximately 2.2-mile section of the existing transmission line associated with the Project are described below. Additional features delineated outside the Project area, as part of the Groves Road-Shannon 138 kV Transmission Line Project, are included in the Environmental Survey Report (**Appendix E**).

Two wetlands were delineated within the Project area and are proposed to be crossed by the Project. Both identified wetlands were classified as Palustrine Emergent (PEM) wetlands. No wetlands were classified as Palustrine Forested (PFO) or Palustrine Scrub Shrub (PSS). The Company does not anticipate any permanent impacts to wetlands by Project construction.

Four streams were delineated within the Project area. These include three intermittent streams and one perennial stream. Two perennial streams were crossed by the Project. Structures will not be installed in any streams. Therefore, the Company does not anticipate any impacts to the identified streams by Project construction.

A freshwater pond was delineated within the Project area. The pond appears to be man-made and was hydrologically connected to Blacklick Creek (**Appendix E**). Additionally, two man-made detention basins were identified within the Project area. Structures will not be installed in any ponds or detention basins. Therefore, the Company does not anticipate any impacts to the identified ponds by Project construction.

The FEMA Flood Insurance Rate Map (map numbers 39049C0354K and 39049C0362K) were reviewed to check for the presence of floodplains/flood hazard areas within the Project area. The Project area is not within any mapped FEMA floodplains or floodways. Therefore, no floodplain permitting is expected to be required for the Project.

No other areas of ecological concern were identified within the Project area.

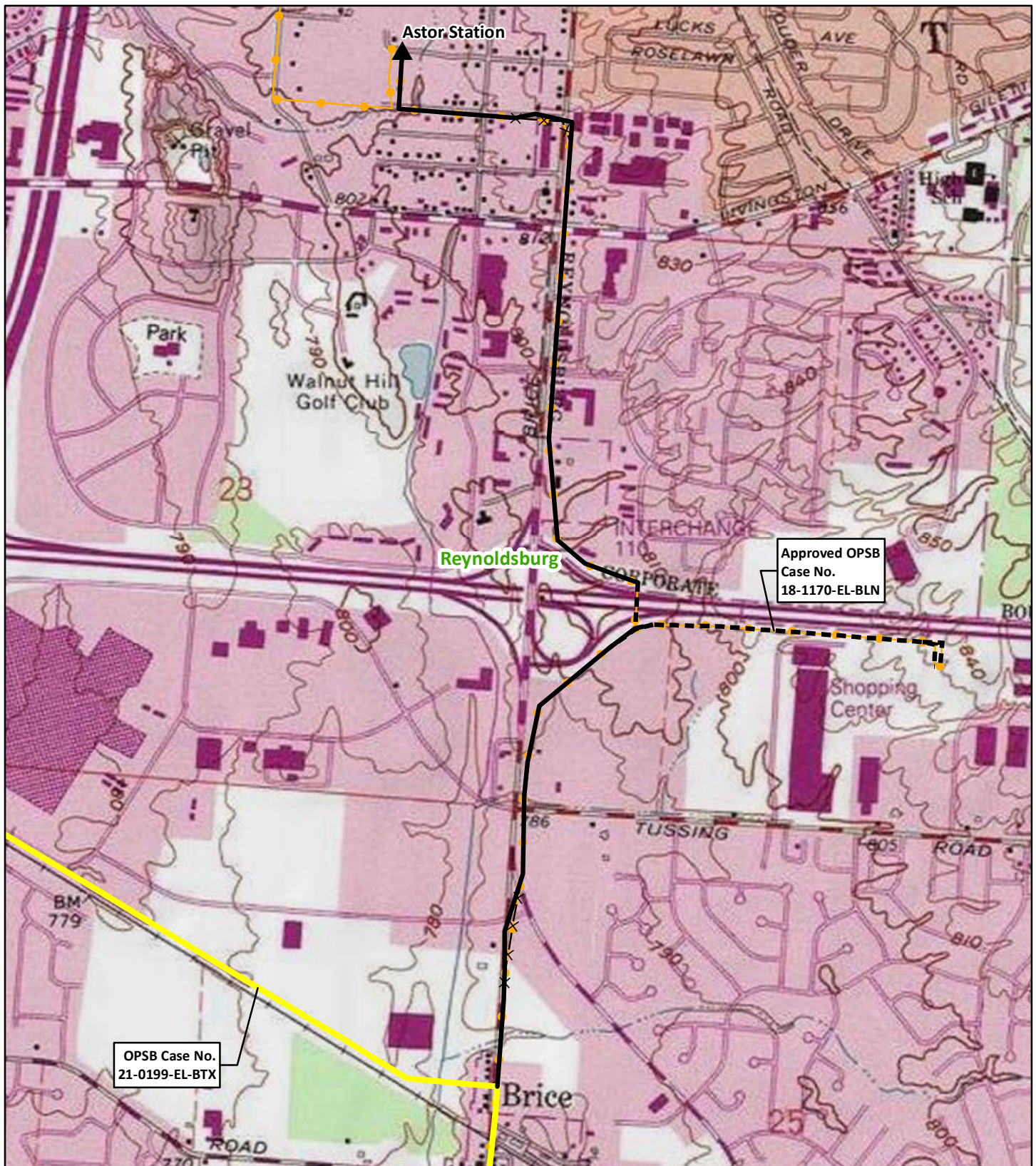


**B(10)(g) Unusual Conditions**

**Provide any known additional information that will describe any unusual conditions resulting in significant environmental, social, health, or safety impacts.**

To the best of the Company's knowledge, no unusual conditions exist that would result in significant environmental, social, health, or safety impacts.

## Appendix A Project Maps



<p>▲ Existing Substation</p> <p>— Proposed Shannon - Astor 138 kV Transmission Line Rebuild</p> <p>— Proposed Groves Road - Shannon 138 kV (OPSB Recommended)</p> <p>— Existing 138 kV Transmission Line</p> <p>— Existing Transmission Line to be Removed</p> <p>— Rebuilt Brice 138 kV Extension (OPSB Approved)</p> <p>— USGS 24k Topo Quad Boundary</p>	<p>Sources: ESRI (2021) USGS (2020)</p> <p>Coordinate System: State Plane Ohio South NAD 1983</p> <p>January 12, 2023</p>		<p><b>Map 1</b> <b>Project Area</b></p> <p><b>AEP OHIO</b> ASTOR EXTENSION 138 KV TRANSMISSION LINE REBUILD PROJECT</p> <p>0 0.2 0.4 Miles</p>
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- ▲ Existing Substation
- Proposed Shannon - Astor  
138 kV Transmission Line  
Rebuild
- Existing 138 kV Transmission  
Line
- Parcel Boundary

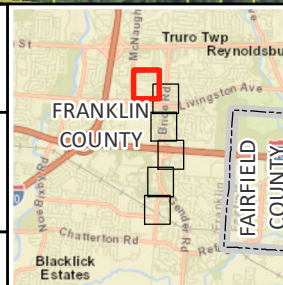
Sources:  
Imagery (OGRIP 2020)  
Transportation (ODOT 2021)

Coordinate System:  
State Plane Ohio South  
NAD 1983



January 12, 2023

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## Map 2 Aerial Map



**ASTOR EXTENSION 138 KV  
TRANSMISSION LINE  
REBUILD PROJECT**

0 150 300 450  
Feet





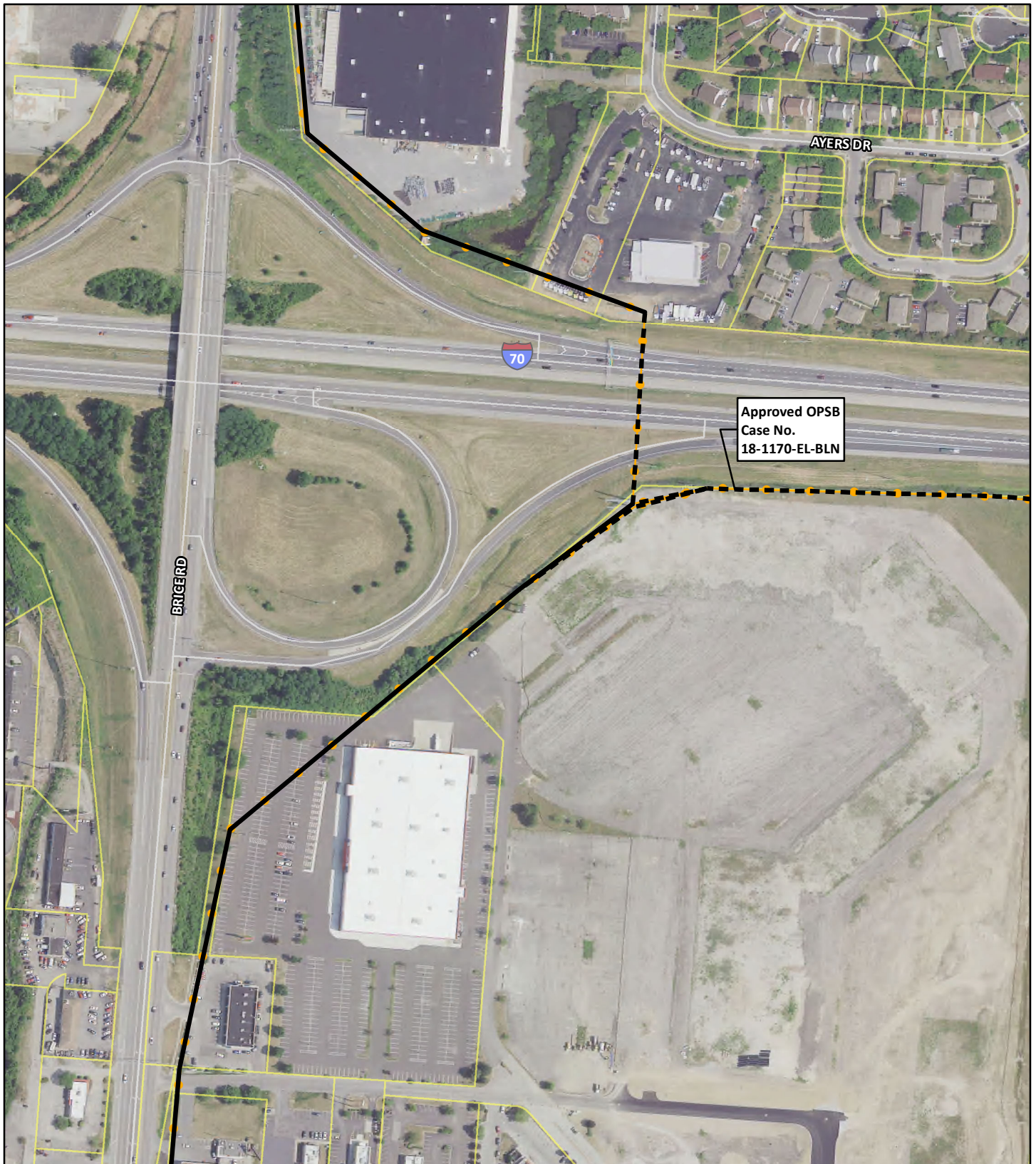
<p>Proposed Shannon - Astor 138 kV Transmission Line Rebuild</p> <p>—X—X— Existing Transmission Line to be Removed</p> <p>— Existing 138 kV Transmission Line</p> <p>Parcel Boundary</p>	<p>Sources: Imagery (OGRIP 2020) Transportation (ODOT 2021)</p> <p>Coordinate System: State Plane Ohio South NAD 1983</p> <p>January 12, 2023</p> <p>Page 2 of 6</p>		<p><b>Map 2</b> <b>Aerial Map</b></p> <p><b>AEP OHIO</b> ASTOR EXTENSION 138 KV TRANSMISSION LINE REBUILD PROJECT</p> <p>0 150 300 450 Feet</p>
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<p>  Proposed Shannon - Astor 138 kV Transmission Line Rebuild   Existing 138 kV Transmission Line   Parcel Boundary         </p>	<p>           Sources:            Imagery (OGRIP 2020)            Transportation (ODOT 2021)         </p> <p>           Coordinate System:            State Plane Ohio South            NAD 1983         </p> <p> </p> <p>           January 12, 2023  <b>Page 3 of 6</b> </p>		<p> <b>Map 2</b>  <b>Aerial Map</b> </p> <p> <b>ASTOR EXTENSION 138 KV TRANSMISSION LINE REBUILD PROJECT</b> </p> <p>           0 150 300 450 Feet         </p>
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Approved OPSB  
Case No.  
18-1170-EL-BLN

<p>Proposed Shannon - Astor 138 kV Transmission Line Rebuild</p> <p>Rebuilt Brice 138 kV Extension (OPSB Approved)</p> <p>Existing 138 kV Transmission Line</p> <p>Parcel Boundary</p>	<p>Sources: Imagery (OGRIP 2020) Transportation (ODOT 2021)</p> <p>Coordinate System: State Plane Ohio South NAD 1983</p> <p>January 12, 2023</p> <p>Page 4 of 6</p>		<p><b>Map 2</b> <b>Aerial Map</b></p> <p><b>ASTOR EXTENSION 138 KV TRANSMISSION LINE REBUILD PROJECT</b></p> <p>0 150 300 450 Feet</p>
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<p>  Proposed Shannon - Astor 138 kV Transmission Line Rebuild   Existing Transmission Line to be Removed   Existing 138 kV Transmission Line   Parcel Boundary </p>	<p> Sources:  Imagery (OGRIP 2020)  Transportation (ODOT 2021) </p> <p> Coordinate System:  State Plane Ohio South  NAD 1983 </p> <p> January 12, 2023  Page 5 of 6 </p>		<p> <b>Map 2</b>  <b>Aerial Map</b> </p> <p> <b>ASTOR EXTENSION 138 KV TRANSMISSION LINE REBUILD PROJECT</b> </p> <p> 0 150 300 450 Feet </p>
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<p>Proposed Shannon - Astor 138 kV Transmission Line Rebuild</p> <p>Proposed Groves Road - Shannon 138 kV (OPSB Recommended)</p> <p>Existing 138 kV Transmission Line</p> <p>Railroad</p> <p>Parcel Boundary</p>	<p>Sources: Imagery (OGRIP 2020) Transportation (ODOT 2021)</p> <p>Coordinate System: State Plane Ohio South NAD 1983</p> <p>January 12, 2023</p> <p>Page 6 of 6</p>		<p><b>Map 2</b> <b>Aerial Map</b></p> <p><b>ASTOR EXTENSION 138 KV TRANSMISSION LINE REBUILD PROJECT</b></p> <p><b>AEP OHIO</b></p> <p>0 150 300 450 Feet</p>
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## Appendix B PJM Submittal and 2022 Long Term Forecast Report

PUCO FORM FE-T9  
AEP OHIO TRANSMISSION COMPANY  
Specifications of Planned Transmission Lines

3.	RIGHTS-OF-WAY: LENGTH / WIDTH / CIRCUITS	4.3 mi / 100 ft / 1 circuit
4.	VOLTAGE: DESIGN / OPERATE	138 kV/ 138 kV
5.	APPLICATION FOR CERTIFICATE:	2021
6.	CONSTRUCTION:	2023-2024
7.	CAPITAL INVESTMENT:	\$13M
8.	PLANNED SUBSTATION:	N/A
9.	SUPPORTING STRUCTURES:	Steel
10.	PARTICIPATION WITH OTHER UTILITIES	N/A
11.	PURPOSE OF THE PLANNED TRANSMISSION LINE	Rebuild of existing 138 kV line
12.	CONSEQUENCES OF LINE CONSTRUCTION DEFERMENT OR TERMINATION	Increased risk of equipment failure.
13.	MISCELLANEOUS:	
1.	LINE NAME AND NUMBER:	Astor - Brice - Shannon (s2282), TP2019017
2.	POINTS OF ORIGIN AND TERMINATION	Bixby , Shannon INTERMEDIATE STATION - Brice
3.	RIGHTS-OF-WAY: LENGTH / WIDTH / CIRCUITS	5.0 mi / 100 ft / 1 circuit
4.	VOLTAGE: DESIGN / OPERATE	138 kV/ 138 kV
5.	APPLICATION FOR CERTIFICATE:	2022
6.	CONSTRUCTION:	2023-2024
7.	CAPITAL INVESTMENT:	\$19M
8.	PLANNED SUBSTATION:	N/A
9.	SUPPORTING STRUCTURES:	Steel
10.	PARTICIPATION WITH OTHER UTILITIES	N/A
11.	PURPOSE OF THE PLANNED TRANSMISSION LINE	Rebuild of existing 138 kV line
12.	CONSEQUENCES OF LINE CONSTRUCTION DEFERMENT OR TERMINATION	Increased risk of equipment failure.
13.	MISCELLANEOUS:	



## AEP Transmission Zone M-3 Process Shannon Station Rebuild

**Need Number:** AEP-2018-OH018

**Process Stage:** Submission of Supplemental Project for inclusion in the Local Plan 9/14/2020

**Previously Presented:**

Needs Meeting 11/29/2018

Solutions Meeting 6/19/2020

**Project Driver:**

Equipment Material/Condition/Performance/Risk, Operational Flexibility and Efficiency

**Specific Assumption Reference:**

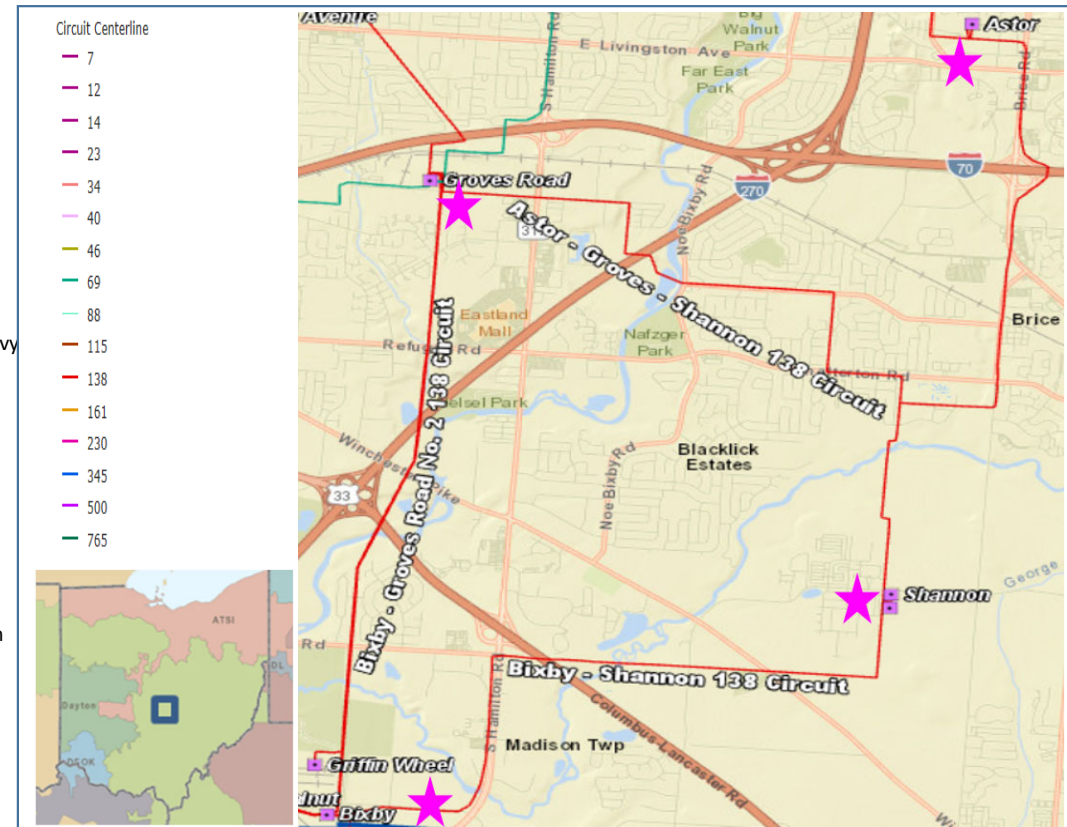
AEP Guidelines for Transmission Owner Identified Needs

**Problem Statement:**

- A study of the current physical loading capability of the structures along the Astor-Shannon-Groves & Shannon – Bixby 138 kV circuits revealed that many of the poles are currently overloaded under NESC Heavy Loading Conditions. Additionally, the line structures are unable to handle the addition of telecom fiber, which is needed to improve communications in this area.

Existing NESC Heavy Loading Conditions:

- 36% of poles on the Astor-Bixby 138 kV circuit show overloading.
- 29% of poles on the Bixby – Shannon 138 kV circuit show overloading.
- 20% of the poles on the Shannon – Refugee 138 kV circuit show overloading.
- 58% of poles on the Refugee – (Future) Brice 138 kV circuit show overloading.
- 35% of poles on the (Future) Brice – Astor 138kV circuit show overloading.
- Primarily 1952 wood poles (57% of total line)
- Conductor is all from 1952
- 43 (out of 155) structures on the circuit have at least 1 open condition (28%), with a total count of 63 open conditions.
- 23 reported closed conditions – 1 forestry, 4 conductor, 18 structure
- No outage history (0 CMI/CI)
- The Astor-Groves-Shannon 138 kV circuit is a three-terminal line, which limits sectionalizing and can cause mis-operations and over tripping.
- Astor 138 kV Station has ground switch MOAB's on both 138/13 kV transformers. Ground switch MOABs cause intentional high side faults, which can damage nearby equipment.



## AEP Transmission Zone M-3 Process Shannon Station Rebuild

**Need Number:** AEP-2018-OH018

**Process Stage:** Submission of Supplemental Project for inclusion in the Local Plan 9/14/2020

### Selected Solution:

- Rebuild ~5.0 miles of 138 kV line between Astor - Shannon. The existing Refugee Switch will be retired. **(s2282.1) Cost: \$21.8M**
- Rebuild ~0.5 miles and construct ~4.6 miles of greenfield 138 kV line between Groves - Shannon to eliminate the three terminal line. **(s2282.2) Cost: \$22.0M**
- Rebuild ~4.3 miles of 138 kV line between Bixby – Shannon. **(s2282.3) Cost: \$15.1M**
- Reconfigure lines at Shannon to accommodate the new 138 kV circuit from Groves. Install two new 138 kV 3000A 40 kA circuit breakers on circuits towards Brice and Bixby to prevent dissimilar zones of protection when bringing the 3<sup>rd</sup> 138 kV circuit to the station. **(s2282.4) Cost: \$1.9M**

**Ancillary Benefits:** Provides a third transmission source into AEP Ohio's Shannon station (35 MVA/ 90 MVA capacity) that has limited ability to transfer load.

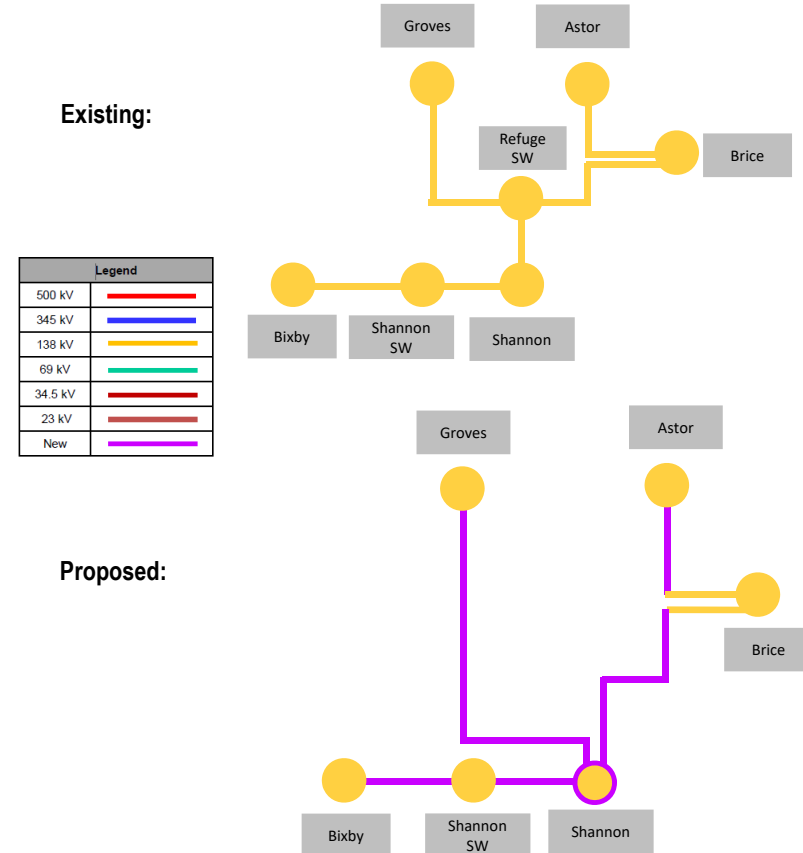
**Total Estimated Transmission Cost:** \$60.8 M

**Projected In-Service:** 11/1/2024

**Supplemental Project ID:** s2282

**Project Status:** Scoping

**Model:** N/A



**Appendix C Property Agreement Table**

Parcel ID	Agreement Type	Easement Obtained
530-166430	Supplemental Easement	Yes
Brice Rd.		
530-207033	Supplemental Easement	Yes
010-224227	Supplemental Easement	Yes
530-216149	Supplemental Easement	Yes
Chantry Dr.		
Brice Rd.		
530-214867	Supplemental Easement	No
530-220068	Supplemental Easement	Yes
530-166434	Supplemental Easement	No
Independence Village Center Dr.		
530-214869	Supplemental Easement	Yes
Tussing Rd.		
010-105162	Supplemental Easement	Yes
010-190411	Supplemental Easement	Yes
Independence Village Center Dr.		
010-104478	Supplemental Easement	Yes
010-219081	Supplemental Easement	Yes
010-007362	Supplemental Easement	Yes
I-70		
060-007892	Supplemental Easement	Yes
060-004512	Supplemental Easement	Yes
060-004144	Supplemental Easement	No
010-104476	Supplemental Easement	Yes
060-008060	Easement	Yes
060-001777	Supplemental Easement	Yes
Eastgreen Blvd.		
060-002387	Easement	Yes
060-002812	Easement	Yes
060-001813	Easement	Yes
Merchants Dr.		
060-006072	Easement	Yes
060-006096	Easement	Yes
060-004401	Easement	Yes
060-001252	Easement	Yes
E. Livingston Ave.		
060-001159	Easement	No
060-001358	Easement	No
060-001258	Easement	No
060-001142	Supplemental Easement	No
060-001261	Easement	No
060-009227	Supplemental Easement	Yes

060-001117	Supplemental Easement	Yes
Brice Rd.		
060-001177	Easement	Yes
Astor Ave.		
060-001174	Easement	Yes
550-156023	Easement	Yes
550-156024	Easement	Yes
550-156025	Easement	Yes
550-156026	Easement	Yes
Astor Ave.		
550-156020	Easement	Yes
550-156019	Easement	Yes
550-156018	Easement	Yes
550-156016	Easement	Yes
550-156015	Easement	Yes
550-156014	Easement	Yes
Idlewild Dr.		
550-156012	Easement	Yes
550-156011	Easement	Yes
550-156010	Easement	Yes
550-156009	Easement	No
550-156008	Easement	No
550-156007	Easement	Yes
550-156006	Easement	Yes
550-156005	Easement	Yes
550-156003	Easement	Yes
550-156002	Easement	Yes
550-156001	Easement	Yes
550-156000	Easement	Yes
550-155999	Easement	Yes
550-155998	AEP Owned	N/A
Astor Ave.		
550-156045	AEP Owned	N/A
550-156050	AEP Owned	N/A
550-156051	AEP Owned	N/A



## Appendix D      Agency Correspondence



In reply, refer to  
2020-FRA-47607

May 21, 2021

Mr. Ryan J. Weller  
Weller & Associates, Inc.  
1395 West Fifth Avenue  
Columbus, Ohio 43212

**RE: Shannon-Astor 138kV Transmission Line Rebuild Project, Madison and Truro Townships, Franklin County, Ohio - Addendum Survey**

Dear Mr. Weller:

This letter is in response to the correspondence received April 22, 2021 regarding the proposed Shannon-Astor 138kV Transmission Line Rebuild Project, Madison and Truro Townships, Franklin County, Ohio. We appreciate the opportunity to comment on this project. The comments of the Ohio State Historic Preservation Office (SHPO) are made pursuant to Section 149.53 of the Ohio Revised Code and the Ohio Power Siting Board rules for siting this project (OAC 4906-5). The comments of the Ohio SHPO are also submitted in accordance with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. 306108 [36 CFR 800]).

The following comments pertain to the *Addendum Phase I Cultural Resource Management Investigations for a Reroute Area Associated with the Shannon-Astor 138kV Transmission Line Rebuild Project in Madison and Truro Townships, Franklin County, Ohio* by Joshua D. Engle (Weller & Associates, Inc. 2021).

A literature review, visual inspection, shovel probe and shovel test unit excavations were completed as part of the investigations. No previously identified archaeological sites are located within the project area. One (1) new archaeological sites was identified during survey. Ohio Archaeological Inventory (OAI) #33FR3454. The site is recommended not eligible for listing in the National Register of Historic Places (NRHP). Our office agrees with this recommendation and no additional archaeological survey is required.

A literature review and field survey were completed as part of the investigations. Two (2) properties fifty years of age or older were identified within the project area and/or 1,000' study area that may have a direct line of sight to the project. It is Weller's recommendation that none of the identified properties are eligible for inclusion in the NRHP. Our office agrees with Weller's recommendations of eligibility.

Based on the information provided, our office continues to agree the proposed project will have no effect on historic properties. No further coordination with this office is necessary, unless the project changes or unless new or additional historic properties are discovered during implementation of this project. In such a situation, this office should be contacted. If you have any questions, please contact me at (614) 298-2022, or by e-mail at [khorrocks@ohiohistory.org](mailto:khorrocks@ohiohistory.org), or Joy Williams at [jwilliams@ohiohistory.org](mailto:jwilliams@ohiohistory.org). Thank you for your cooperation.

Sincerely,

A handwritten signature in blue ink, appearing to read "Krista Horrocks".

Krista Horrocks, Project Reviews Manager  
Resource Protection and Review

RPR Serial No: 1088313



In reply, refer to  
2020-FRA-47607

March 23, 2020

Mr. Ryan J. Weller  
Weller & Associates, Inc.  
1395 West Fifth Avenue  
Columbus, Ohio 43212

**RE: Shannon-Astor 138kV Transmission Line Rebuild Project, Madison & Truro Townships, Franklin County, Ohio**

Dear Mr. Weller:

This letter is in response to the correspondence received on February 24, 2020 regarding the proposed Shannon-Astor 138kV Transmission Line Rebuild Project, Madison & Truro Townships, Franklin County, Ohio. We appreciate the opportunity to comment on this project. The comments of the Ohio State Historic Preservation Office (SHPO) are made pursuant to Section 149.53 of the Ohio Revised Code and the Ohio Power Siting Board rules for siting this project (OAC 4906-5). The comments of the Ohio SHPO are also submitted in accordance with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. 306108 [36 CFR 800]).

The following comments pertain to the *Phase I Archaeological Investigations for the 7.77 km (4.83 mi) Shannon-Astor 138kV Transmission Line Rebuild Project in Madison and Truro Townships, Franklin County, Ohio* by Weller & Associates, Inc. (2020).

A literature review, visual inspection, surface collection, shovel probe, and shovel test unit excavation was completed as part of the investigations. One (1) previously identified archaeological site is located within the project area. Ohio Archaeological Inventory (OAI) site 33FR0419, a prehistoric lithic scatter, was originally identified in 1981. The archaeological site was not reidentified during this survey. No new archaeological sites were identified. Our office agrees no further archaeological survey is necessary.

The following comments pertain to the *History/Architecture Investigations for the 7.77 km (4.83 mi) Shannon-Astor 138kV Transmission Line Rebuild Project in Madison and Truro Townships, Franklin County, Ohio* by Weller & Associates, Inc. (2020).

A literature review and field survey were completed as part of the investigations. A total of 167 properties fifty years of age or older, including three extant OHI resources, were identified within the project area and/or 1,000' study area that may have a direct line of sight to the project. It is Weller's recommendation that none of the identified properties are eligible for inclusion in the National Register of Historic Places. Our office agrees with Weller's recommendations of eligibility.

Based on the information provided, we agree the project will not affect historic properties. No further coordination with this office is necessary, unless the project changes or unless new or additional historic properties are discovered during implementation of this project. In such a situation, this office should be contacted. If you have any questions, please contact me at (614) 298-2022, or by e-mail at [khorrocks@ohiohistory.org](mailto:khorrocks@ohiohistory.org), or Joy Williams at [jwilliams@ohiohistory.org](mailto:jwilliams@ohiohistory.org). Thank you for your cooperation.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Krista Horrocks', with a stylized flourish at the end.

Krista Horrocks, Project Reviews Manager  
Resource Protection and Review

cc: Amy Toohey, AEP ([ajtoohey@aep.com](mailto:ajtoohey@aep.com))

RPR Serial No: 1083066, 1083067

## Renner, Philip

---

**From:** Ohio, FW3 <ohio@fws.gov>  
**Sent:** Thursday, March 12, 2020 8:41 AM  
**To:** Renner, Philip  
**Subject:** Astor Extension 138 kV Trans Line Rebuild Project, Franklin Co. (AEP)



UNITED STATES DEPARTMENT OF THE INTERIOR  
U.S. Fish and Wildlife Service  
Ecological Services Office  
4625 Morse Road, Suite 104  
Columbus, Ohio 43230  
(614) 416-8993 / Fax (614) 416-8994



TAILS# 03E15000-2020-TA-1006

Dear Mr. Renner,

We have received your recent correspondence regarding potential impacts to federally listed species in the vicinity of the above referenced project. There are no federal wilderness areas, wildlife refuges or designated critical habitat within the vicinity of the project area. We recommend that proposed activities minimize water quality impacts, including fill in streams and wetlands. Best management practices should be utilized to minimize erosion and sedimentation.

**FEDERALLY LISTED, PROPOSED, AND CANDIDATE SPECIES COMMENTS:** Due to the project type, size, location, and the proposed implementation of seasonal tree cutting (clearing of trees  $\geq 3$  inches diameter at breast height between October 1 and March 31) to avoid impacts to the federally listed endangered Indiana bat (*Myotis sodalis*) and threatened northern long-eared bat (*Myotis septentrionalis*), we do not anticipate adverse effects to any federally endangered, threatened, proposed or candidate species. Should the project design change, or during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the U.S. Fish and Wildlife Service (Service) should be initiated to assess any potential impacts.

If there is a federal nexus for the project (e.g., federal funding provided, federal permits required to construct), no tree clearing should occur on any portion of the project area until consultation under section 7 of the Endangered Species Act (ESA), between the Service and the federal action agency, is completed. We recommend that the federal action agency submit a determination of effects to this office, relative to the Indiana bat and northern long-eared bat, for our review and concurrence.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), ESA, and are consistent with the intent of the National Environmental Policy Act of 1969 and the Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed section 7 consultation document. We recommend that the project be coordinated with the Ohio Department of Natural Resources due to the potential for the project to affect state listed species and/or state lands. Contact John Kessler, Environmental Services Administrator, at (614) 265-6621 or at [john.kessler@dnr.state.oh.us](mailto:john.kessler@dnr.state.oh.us).

If you have questions, or if we can be of further assistance in this matter, please contact our office at (614) 416-8993 or [ohio@fws.gov](mailto:ohio@fws.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read "Patrice M. Ashfield". The signature is stylized with a large, looping initial "P" and a long, sweeping underline.

Patrice M. Ashfield  
Field Office Supervisor



# Ohio Department of Natural Resources

MIKE DeWINE, GOVERNOR

MARY MERTZ, DIRECTOR

## Office of Real Estate

*John Kessler, Chief*

2045 Morse Road – Bldg. E-2

Columbus, OH 43229

Phone: (614) 265-6621

Fax: (614) 267-4764

April 14, 2020

Philip Renner  
WSP USA  
312 Elm Street, Suite 2500  
Cincinnati, Ohio 45202

**Re:** 20-216; Astor Extension 138 kV Transmission Line Rebuild Project

**Project:** The proposed project involves rebuilding approximately 4.83 miles of the Astor Extension 138 kV Transmission Line.

**Location:** The proposed project is located in Truro and Madison Townships, Franklin County, Ohio.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

**Natural Heritage Database:** The Natural Heritage Database has the following records at or within a one-mile radius of the project area:

Walter A. Tucker State Nature Preserve – Columbus & Franklin Co. Metro Parks  
Blacklick Woods Metro Park – Columbus & Franklin Co. Metro Parks  
Pickerington Ponds Metro Park – Columbus & Franklin Co. Metro Parks  
Blacklick Creek Greenway Trail – Columbus & Franklin Co. Metro Parks

The review was performed on the project area you specified in your request as well as an additional one-mile radius. Records searched date from 1980. This information is provided to inform you of features present within your project area and vicinity.

Please note that Ohio has not been completely surveyed and we rely on receiving information from many sources. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although all types of plant communities have been surveyed, we only maintain records on the highest quality areas.

**Fish and Wildlife:** The Division of Wildlife (DOW) has the following comments.

The DOW recommends that impacts to streams, wetlands and other water resources be avoided and minimized to the fullest extent possible, and that best management practices be utilized to minimize erosion and sedimentation.

The project is within the range of the Indiana bat (*Myotis sodalis*), a state endangered and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees to include: shagbark hickory (*Carya ovata*), shellbark hickory (*Carya laciniosa*), bitternut hickory (*Carya cordiformis*), black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*), shingle oak (*Quercus imbricaria*), northern red oak (*Quercus rubra*), slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), sassafras (*Sassafras albidum*), post oak (*Quercus stellata*), and white oak (*Quercus alba*). Indiana bat roost trees consists of trees that include dead and dying trees with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. However, Indiana bats are also dependent on the forest structure surrounding roost trees. If suitable habitat occurs within the project area, the DOW recommends trees be conserved. If suitable habitat occurs within the project area and trees must be cut, the DOW recommends cutting occur between October 1 and March 31. If suitable trees must be cut during the summer months, the DOW recommends a net survey be conducted between June 1 and August 15, prior to any cutting. Net surveys should incorporate either nine net nights per square 0.5 kilometer of project area, or four net nights per kilometer for linear projects. If no tree removal is proposed, this project is not likely to impact this species.

The project is within the range of the purple cat's paw (*Epioblasma o. obliquata*), a state endangered and federally endangered mussel, the clubshell (*Pleurobema clava*), a state endangered and federally endangered mussel, the northern riffleshell (*Epioblasma torulosa rangiana*), a state endangered and federally endangered mussel, the rayed bean (*Villosa fabalis*), a state endangered and federally endangered mussel species, the rabbitsfoot (*Quadrula cylindrica cylindrica*), a state endangered and federal candidate mussel, the snuffbox (*Epioblasma triquetra*), a state endangered and federal endangered mussel, the long solid (*Fusconaia maculata maculata*), a state endangered mussel, the Ohio pigtoe (*Pleurobema cordatum*), a state endangered mussel, the pocketbook (*Lampsilis ovata*), a state endangered mussel, the washboard (*Megaloniais nervosa*), a state endangered mussel, the elephant-ear (*Elliptio crassidens crassidens*), a state endangered mussel, the black sandshell (*Ligumia recta*), a state threatened mussel, the threehorn wartyback (*Obliquaria reflexa*), a state threatened mussel, the pondhorn (*Unio merus tetralasmus*), a state threatened mussel, and the fawnsfoot (*Truncilla donaciformis*), a state threatened mussel.

This project must not have an impact on freshwater native mussels at the project site. This applies to both listed and non-listed species. Per the Ohio Mussel Survey Protocol (2020), all Group 2, 3, and 4 streams (Appendix A) require a mussel survey. Per the Ohio Mussel Survey Protocol, Group 1 streams (Appendix A) and unlisted streams with a watershed of 5 square miles or larger above the point of impact should be assessed using the Reconnaissance Survey for Unionid Mussels (Appendix B) to determine if mussels are present. Mussel surveys may be recommended for these streams as well. This is further explained within the Ohio Mussel Survey Protocol. Therefore, if in-water work is planned in any stream that meets any of the above criteria, the DOW recommends the applicant provide information to indicate no mussel impacts will occur. If this is not possible, the DOW recommends a professional malacologist conduct a



mussel survey in the project area. If mussels that cannot be avoided are found in the project area, as a last resort, the DOW recommends a professional malacologist collect and relocate the mussels to suitable and similar habitat upstream of the project site. Mussel surveys and any subsequent mussel relocation should be done in accordance with the Ohio Mussel Survey Protocol. The Ohio Mussel Survey Protocol (2020) can be found at:

<http://wildlife.ohiodnr.gov/portals/wildlife/pdfs/licenses%20&%20permits/OH%20Mussel%20Survey%20Protocol.pdf>

The project is within the range of the Scioto madtom (*Noturus trautmani*), a state endangered and federally endangered fish, the popeye shiner (*Notropis ariommus*), a state endangered fish, the northern brook lamprey (*Ichthyomyzon fossor*), a state endangered fish, the spotted darter (*Etheostoma maculatum*), a state endangered fish, the shortnose gar (*Lepisosteus platostomus*), a state endangered fish, the tonguetied minnow (*Exoglossum laurae*), a state threatened fish, the paddlefish (*Polyodon spathula*) a state threatened fish, and the Tippecanoe darter (*Etheostoma tippecanoe*), a state threatened fish. The DOW recommends no in-water work in perennial streams from April 15 to June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed in a perennial stream, this project is not likely to impact these or other aquatic species.

The project is within the range of the upland sandpiper (*Bartramia longicauda*), a state endangered bird. Nesting upland sandpipers utilize dry grasslands including native grasslands, seeded grasslands, grazed and ungrazed pasture, hayfields, and grasslands established through the Conservation Reserve Program (CRP). If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of April 15 to July 31. If this type of habitat will not be impacted, this project is not likely to impact this species.

Due to the potential of impacts to federally listed species, as well as to state listed species, we recommend that this project be coordinated with the U.S. Fish & Wildlife Service.

**Water Resources:** The Division of Water Resources has the following comment.

The local floodplain administrator should be contacted concerning the possible need for any floodplain permits or approvals for this project. Your local floodplain administrator contact information can be found at the website below.

[http://water.ohiodnr.gov/portals/soilwater/pdf/floodplain/Floodplain%20Manager%20Community%20Contact%20List\\_8\\_16.pdf](http://water.ohiodnr.gov/portals/soilwater/pdf/floodplain/Floodplain%20Manager%20Community%20Contact%20List_8_16.pdf)

ODNR appreciates the opportunity to provide these comments. Please contact Sarah Tebbe, Environmental Specialist, at (614) 265-6397 or [Sarah.Tebbe@dnr.state.oh.us](mailto:Sarah.Tebbe@dnr.state.oh.us) if you have questions about these comments or need additional information.

Mike Pettegrew  
Environmental Services Administrator (Acting)

## Appendix E      Ecological Delineation Report



# ASTOR EXTENSION 138 KV TRANSMISSION LINE PROJECT ENVIRONMENTAL SURVEY REPORT



PROJECT NO.: LP2043151.051  
DATE: JANUARY 2023

AEP Transmission  
8600 Smith's Mill Road  
New Albany, Ohio 43054



WSP USA  
312 ELM STREET, SUITE 2500  
CINCINNATI, OH 45202



WSP.COM



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# 1 INTRODUCTION

On behalf of American Electric Power (AEP) Ohio Transmission Company, Inc. (AEP Ohio Transco), WSP USA Inc. (WSP) conducted environmental surveys for the existing Astor Extension 138 kV Transmission Line Project (“Project”) located in Madison and Truro Townships, Franklin County, Ohio. The ecological surveys included a wetland and water resource delineation and characterization of potential habitat for state- and federally-listed species. The wetland delineation was performed by individuals trained in the three-parameter methodology (hydrophytic vegetation, wetland hydrology, and hydric soils) adopted by the U.S. Army Corps of Engineers (USACE) as outlined in the USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)* (USACE, 2010) and in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987).

## 2 BACKGROUND INFORMATION

### 2.1 PROJECT AREA

The Project is located within Madison and Truro Townships, Franklin County, Ohio. The Environmental Survey Corridor (ESC) begins at the existing Astor Substation, located north of Astor Avenue (39.946544 °, -82.835062°) and continues southward, terminating at the Shannon Substation, located south of Shannon Road and west of Brice Road (39.892689°, -82.843240°). The ESC is within the Reynoldsburg, Ohio U.S. Geological Survey (USGS) 7.5-minute topographic map quadrangle boundary. The ESC is approximately 4.8-miles long and encompasses the approximately 100-foot wide existing right-of-way (ROW), proposed route adjustments, proposed access roads, and off-ROW work areas (totaling 69.2 acres).

Topographic relief within the ESC is limited to relatively gradual elevation changes, with elevations ranging between 760 feet and 810 feet above sea level throughout the ESC (Figure 1).

Land uses and natural communities observed within the ESC primarily include urban, residential, and agricultural land, as well as existing roadways and forested woodlots, in addition to the identified streams and wetlands.

#### 2.1.1 ANNUAL PRECIPITATION

Recent rainfall data for Franklin County, Ohio was reviewed prior to completing the environmental survey to determine if climatic conditions were normal at the time of the survey. The nearest weather station with both historical and recent precipitation records is located at Port Columbus International Airport, approximately 3.8 miles northwest of the Project. Rainfall recorded at this location was above normal for fourteen of the 23 months between March 2019 and May 2021 (Table 2-1). This data suggests precipitation was generally below normal during the 23-month time period prior to and during the environmental survey. This was taken into consideration during the delineation.

**TABLE 2-1: RECENT PRECIPITATION DATA**

MONTH	MONTHLY SUM <sup>1, 3</sup>	NORMAL PRECIPITATION <sup>2, 3</sup>	MONTHLY CLIMATIC CONDITIONS
March 2019	3.22	4.58	Below Normal
August 2019	3.28	3.51	Below Normal
September 2019	0.85	3.36	Below Normal
October 2019	4.05	3.56	Above Normal
November 2019	1.48	2.62	Below Normal
December 2019	2.76	3.58	Below Normal
January 2020	4.37	2.68	Above Normal
February 2020	2.56	2.86	Below Normal
March 2020	8.16	4.46	Above Normal
April 2020	4.22	3.71	Above Normal
May 2020	6.29	3.61	Above Normal
June 2020	2.40	4.93	Below Normal
July 2020	3.62	4.58	Below Normal
August 2020	4.75	3.51	Above Normal

**TABLE 2-1: RECENT PRECIPITATION DATA**

MONTH	MONTHLY SUM <sup>1, 3</sup>	NORMAL PRECIPITATION <sup>2, 3</sup>	MONTHLY CLIMATIC CONDITIONS
September 2020	4.30	3.36	Above Normal
October 2020	4.19	3.56	Above Normal
November 2020	3.35	2.62	Above Normal
December 2020	2.24	3.58	Below Normal
January 2021	2.25	2.68	Below Normal
February 2021	2.23	2.86	Below Normal
March 2021	2.85	4.46	Below Normal
April 2021	3.28	3.71	Below Normal
May 2021	3.46	3.61	Below Normal
<b>Total</b>	<b>80.16</b>	<b>81.99</b>	<b>Below Normal</b>

<sup>1</sup> Monthly weather summary from Port Columbus International Airport weather station (NOAA 2021)

<sup>2</sup> Climate Statistics at Individual Stations – Data Tables (NOAA 2021)

<sup>3</sup> Displayed in inches

### 2.1.2 DRAINAGE BASINS

The ESC is within the Upper Scioto River drainage basin, 8-digit hydrologic unit code (HUC) 05060001. The ESC lies within two 12-digit HUC watersheds, as outlined in Table 2-2 (USDA, 2019). The OEPA *401 Water Quality Certification for the Nationwide Permits Web Mapping Application* indicates that portions of the 12-digit sub-watershed are either “possibly eligible” or “ineligible” for coverage under the existing Section 401 Water Quality Certification (WQC) for the USACE Section 404 Nationwide Permits (OEPA, 2020).

**TABLE 2-2: 12-DIGIT HUC’S CROSSED BY THE PROJECT**

8-DIGIT HUC CODE <sup>1</sup>	12-DIGIT HUC CODE <sup>1</sup>	12-DIGIT HUC NAME	ESC LENGTH IN HUC (miles)	OHIO EPA SECTION 401 ELIGIBILITY <sup>2</sup>
05060001	05060001-15-04	Town of Brice – Blacklick Creek	4.2	Possibly Eligible
05060001	05060001-15-05	Mason Run – Big Walnut Creek	0.6	Ineligible

Source: USDA 2019, OEPA 2020

### 2.1.3 TRADITIONALLY NAVIGABLE WATERS

The U.S. Environmental Protection Agency (USEPA) and USACE assert jurisdiction over “all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce including all waters which are subject to the ebb and flow of the tide” (USACE and USEPA, 2008). These waters are considered traditionally navigable waters (TNW). All streams within the ESC drain to Big Walnut Creek or Blacklick Creek,, which are tributaries to the Scioto River, a TNW. No TNWs were crossed by the Project.



# 3 METHODOLOGY

The purpose of the field survey was to determine whether wetlands and streams are present within the ESC that would meet the definition of Waters of the United States (WoUS) or be subject to regulations implemented by the USACE and Ohio Environmental Protection Agency (OEPA), and to document their extents and current conditions if present. The USACE and the USEPA define wetlands as areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR, Part 328.3). Identification and delineation of jurisdictional wetlands is based on the presence of the following three parameters:

1. Wetland hydrology – the area is inundated permanently or periodically, or the soil is saturated to the surface for sufficient duration during the growing season to support hydrophytic vegetation.
2. Hydrophytic vegetation – the dominant vegetation consists of species capable of growing in water or on substrate that is at least periodically deficient in oxygen as a result of the presence of water.
3. Hydric soils – soils that are saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions that favor the growth of hydrophytic vegetation.

The ESC was evaluated according to the procedures outlined in the USACE 1987 *Corps of Engineers Wetlands Delineation Manual* ('87 Manual) (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest, (Version 2.0) (Regional Supplement)* (USACE, 2010). The *Regional Supplement* was released by the USACE to improve the accuracy and efficiency of wetland delineation procedures by addressing regional wetland characteristics and was finalized in 2010.

WSP performed the routine delineation method described in the '87 *Manual* and *Regional Supplement* that consisted of a desktop data review followed by a pedestrian site reconnaissance that included identification of vegetative communities, soils profile descriptions, recording geomorphological descriptions, and observations of hydrology. Evidence of mechanical alterations or disturbance having the potential to affect the wetland determination were also noted if present.

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## 3.1 DESKTOP REVIEW

Prior to conducting field surveys, WSP ecologists completed a desktop review by analyzing several federal and state publicly available data sources to assist with determining the presence of wetland and streams. This review included Natural Resources Conservation Service (NRCS) soil survey data, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps of Ohio, USGS 7.5-minute topographic maps, and USGS National Hydrography Dataset (NHD) stream and river data as an exercise to identify the occurrence and location of potential wetlands and streams.

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## 3.2 SITE INVESTIGATION

On January 28<sup>th</sup> – 30<sup>th</sup>, 2020, February 19<sup>th</sup>, and May 5<sup>th</sup>, 2021 two WSP ecologists traversed the ESC to conduct a wetland and waters delineation. During field surveys, the physical boundaries of aquatic resources were recorded using a Trimble Global Positioning System (GPS) unit rated for sub-decimeter accuracy. The GPS data were then geo-corrected using GPS Pathfinder Office software (version 5.60) and reviewed for quality control. The methodology used to examine each parameter is described in the following sections.

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### 3.2.1 HYDROLOGY

During field surveys, WSP ecologists assessed potential wetland areas for indicators of wetland hydrology described in the *'87 Manual* and *Regional Supplement*. Observation of at least one primary indicator or at least two secondary indicators was sufficient to positively say wetland hydrology was present.

The *'87 Manual* requires that an area be inundated or saturated to the surface for an absolute minimum of five percent of the growing season (areas saturated between five percent and 12.5 percent of the growing season may or may not be wetlands, while areas saturated over 12.5 percent of the growing season fulfill the hydrology requirements for wetlands). The *Regional Supplement* states that the growing season dates are determined through onsite observations of the following indicators of biological activity in a given year: (1) above-ground growth and development of vascular plants, and/or (2) soil temperature (12-inch depth) is 41 degrees Fahrenheit (°F) or higher as an indicator of soil microbial activity. Therefore, the beginning of the growing season in a given year is indicated by whichever condition occurs earlier, and the end of the growing season by whichever persists later.

The *Regional Supplement* also states that if onsite data gathering is not practical, the growing season can be approximated by the number of days between the average (five years out of ten, or 50 percent probability) date of the last and first 28°F air temperature in the spring and fall, respectively. National Weather Service Agricultural Applied Climate Information System (AgACIS) WETS (wetlands determination) growing season data for Franklin County indicated a mean growing season length of 221 days.

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### 3.2.2 VEGETATION

To determine the presence of hydrophytic vegetation, dominant vegetation was visually assessed for each stratum (tree, sapling and shrub, herb, and woody vine) and an indicator status of obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), or upland (UPL) was assigned to each plant species based on the *2018 National List of Plant Species* (USACE, 2018)<sup>1</sup>. The hydrophytic vegetation indicators are applied in the sequence presented in the *Regional Supplement*, where the vegetation is determined to be hydrophytic after the first indicator in the sequence is met and no further vegetation analysis is required. In the majority of wetland determinations, the presence of hydrophytic vegetation is determined by applying the rapid test for hydrophytic vegetation (Indicator 1) or the dominance test (Indicator 2). Indicator 1 is met when all dominant species across all strata are OBL and/or FACW. Where the rapid test is not met, the dominance test is satisfied when more than 50 percent of the composition of the dominant species are rated OBL, FACW and/or FAC.

Indicators 1 and 2 are the first indicators that need to be considered, however some wetland plant communities may fail a test based only on dominant species. If the plant community fails the dominance test, but indicators of hydric soil and wetland hydrology are both present, WSP scientists use the prevalence index (indicator 3), or observations of plant morphological adaptations for life in wetlands (indicator 4), to determine if an area has hydrophytic vegetation. Vegetation of an area was determined to be non-hydrophytic when none of the indicators for hydrophytic vegetation were satisfied.

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<sup>1</sup> OBL: A plant that almost always occurs in wetlands, but rarely in uplands;  
FACW: A plant that usually occurs in wetlands, but occasionally occurs in uplands;  
FAC: A plant that commonly occurs in both wetland and uplands;  
FACU: A plant that usually occurs in uplands, but occasionally occurs in wetlands; and  
UPL: A plant that almost always occurs in uplands, but rarely occurs in wetlands.

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### 3.2.3 SOILS

The National Technical Committee for Hydric Soils defines hydric soils as those that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

Prior to beginning field work, NRCS soil survey data were reviewed for soil mapping units and soil series listed as hydric soils or containing hydric components. To the extent possible, soils were observed to a depth of 20 inches below the soil surface; in instances where refusal was encountered before 20 inches, this was noted on field data sheets. Soils were examined in the field for hydric soil characteristics according to the guidelines in the *Regional Supplement. A Munsell Soil Color Chart* was used to identify the hue, value, and chroma of the soil matrix and redoximorphic features that may be present.

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## 3.3 WETLAND CLASSIFICATION

Wetlands, streams, and other waters were classified according to the *Classification of Wetlands and Deepwater Habitats of the United States*, commonly referred to as the Cowardin Classification System (Cowardin et al., 1979).

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## 3.4 OHIO RAPID ASSESSMENT METHOD V. 5.0

The OEPA Ohio Rapid Assessment Method for Wetlands v. 5.0 (ORAM) was developed to determine the relative ecological quality and level of disturbance of a particular wetland in order to meet requirements under Section 401 of the Clean Water Act. Wetlands are scored on the basis of hydrology, upland buffer, habitat alteration, special wetland communities, and vegetation communities. Each of these subject areas is further divided into subcategories under ORAM v. 5.0 resulting in a score that describes the wetland using a range from 0 (low quality and high disturbance) to 100 (high quality and low disturbance). Wetlands scored from 0 to 29.9 are grouped into "Category 1", 30 to 59.9 are "Category 2" and 60 to 100 are "Category 3". Transitional zones exist between "Categories 1 and 2" from 30 to 34.9 and between "Categories 2 and 3" from 60 to 64.9. However, according to the OEPA, if the wetland score falls into the transitional range, it must be given the higher Category unless scientific data can prove it should be in a lower Category (Mack, 2001).

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## 3.5 STREAM AND RIVER CROSSINGS

The Clean Water Act provides authority for states to issue water quality standards and designated uses to authorize certain activities in WoUS. upstream to the highest reaches of the tributary streams. In addition, the Federal Water Pollution Control Act of 1972 and its 1977 and 1987 amendments require knowledge of the potential fish or biological communities that can be supported in a stream or river, including upstream headwaters. Streams were identified by the presence of a defined bed and bank, and evidence of an ordinary high-water mark (OHWM). The USACE defines OHWM as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" (USACE, 2005).

Stream assessments were conducted using the methods described in the OEPA's Methods for Assessing Habitat in Flowing Waters: Using OEPA's *Qualitative Habitat Evaluation Index* (Rankin, 2006) and *Field Evaluation Manual for Ohio's Primary Headwater Habitat Streams, Version 3* (OEPA, 2012).

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### 3.5.1 OEPA QUALITATIVE HABITAT EVALUATION INDEX

The Qualitative Habitat Evaluation Index (QHEI) stream assessment method is designed to provide a rapid determination of habitat features that correspond to those physical factors that most affect fish communities and which are generally important to other aquatic life (*e.g.*, macroinvertebrates). The quantitative measure of habitat used to calibrate the QHEI score are Indices (or Index) of Biotic Integrity (IBI) for fish. In most instances the QHEI is sufficient to give an indication of habitat quality, and the intensive quantitative analysis used to measure the IBI is not necessary. It is the IBI, rather than the QHEI, that is directly correlated with the aquatic life use designation for a particular surface water.

The QHEI method is generally considered appropriate for waterbodies with drainage basins greater than one square mile, if natural pools are greater than 40 cm, or if the water feature is shown as blue-line waterways on USGS 7.5-minute topographic quadrangle maps. In order to convey general stream habitat quality to the regulated public, the OEPA has assigned narrative ratings to QHEI scores. The ranges vary slightly for headwater streams (H are those with a watershed area less than or equal to 20 square miles) versus larger streams (L are those with a watershed area greater than 20 square miles). The Narrative Rating System includes: Very Poor (<30 H and L), Poor (30 to 42 H, 30 to 44 L), Fair (43 to 54 H, 45 to 59 L), Good (55 to 69 H, 60 to 74 L) and Excellent (70+ H, 75+ L).

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### 3.5.2 OEPA PRIMARY HEADWATER HABITAT EVALUATION INDEX

The Headwater streams are typically considered to be first-order and second-order streams, meaning streams that have no upstream tributaries (or "branches") and those that have only first-order tributaries, respectively. The stream order concept can be problematic when used to define headwater streams because stream-order designations vary depending upon the accuracy and resolution of the stream delineation. Headwater streams are generally not shown on USGS 7.5-minute topographic quadrangles and are sometimes difficult to distinguish on aerial photographs. Nevertheless, headwater streams are now recognized as useful monitoring units due to their abundance, widespread spatial scale and landscape position (Fritz, et al. 2006). Impacts to headwater streams can have a cascading effect on the downstream water quality and habitat value. The Headwater Habitat Evaluation Index (HHEI) is a rapid field assessment method for physical habitat that can be used to appraise the biological potential of most Primary Headwater Habitat (PHWH) streams. The HHEI was developed using many of the same techniques as used for QHEI, but has criteria specifically designed for headwater habitats. To use HHEI, the stream must have a "defined bed and bank, with either continuous or periodically flowing water, with watershed area less than or equal to 1.0 mi<sup>2</sup> (259 ha), and a maximum depth of water pools equal to or less than 15.75 inches (40 cm)" (OEPA, 2012).

## 4 RESULTS

The results presented in this report reflect the existing and reasonably foreseeable site conditions at the time of our survey. The results cannot apply to site changes occurring after the survey which WSP has not had the opportunity to review. During the course of any survey, site conditions may change over time due to human and/or natural causes; as such, the results presented in this report may be invalidated, either wholly or in part, by changes beyond the control of WSP.

Two WSP ecologists surveyed the Project on January 28<sup>th</sup> – 30<sup>th</sup>, 2020 as well as February 19<sup>th</sup>, and May 5<sup>th</sup>, 2021 by walking the ESC and evaluating for wetlands and other WoUS. Five wetlands, seven streams, and eight open water features (including seven detention basins) were delineated within the ESC.

### 4.1 DESKTOP REVIEW

#### 4.1.1 SOILS EVALUATION

According to the NRCS Soil Data for Franklin County, Ohio, there are 21 soil map units shown within the ESC, as presented in Table 4-1. Four of the 21 soil map units are listed as Not Hydric (0% hydric soil components), fourteen are listed as Predominantly Non-Hydric (1-32%), one is listed as Partially Hydric (33-65%), and two are listed as Predominately Hydric (66-99%). Water features typically represent excavated ponds in the soil survey data and are not rated for hydric soil criteria. The soils observed by WSP ecologists during the environmental surveys were consistent with the NRCS soil survey mapping.

**TABLE 4-1: SOIL UNITS MAPPED WITHIN THE ESC**

SOIL UNIT SYMBOL	SOIL UNIT NAME	PERCENT HYDRIC	HYDRIC RATING <sup>1</sup>
BeA	Bennington silt loam, 0 to 2 percent slopes	8	Predominantly Non-Hydric
BeB	Bennington silt loam, 2 to 6 percent slopes	6	Predominantly Non-Hydric
BfB	Bennington-Urban land complex, 0 to 6 percent slopes	6	Predominantly Non-Hydric
CeB	Celina silt loam, 2 to 6 percent slopes	10	Predominantly Non-Hydric
CeC2	Celina silt loam, 6 to 12 percent slopes, eroded	5	Predominantly Non-Hydric
CrA	Crosby silt loam, Southern Ohio Till Plain, 0 to 2 percent slopes	5	Predominantly Non-Hydric
CrB	Crosby silt loam, Southern Ohio Till Plain, 2 to 6 percent slopes	5	Predominantly Non-Hydric
Ee	Eel silt loam, 0 to 2 percent slopes, occasionally flooded	4	Predominantly Non-Hydric
Gn	Genesee silt loam, 0 to 2 percent slopes, occasionally flooded	6	Predominantly Non-Hydric
KeC2	Kendallville silt loam, 6 to 12 percent slopes, eroded	0	Not Hydric

**TABLE 4-1: SOIL UNITS MAPPED WITHIN THE ESC**

SOIL UNIT SYMBOL	SOIL UNIT NAME	PERCENT HYDRIC	HYDRIC RATING <sup>1</sup>
Ko	Kokomo silty clay loam, 0 to 2 percent slopes	90	Predominantly Hydric
MkB	Miamian silt loam, 2 to 6 percent slopes	5	Predominantly Non-Hydric
MIC2	Miamian silty clay loam, 6 to 12 percent slopes, eroded	5	Predominantly Non-Hydric
OcB	Ockley silt loam, Southern Ohio Till Plain, 2 to 6 percent slopes	0	Not Hydric
Pn	Pewamo low carbonate till-Urban land complex, 0 to 2 percent slopes	59	Partially Hydric
Rs	Ross silt loam, 0 to 2 percent slopes, occasionally flooded	6	Predominantly Non-Hydric
SlA	Sleeth silt loam, Southern Ohio Till Plain, 0 to 2 percent slopes	5	Predominantly Non-Hydric
ThB	Thackery silt loam, 2 to 6 percent slopes	5	Predominantly Non-Hydric
Ut	Udorthents-Urban land complex, gently rolling	0	Not Hydric
W	Water	0	Not Hydric
Wt	Westland silty clay loam, Southern Ohio Till Plain, 0 to 2 percent slopes	90	Predominantly Hydric

<sup>1</sup>Not Hydric = 0% hydric soil component; Predominantly Not Hydric = 1-32%; Partially Hydric =33-65%; Predominantly Hydric = 66-99%; and All Hydric = 100%.

#### 4.1.2 NATIONAL WETLAND INVENTORY REVIEW

National Wetland Inventory (NWI) features are potential wetland areas identified from USFWS aerial photograph interpretation which typically have not been field verified. Forested and heavy scrub/shrub wetlands are often not shown on NWI maps as foliage effectively hides the visual signature that indicates the presence of standing water and moist soils from an aerial view. The USFWS indicates that NWI maps are not intended or designed for jurisdictional wetland identification or location. As a result, NWI maps do not show all the wetlands found in a particular area nor do they necessarily provide accurate wetland boundaries. However, NWI maps are useful for providing indications of potential wetland areas, which are often supported by soil mapping and hydrologic predictions using USGS topographic maps.

According to the NWI maps of the Reynoldsburg, Ohio quadrangle boundary, the ESC contains seven mapped NWI features. Table 4-2 provides an overview of NWI features identified within the ESC, including NWI code, map page, and delineated resources associated with each feature. Locations of the mapped NWI wetlands are shown on Figure 2 (Appendix A).

**TABLE 4-2: NWI POLYGONS MAPPED WITHIN THE ESC**

COWARDIN CLASSIFICATION CODE	COWARDIN CLASSIFICATION	MAP PAGE	ASSOCIATED RESOURCE
R2UBH	Riverine lower perennial unconsolidated bottom permanently flooded	1 of 8	Stream AS-1 (Intermittent)
R4SBC	Riverine intermittent streambed seasonally flooded	1 of 8	No Identified Resource
PUBGx	Palustrine unconsolidated bottom, intermittently exposed, excavated	2 of 8	Pond AS-1
R4SBC	Riverine intermittent streambed seasonally flooded	3 of 8	Stream AS-5 (Perennial)
R4SBC	Riverine intermittent streambed seasonally flooded	4 of 8	No Identified Resource
R5UBH	Riverine unknown perennial unconsolidated bottom permanently flooded	4 of 8 5 of 8 6 of 8	Stream AS-8 (Perennial) / Stream AS-6 (Perennial) / Stream AS-7 (Perennial, Blacklick Creek)
PUBGx	Palustrine unconsolidated bottom, intermittently exposed, excavated	6 of 8	Basin AS-1

## 4.2 DELINEATED WETLANDS

The environmental survey of the ESC identified five wetlands totaling 0.52 acres. These wetlands range in size from 0.01 to 0.21 acres within the limits of the ESC. The reported wetland acreage only corresponds to areas delineated within the ESC as some wetlands extended beyond the survey boundary. Delineated wetlands included four PEM wetlands totaling 0.51 acres and one PSS wetland totaling 0.01 acres.

All 5 of the delineated wetlands were identified as Category One wetlands. No Category 2 or Category 3 wetlands were identified. Classification of wetlands as Category 1 were based on ORAM scores (ranging from 11 to 22.5).

Delineated wetland areas are depicted on Figure 3 (Appendix A). Table 1 (Appendix B) provides specific information regarding wetland location, Cowardin classification, jurisdiction, wetland assessment, and delineated area within the ESC. Completed USACE wetland and upland determination forms are provided in Appendix C. ORAM data forms are provided in Appendix D. Representative photographs were taken of each wetland during the environmental survey and are provided in Appendix G.

### 4.2.1 WETLAND REGULATORY CONSIDERATIONS

Four of the 5 of the wetlands delineated by WSP appear to be hydrologically connected to surface waters that are tributaries to a TNW. These wetlands (totaling 0.48 acres) will likely be considered jurisdictional due to their proximity to waterways that flow to the Scioto River, a TNW. Wetland AS-4 was identified to be isolated and would likely be considered non-jurisdictional by the USACE. Table 4-3 provides an overview of jurisdictional wetlands within the ESC.



**TABLE 4-3: SUMMARY OF JURISDICTIONAL WETLANDS**

COWARDIN CLASSIFICATION	ORAM CATEGORY			AREA WITHIN ESC (ac.)
	CATEGORY 1	CATEGORY 2	CATEGORY 3	
PEM	0.48	0.00	0.00	0.48
PSS	0.01	0.00	0.00	0.01
PFO	0.00	0.00	0.00	0.00
<b>ACRES WITHIN ESC</b>	<b>0.49</b>	<b>0.00</b>	<b>0.00</b>	<b>0.49</b>

\* Wetland AS-4 (PEM) is considered isolated and is not included in table 4-3, above.

## 4.3 STREAMS AND RIVERS

A total of seven streams, totaling approximately 1,677 linear feet, were identified within the ESC as shown in Figure 3. Four of the seven streams were identified as perennial and were actively flowing during the January 28<sup>th</sup> – 30<sup>th</sup>, 2020 as well as February 19<sup>th</sup>, and May 5<sup>th</sup>, 2021 environmental surveys. The remaining three streams were identified as intermittent. No ephemeral streams were identified within the ESC. Four of the six streams were assessed using the HHEI methodology (drainage area less than 1 mi<sup>2</sup>). Two streams (Stream AS-6 and Stream AS-8) were assessed the HHEI methodology. Stream AS-7 (Blacklick Creek) was assessed with neither HHEI or QHEI methodology due to the streams size, lack of visibility, and their existing Aquatic Life Use Designations as Warmwater Habitat by OEPA. Three of the six streams (totaling approximately 207 linear feet within the ESC) were identified as intermittent and four streams (totaling approximately 1,470 linear feet within the ESC) were identified as perennial.

Locations of streams identified within the ESC are shown in Figure 3 (Appendix A). Table 2 (Appendix B) provides the waterbody name, flow regime, and stream length within the ESC for each delineated stream. Completed HHEI and QHEI forms are provided in Appendix E and Appendix F, respectively. Representative photographs were taken of each stream during the field survey and are provided in Appendix G.

### 4.3.1 HHEI STREAM RESULTS

Four streams totaling 207 linear feet within the ESC were evaluated using the HHEI methodology. All streams were identified as Modified, Small Drainage, Warmwater Streams. Details regarding individual streams are provided in Table 2 (Appendix B).

### 4.3.2 QHEI STREAM RESULTS

Two streams (Stream AS-6 and AS-8) totaling approximately 1,312 linear feet within the ESC was evaluated using the QHEI methodology. Both streams assessed with the QHEI methodology were identified as Fair Warmwater Habitat. Details regarding individual streams are provided in Table 2 (follows text).

### 4.3.3 STREAM REGULATORY CONSIDERATIONS

One stream totaling approximately 101 linear feet, Stream BS-7 (Blacklick Creek) was not assessed with either the HHEI or QHEI methodology. According to Ohio Administrative Code 3745-1-11, this stream has been provided an Aquatic Life Use Designation of Warmwater Habitat. Six of the seven delineated streams lie within a watershed designated as “possibly eligible” for the OEPA Section 401 Water Quality Certification (WQC) for the USACE 2017 Nationwide Permits (NWP). One stream (Stream AS-1) lies within a watershed designated as “ineligible” for the OEPA Section 401 WQC for the USACE 2017 NWP.



All seven delineated streams appear to be WoUS due to their downstream connection to the Scioto River, a TNW. It is noted that the USACE will make the final determination of jurisdictional status.

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## 4.4 PONDS, LAKES, AND RESERVOIRS

One freshwater pond was identified within the ESC. The identified pond totals 0.20 acres within the ESC. The identified pond appears to be man-made in origin and is unlikely to be considered jurisdictional by the USACE. In addition, seven stormwater detention basins totaling 0.39 acres were identified within the ESC. The identified detention basins are man-made features constructed to hold and convey stormwater and would not be considered jurisdictional to the USACE. Delineated ponds, lakes, and reservoirs are depicted on Figure 3 (Appendix A). Table 3 (Appendix B) provides specific information regarding waterbody location, jurisdiction, and delineated area within the ESC

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## 4.5 VEGETATIVE COMMUNITIES

WSP ecologists conducted a general habitat survey in conjunction with the stream and wetland delineation. The majority of the ESC was identified as landscaped areas, agricultural field, and urban areas, with additional areas characterized as scrub/shrub, successional hardwood woodlands, and the delineated wetlands and ponds. Table 4-4 provides an overview of habitat types within the ESC. Vegetated land cover can be seen in Figure 4 (Appendix A).

**TABLE 4-4: VEGETATIVE COMMUNITIES WITHIN THE ESC**

VEGETATIVE COMMUNITY	DESCRIPTION	APPROXIMATE ACREAGE WITHIN THE ESC	APPROXIMATE PERCENTAGE OF ESC
Agricultural Land	Agricultural land primarily consisting of soybean and corn fields were present within the ESC.	7.7	11.2%
Landscaped Area	Landscaped areas, including residential and commercial properties, were observed within the ESC. These landscaped areas are frequently mowed or maintained grasses and forbs.	26.0	37.6%
Old Field	Herbaceous cover exists alongside roads, field borders, and abandoned fields within the ESC in the form of successional old-field communities. These communities are an early stage of succession following disturbance. This community type is generally short-lived, giving way progressively to shrub and forest communities unless periodically re-disturbed. Old field areas within the ESC are infrequently mowed areas of grasses, forbs, and occasional shrubs/saplings.	5.3	7.9%
Scrub/Shrub	The successional stage between old field and second growth forest characterized by short, opportunistic woody species.	4.5	6.5%
Streams, Ponds, and Wetlands	Streams, ponds, and wetlands were observed both within and beyond the ESC boundaries.	1.9	2.7%
Successional Hardwood Woodland	Mixed hardwood woodlands characterized by a canopy composed of woody deciduous trees.	2.0	2.9%
Urban	Urban areas consist of heavily developed residential and commercial land uses, including roads, buildings, and parking lots. These areas are generally devoid of significant woody and herbaceous vegetation.	21.8	31.5%
<b>Total</b>		<b>69.2</b>	<b>100.0%</b>

## 4.6 THREATENED AND ENDANGERED SPECIES

WSP conducted a rare, threatened, and endangered species review for areas crossed by the ESC. The first phase of the evaluation involved a review of online lists of federal and state species of concern. In addition to the review of available literature, a request for Environmental Review was submitted to the Ohio Department of Natural Resources (ODNR). A coordination letter was also submitted to the USFWS soliciting comments on the Project. A summary of the agency coordination is provided below. Correspondence from the USFWS and ODNR is included as Appendix H. Table 4 (Appendix B) provides a list of species of concern identified in the vicinity of the ESC during the review.

### 4.6.1 USFWS COORDINATION

A request for review was submitted to the USFWS on February 17, 2020. In an email dated March 12, 2020 the USFWS provided comments on the Project with regard to federally-listed species within the Project vicinity. The USFWS indicated that there are no federal wildlife refuges, wilderness areas, or critical habitat within the vicinity of the Project.

The USFWS noted that the Project lies within the range of the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*). The USFWS recommends that should tree clearing be required, that removal occur between October 1<sup>st</sup> and March 31<sup>st</sup> to avoid adverse effects to these species during the brood-rearing months.

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#### 4.6.2 ODNR ENVIRONMENTAL REVIEW

The ODNR Environmental Review, dated April 14, 2020 included comments from the Ohio Natural Heritage Database Program, Division of Wildlife (DOW), and Division of Water Resources. Natural Heritage Database records within a one-mile radius of the ESC include four managed areas (Walter A. Tucker State Nature Preserve, Blacklick Woods Metro Park, Pickerington Ponds Metro Park, and Blacklick Creek Greenway Trail). Records of state-listed species were not identified in the Natural Heritage Database review.

The DOW indicated that the ESC lies within the range of the Indiana bat and northern long-eared bat, and recommended seasonal tree clearing dates of October 1st through March 31st.

The ESC lies within the range of 15 state- and federally-listed freshwater mussel species (Listed in Table 4, following text). Ohio Mussel Survey Protocol Group 2, 3, and 4 streams will require a mussel survey. Group 1 streams and unlisted streams with a watershed greater than five square miles should be assessed using a reconnaissance survey to determine the presence of freshwater mussels. Further mussel surveys may be recommended for Group 1 streams following completion of a reconnaissance effort. Requirements of freshwater mussel reconnaissance and survey efforts are explained in the Ohio Mussel Survey Protocol. If in-water work is planned in any stream with a watershed greater than five square miles at the point of impact, DOW recommends that information indicating that mussel impacts will not occur be provided. If this is not possible, the DOW recommends that a professional malacologist conduct survey and relocation efforts in accordance with the Ohio Mussel Survey Protocol.

DOW also indicated that the ESC lies within the range of eight state-listed fish species, including: the Scioto madtom (*Noturus trautmani*), popeye shiner (*Notropis ariommus*, State-Endangered), northern brook lamprey (*Ichthyomyzon fossor*, State-Endangered), spotted darter (*Etheostoma maculatum*, State-Endangered), shortnose gar (*Lepisosteus platostomus*, State-Endangered), tongue-tied minnow (*Exoglossum lauae*, State-Threatened), paddlefish (*Polyodon spathula*, State-Threatened), and the Tippecanoe darter (*Etheostoma Tippecanoe*, State-Threatened). The DOW has recommended in-water work restriction dates from April 15<sup>th</sup> to June 30<sup>th</sup> in perennial streams in order to avoid impacts to these species.

The ESC also lies within the range of the upland sandpiper (*Bartramia longicauda*, State-Endangered). This species nests in dry grasslands, pastures, and hayfields, typically greater than 19 acres in area. Construction in these types of habitats should be avoided during the April 15<sup>th</sup> to July 31<sup>st</sup> nesting period.

## 5 SUMMARY

WSP conducted a wetland delineation and stream assessment of the Astor Extension 138 kV Transmission Line Rebuild Project on January 28<sup>th</sup> – January 30<sup>th</sup>, 2020 as well as February 19<sup>th</sup> and May 5<sup>th</sup>, 2021. A total of five wetlands, seven streams, and eight open water features were delineated within the approximately 69.2 acre ESC.

Four of the five wetlands were classified as PEM wetlands, and one was classified as a PSS wetland. No PFO wetlands were identified. Four of the five the wetlands, totaling 0.49 acres, appear to be hydrologically connected to surface waters that are tributaries to the Scioto River, and therefore will likely be considered jurisdictional by the USACE. Wetland AS-4 was identified to be isolated and will likely be considered non-jurisdictional by the USACE.

The seven streams, totaling approximately 1,677 linear feet, identified within the ESC include three intermittent streams and four perennial streams. No ephemeral streams were identified within the ESC. Four streams (Streams AS-1, AS-2, AS-3 and AS-5) totaling 248 linear feet within the ESC were evaluated using the HHEI methodology. Two streams (Streams AS-6 and AS-8, both Blacklick Creek) were assessed using the QHEI methodology. Stream AS-7 (Blacklick Creek) was not assessed using the QHEI or HHEI methodology due to limited visibility and the fact that the stream has an existing Aquatic Life Use Designation of WWH by OEPA. Six of the seven delineated streams lie within a watershed designated as “possibly eligible” for the OEPA Section 401 Water Quality Certification (WQC) for the USACE 2017 Nationwide Permits (NWP). One stream (Stream AS-1) lies within a watershed designated as “ineligible” for the OEPA Section 401 WQC for the USACE 2017 NWP.

One freshwater pond (Pond AS-1) totaling 0.2 acres was delineated within the ESC. Additionally, seven detention basins (totaling 0.39 acres) were identified with the ESC. All eight open water features appear to be man-made and are hydrologically isolated. Therefore, all eight identified open water features would not be considered jurisdictional to the USACE.

The results discussed in this report are confined to the ESC limits described in earlier sections and depicted on Figure 3. Similarly, the data described is often for an area that is larger than the actual Project limits-of-disturbance for construction, therefore, lengths and acreages listed in the report are likely not representative of actual Project impacts which are often determined later after Project design and engineering is completed. If it is determined that this Project will impact Waters of the U.S., actual impacted lengths and acreages will be supplied in a permit application. Additionally, the results presented in this report should not be construed as a jurisdictional determination. If a jurisdictional determination is desired, one can be acquired through obtaining an approved Jurisdictional Determination (JD) or Preliminary Jurisdictional Determination (PJD) through the USACE.

Wetlands, excavated ponds, stream channels, and rivers are regulated by the USACE and OEPA. Any encroachments, fill material, or crossings of these areas will require permit authorization from the associated state and federal agencies. Should it be determined that the Project may impact potentially regulated waters, WSP can work to determine whether a JD or PJD is recommended, as well as support submittal for necessary permits.

Based on observations within the ESC during the field assessment, USFWS comments, potential impacts to the Indiana bat and northern long-eared bat are not anticipated if the recommended seasonal clearing dates are utilized.

Four public parks or managed areas (Walter A. Tucker State Nature Preserve, Blacklick Woods Metro Park, Pickerington Ponds Metro Park, and Blacklick Creek Greenway Trail) have been identified in the Project vicinity. To minimize impacts to these managed areas it is recommended that early coordination and communication occur with the agency managing each area that is crossed by the Project.

It is anticipated that in-water work won't be necessary, therefore no mussel surveys or construction timing windows will be necessary related to protected fish species. Potential nesting habitat for the upland sandpiper nesting habitat

was not identified within the ESC. If impacts to the potential nesting habitat is anticipated during the restriction window, additional coordination with ODNR will be necessary to discuss next steps.

Based on the board description of upland sandpiper nesting habitat, WSP did not identify suitable nesting habitat within the ESC. If impacts to the potential nesting habitat is anticipated during the restriction window, additional coordination with ODNR will be necessary to discuss next steps.

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# APPENDIX

## A FIGURES



# APPENDIX

## B REFERENCE TABLES

TABLE 1: WETLANDS DELINEATED WITHIN THE ESC

WETLAND ID	LOCATION		COWARDIN CLASS. <sup>1</sup>	DELINEATED AREA <sup>2</sup> (acres)	ORAM		JURISDICTIONAL?	PROXIMAL WATERBODY
	LAT.	LON.			SCORE	CATEGORY		
Wetland AS-1	39.945245	-82.835192	PEM	0.07	11	Category One	Yes	Stream AS-1 (UNT to Big Walnut Creek)
Wetland AS-2	39.906820	-82.843658	PEM	0.21	22.5	Category One	Yes	Stream AS-7 (Blacklick Creek)
Wetland AS-3	39.896263	-82.843822	PEM	0.20	20.5	Category One	Yes	Stream AS-7 (Blacklick Creek)
Wetland AS-4	39.944989	-82.830895	PEM	0.03	12.5	Category One	No	Isolated
Wetland SS-1	39.891940	-82.844046	PSS	<0.01	12.5	Category One	Yes	UNT to Blacklick Creek

Sum of PEM Wetland Areas	0.51
Sum of PSS Wetland Areas	0.01
Sum of PFO Wetland Areas	0.00
Sum of PUB Wetland Areas	0.00
<b>Total Wetland Area</b>	<b>0.52</b>

<sup>1</sup> PEM = palustrine emergent, PSS = palustrine scrub/shrub. PFO = palustrine forested, PUB = palustrine unconsolidated bottom.

<sup>2</sup> Acreages reflect the area delineated within the ESC and are approximate based on GPS data and are rounded to the nearest 0.01-acre.

**TABLE 2: STREAMS DELINEATED WITHIN ESC**

STREAM ID	LOCATION		STREAM NAME	STREAM TYPE	DELINEATED LENGTH <sup>1</sup> (feet)	BANKFULL WIDTH (feet)	OHWM WIDTH (feet)	FIELD EVALUATION			WOUS?	OHIO EPA 401 ELIGIBILITY
	LAT.	LON.						METHOD	SCORE	DESIGNATION		
Stream AS-1	39.944960	-82.834690	UNT to Big Walnut Creek	Intermittent	55	6	4	HHEI	48	Modified Small Drainage Warmwater Stream	Yes	Ineligible
Stream AS-2	39.935100	-82.830170	UNT to Blacklick Creek	Intermittent	122	5	4	HHEI	44	Modified Small Drainage Warmwater Stream	Yes	Possibly Eligible
Stream AS-3	39.934850	-82.830150	UNT to Blacklick Creek	Intermittent	30	8	3	HHEI	36	Modified Small Drainage Warmwater Stream	Yes	Possibly Eligible
Stream AS-5	39.927570	-82.830950	UNT to Blacklick Creek	Perennial	57	18	18	HHEI	70	Modified Small Drainage Warmwater Stream	Yes	Possibly Eligible
Stream AS-6	39.910470	-82.834950	UNT to Blacklick Creek	Perennial	114	26	22	QHEI	43	Fair Warmwater Habitat	Yes	Possibly Eligible
Stream AS-7	39.906348	-82.843652	Blacklick Creek	Perennial	101	140	120	N/A	N/A	Warmwater Habitat	Yes	Possibly Eligible
Stream AS-8	39.915383	-82.833081	UNT to Blacklick Creek	Perennial	1,198	24	10	QHEI	47	Fair Warmwater Habitat	Yes	Possibly Eligible

Sum of Ephemeral Stream Lengths 0  
Sum of Intermittent Stream Lengths 207  
Sum of Perennial Stream Lengths 1,470  
**Total Stream Length 1,677**

<sup>1</sup>Indicates the stream length delineated within the ESC limits. Streams may continue beyond the ESC boundary.

**TABLE 3: PONDS, LAKES, AND RESIRVIORS DELINEATED WITHIN ESC**

WATERBODY ID	LOCATION		DELINEATED	JURISDICTIONAL?
	LAT.	LON.	AREA <sup>1</sup> (acres)	
Pond AS-1	39.933500	-82.828500	0.20	No
Detention Basin AS-1	39.908400	-82.842600	0.09	No
Detention Basin AS-2	39.909900	-82.842300	0.03	No
Detention Basin AS-3	39.910800	-82.839900	0.06	No
Detention Basin AS-4	39.910700	-82.839400	0.02	No
Detention Basin AS-5	39.910400	-82.836400	0.03	No
Detention Basin AS-6	39.936100	-82.830100	0.06	No
Detention Basin AS-7	39.935500	-82.830000	0.10	No

**Total Ponds Area in ESC                      0.59 ac**

<sup>1</sup> Acreages reflect the area delineated within the ESC and are approximate based on GPS data and are rounded to the nearest 0.01-acre.



**TABLE 4. LISTED SPECIES COMMENTED ON BY ODNR AND USFWS**

COMMON NAME (SCIENTIFIC NAME)	STATE STATUS	FEDERAL STATUS	HABITAT DESCRIPTION	POTENTIAL HABITAT OBSERVED IN ESC	AGENCY COMMENT	IMPACT ASSESSMENT
Mammals						
Indiana bat ( <i>Myotis sodalis</i> )	Endangered	Endangered	Winter hibernacula are provided by caves and mines. Summer roost habitat typically includes live or dead trees with exfoliating bark, crevices, or cavities that can be used for roosting. Open sub-canopy areas and flight corridors are important to allow maneuvering during foraging. Proximity to water sources provides a greater density of insect prey.	Yes	Due to the project type, size, and location, in addition to the seasonal tree clearing dates (October 1 through March 31), there are no anticipated impacts to the Indiana bat.	Some potentially suitable habitat is present within the ESC (woodland edges).
Northern long-eared bat ( <i>Myotis septentrionalis</i> )	Threatened	Threatened				
Birds						
Upland sandpiper ( <i>Bartramia longicauda</i> )	Endangered	Not Listed	Nesting habitat is provided in grasslands, pastures, and old-field areas typically greater than 19 acres in size.	No	ODNR has recommended that potential nesting habitat be avoided during the April 15 <sup>th</sup> to July 31 <sup>st</sup> nesting period.	Potentially suitable habitat of sufficient size was not identified within the ESC.
Fish						
Scioto madtom ( <i>Noturus trautmani</i> )	Endangered	Endangered	Records of this species have only been found for one location in Big Darby Creek, a tributary to the Scioto River. The last record of this species was dated 1957.	No	ODNR has recommended in-water work restriction dates of April 15th to June 30th in perennial streams. If not in-water work is proposed in perennial streams, the Project is not likely to impact this species.	Suitable habitat was not identified within the ESC
Popeye shiner ( <i>Notropis ariommus</i> )	Endangered	Not Listed	Found in moderate-sized streams in clear water with slow to moderate flow.	Yes		Suitable habitat may be provided in Streams AS-6 (UNT to Blacklick Creek) and Stream AS-7 (Blacklick Creek). In-water work is not anticipated as part of this project.
Northern brook lamprey ( <i>Ichthyomyzon fossor</i> )	Endangered	Not Listed	Found in several tributaries to the Scioto River. Adults inhabit fast-flowing, clear streams with sand and gravel substrates. Juveniles are found in medium to large streams with soft substrates and slow-moving water.	No		

**TABLE 4. LISTED SPECIES COMMENTED ON BY ODNR AND USFWS**

COMMON NAME (SCIENTIFIC NAME)	STATE STATUS	FEDERAL STATUS	HABITAT DESCRIPTION	POTENTIAL HABITAT OBSERVED IN ESC	AGENCY COMMENT	IMPACT ASSESSMENT
Spotted darter ( <i>Etheostoma maculatum</i> )	Endangered	Not Listed	Found in moderate-sized streams in clear water with slow to moderate flow.	No	ODNR has recommended in-water work restriction dates of April 15th to June 30th in perennial streams. If not in-water work is proposed in perennial streams, the Project is not likely to impact this species.	Suitable habitat featuring fast-flowing water and boulders within the substrate were not identified within the ESC. In-water work is not anticipated as part of this project.
Shortnose gar ( <i>Lepisosteus platostomus</i> )	Endangered	Not Listed	Found in several tributaries to the Scioto River. Adults inhabit fast-flowing, clear streams with sand and gravel substrates. Juveniles are found in medium to large streams with soft substrates and slow-moving water.	No		Suitable habitat provided by large rivers featuring stagnant backwaters were not observed within the ESC. In-water work is not anticipated as part of this project.
Tonguetied minnow ( <i>Exoglossum laurae</i> )	Threatened	Not Listed	Habitat is typically provided by swift-flowing waters near riffles in moderate-sized streams and rivers. Habitat typically features large boulders and boulder slabs. Known populations in the Scioto River drainage include limited areas in Big Darby Creek, Paint Creek, and Little Walnut Creek.	No		Suitable habitat was not identified within the ESC. In-water work is not anticipated as part of this project.

**TABLE 4. LISTED SPECIES COMMENTED ON BY ODNR AND USFWS**

COMMON NAME (SCIENTIFIC NAME)	STATE STATUS	FEDERAL STATUS	HABITAT DESCRIPTION	POTENTIAL HABITAT OBSERVED IN ESC	AGENCY COMMENT	IMPACT ASSESSMENT
Paddlefish <i>(Polyodon spathula)</i>	Threatened	Not Listed	This species inhabits large rivers and associated backwaters. Juveniles depend on stagnant backwaters. Known populations in Ohio are limited to the Ohio River and lower Scioto River.	No	ODNR has recommended in-water work restriction dates of April 15th to June 30th in perennial streams. If not in-water work is proposed in perennial streams, the Project is not likely to impact this species.	Large rivers with slow-moving backwaters were not identified within the ESC. In-water work is not anticipated as part of this project.
Tippecanoe darter <i>(Etheostoma Tippecanoe)</i>	Threatened	Not Listed	Habitat is provided by clear waters with gravel and pebble substrates, typically in forested areas within undercut banks.	Yes		Habitat for this species may be provided in Stream AS-7 (Blacklick Creek). In-water work is not anticipated as part of this project.
Freshwater Mussels						
Clubshell <i>(Pleurobema clava)</i>	Endangered	Endangered	Habitat is typically provided by streams and small rivers with well-oxygenated riffles and sand and gravel substrates.	No	The Ohio Natural Heritage Database includes a record of this species within a one-mile radius of the ESC. In-water work in streams with a drainage area >5 mi² at the point of impact will require reconnaissance and/or survey efforts per the Ohio Mussel Survey Protocol.	No stream of sufficient size (>5 mi2) to support mussel populations with known populations of federally-listed species was identified. In-water work is not anticipated

**TABLE 4. LISTED SPECIES COMMENTED ON BY ODNR AND USFWS**

COMMON NAME (SCIENTIFIC NAME)	STATE STATUS	FEDERAL STATUS	HABITAT DESCRIPTION	POTENTIAL HABITAT OBSERVED IN ESC	AGENCY COMMENT	IMPACT ASSESSMENT
Northern riffleshell ( <i>Epioblasma torulosa rangiana</i> )	Endangered	Endangered	Habitat is typically provided by firm sand substrates in riffle areas of large streams and small rivers.	No	In-water work in streams with a drainage area >5 mi <sup>2</sup> at the point of impact will require reconnaissance and/or survey efforts per the Ohio Mussel Survey Protocol.	No stream of sufficient size (>5 mi2) to support mussel populations with known populations of federally-listed species was identified. In-water work is not anticipated.
Rayed bean ( <i>Villosa fabalis</i> )	Endangered	Endangered	The rayed bean typically inhabits small headwater creeks in gravel and sand substrates.	No		
Rabbitsfoot ( <i>Quadrula cylindrica cylindrica</i> )	Endangered	Threatened	Habitat is provided by shallow water areas with reduced velocity in small to medium sized rivers. The rabbitsfoot is typically found in gravel and sand substrates.	No	The Ohio Natural Heritage Database includes a record of this species within a one-mile radius of the ESC. In-water work in streams with a drainage area >5 mi <sup>2</sup> at the point of impact will require reconnaissance and/or survey efforts per the Ohio Mussel Survey Protocol.	
Snuffbox ( <i>Epioblasma triquetra</i> )	Endangered	Endangered	The snuffbox is usually found in small to mid-sized streams in areas with swift current. Adults are typically found burrowed in sand, gravel, or cobble substrates.	No		

**TABLE 4. LISTED SPECIES COMMENTED ON BY ODNR AND USFWS**

COMMON NAME (SCIENTIFIC NAME)	STATE STATUS	FEDERAL STATUS	HABITAT DESCRIPTION	POTENTIAL HABITAT OBSERVED IN ESC	AGENCY COMMENT	IMPACT ASSESSMENT
Purple cat's paw ( <i>Epioblasma obliquata obliquata</i> )	Endangered	Endangered	Habitat is provided by large rivers in the Ohio River basin, typically in shallow, swift-flowing waters with silt-free substrates.	No	In-water work in streams with a drainage area >5 mi <sup>2</sup> at the point of impact will require reconnaissance and/or survey efforts per the Ohio Mussel Survey Protocol.	No stream of sufficient size (>5 mi <sup>2</sup> ) to support mussel populations with known populations of federally-listed species was identified. In-water work is not anticipated.
Long solid ( <i>Fusconaia maculata</i> )	Endangered	Not Listed	Habitat is generally provided by large rivers in gravel substrates.	Yes	In-water work in streams with a drainage area >5 mi <sup>2</sup> at the point of impact will require reconnaissance and/or survey efforts per the Ohio Mussel Survey Protocol.	Potentially suitable habitat may be provided by Stream AS-7 (Blacklick Creek). In-water work is not anticipated.
Ohio pigtoe ( <i>Pleurobema cordatum</i> )	Endangered	Not Listed	Habitat is generally provided by medium to large rivers in sand or gravel substrates.	Yes		
Pocketbook ( <i>Lampsilis ovata</i> )	Endangered	Not Listed	Habitat is generally provided by large rivers with sand and gravel substrates.	Yes		
Washboard ( <i>Megaloniais nervosa</i> )	Endangered	Not Listed	Habitat is generally provided by large rivers with swift current and mud, sand, or gravel substrates.	Yes	The Ohio Natural Heritage Database includes a record of this species within a one-mile radius of the ESC. In-water work in streams with a drainage area >5 mi <sup>2</sup> at the point of impact will require reconnaissance and/or survey efforts per the Ohio Mussel Survey Protocol.	Potentially suitable habitat may be provided by Stream BS-5 and BS-6 (Blacklick Creek). However, in -water work is not anticipated.
Elephant ear ( <i>Elliptio crassidens crassidens</i> )	Endangered	Not Listed	This species is typically found in large rivers in mud, sand, or fine gravel substrates.	Yes		
Black sandshell ( <i>Ligumia recta</i> )	Threatened	Not Listed	Typical habitat includes medium and large rivers with gravel and firm sand substrates.	Yes		



**TABLE 4. LISTED SPECIES COMMENTED ON BY ODNR AND USFWS**

COMMON NAME (SCIENTIFIC NAME)	STATE STATUS	FEDERAL STATUS	HABITAT DESCRIPTION	POTENTIAL HABITAT OBSERVED IN ESC	AGENCY COMMENT	IMPACT ASSESSMENT
Threehorn wartyback ( <i>Obliquaria reflexa</i> )	Threatened	Not Listed	Habitat is generally provided by large rivers with sand or gravel substrates.	Yes	In-water work in streams with a drainage area >5 mi <sup>2</sup> at the point of impact will require reconnaissance and/or survey efforts per the Ohio Mussel Survey Protocol.	Potentially suitable habitat may be provided by Stream AS-7 (Blacklick Creek). In-water work is not anticipated.
Pondhorn ( <i>Uniomereus tetralasmus</i> )	Threatened	Not Listed	This species is typically found in ponds, small creeks, and headwater streams with sand or mud substrates	Yes		
Fawnsfoot ( <i>Truncilla donaciformis</i> )	Threatened	Not Listed	Habitat includes large rivers in sand or gravel substrates.	Yes		

# APPENDIX

## C USACE WETLAND DETERMINATION FORMS

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Astor Extension 138 kV Transmission Line City/County: Franklin County Sampling Date: 1/28/2020  
 Applicant/Owner: AEP State: OH Sampling Point: Wetland SS-1  
 Investigator(s): P. Renner; M. Thomayer Section, Township, Range: T11N R21W

Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): Concave

Slope (%): 1 Lat: 39.891940 Long: -82.844046 Datum: NAD83

Soil Map Unit Name: Crosby silt loam, Southern Ohio Till Plain, 2 to 6 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No      (If no, explain in Remarks.)

Are Vegetation     , Soil     , or Hydrology      significantly disturbed? Are "Normal Circumstances" present? Yes X No     

Are Vegetation     , Soil     , or Hydrology      naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u>    </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u>    </u>
Hydric Soil Present? Yes <u>X</u> No <u>    </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u>    </u>	
Remarks: Identified in field as W-PJR-20200128-3. PSS Wetland.	

## VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>r=30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>    </u>				
2. <u>    </u>				
3. <u>    </u>				
4. <u>    </u>				
5. <u>    </u>				
		=Total Cover		
Sapling/Shrub Stratum	(Plot size: <u>r=15'</u> )			
1. <u>Cornus racemosa</u>		65	Yes	FAC
2. <u>    </u>				
3. <u>    </u>				
4. <u>    </u>				
5. <u>    </u>				
		65	=Total Cover	
Herb Stratum	(Plot size: <u>r=5'</u> )			
1. <u>Scirpus cyperinus</u>		10	Yes	OBL
2. <u>Apocynum cannabinum</u>		5	Yes	FAC
3. <u>    </u>				
4. <u>    </u>				
5. <u>    </u>				
6. <u>    </u>				
7. <u>    </u>				
8. <u>    </u>				
9. <u>    </u>				
10. <u>    </u>				
		15	=Total Cover	
Woody Vine Stratum	(Plot size: <u>r=30'</u> )			
1. <u>    </u>				
2. <u>    </u>				
			=Total Cover	

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species <u>10</u>	x 1 = <u>10</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>70</u>	x 3 = <u>210</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>80</u> (A)	<u>220</u> (B)
Prevalence Index = B/A = <u>2.75</u>	

**Hydrophytic Vegetation Indicators:**

     1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0<sup>1</sup>

     4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

     Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: Wetland SS-1

[illegible]

## HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)		
<b>Field Observations:</b>			
Surface Water Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches):	<u>4</u>
Water Table Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches):	<u>0</u>
Saturation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches):	<u>0</u>
(includes capillary fringe)		<b>Wetland Hydrology Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Astor Extension 138 kV Transmission Line City/County: Franklin County Sampling Date: 2/19/2020  
 Applicant/Owner: AEP State: OH Sampling Point: Wetland AS-1  
 Investigator(s): P. Renner; M. Thomayer Section, Township, Range: S14 T12N R21W

Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): None

Slope (%): 1 Lat: 39.945245 Long: -82.835192 Datum: NAD83

Soil Map Unit Name: Pewamo low carbonate till-Urban land complex, 0 to 2 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No      (If no, explain in Remarks.)

Are Vegetation     , Soil     , or Hydrology      significantly disturbed? Are "Normal Circumstances" present? Yes X No     

Are Vegetation     , Soil     , or Hydrology      naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u>    </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u>    </u>
Hydric Soil Present? Yes <u>X</u> No <u>    </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u>    </u>	
Remarks: Identified in field as W-PJR-20200219-3. PEM Wetland.	

## VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>r=30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
			=Total Cover	
Sapling/Shrub Stratum	(Plot size: <u>r=15'</u> )			
1.	<u>Poa pratensis</u>	<u>80</u>	<u>Yes</u>	<u>FAC</u>
2.	<u>Lysimachia nummularia</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
3.				
4.				
5.				
		<u>90</u>	=Total Cover	
Herb Stratum	(Plot size: <u>r=5'</u> )			
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
			=Total Cover	
Woody Vine Stratum	(Plot size: <u>r=30'</u> )			
1.				
2.				
			=Total Cover	

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>80</u>	x 3 = <u>240</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>90</u> (A)	<u>260</u> (B)
Prevalence Index = B/A = <u>2.89</u>	

**Hydrophytic Vegetation Indicators:**

     1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0<sup>1</sup>

     4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

     Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)



## SOIL

Sampling Point: Wetland AS-1

[illegible]

## HYDROLOGY

Wetland Hydrology Indicators:				Wetland Hydrology Indicators:	
Primary Indicators (minimum of one is required; check all that apply)				Secondary Indicators (minimum of two required)	
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Drift Deposits (B3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Aquatic Fauna (B13)
<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Thin Muck Surface (C7)
<input type="checkbox"/> Gauge or Well Data (D9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input type="checkbox"/> Geomorphic Position (D2)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)		
Field Observations:					
Surface Water Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Depth (inches):	<input type="text" value="3"/>	
Water Table Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches):	<input type="text"/>	
Saturation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches):	<input type="text"/>	
(includes capillary fringe)				Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks:					

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Astor Extension 138 kV Transmission Line City/County: Franklin County Sampling Date: 2/19/2020  
 Applicant/Owner: AEP State: OH Sampling Point: Wetland as-2  
 Investigator(s): P. Renner; M. Thomayer Section, Township, Range: T11N R21W  
 Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): Concave  
 Slope (%): 1 Lat: 39.906820 Long: -82.843658 Datum: NAD83  
 Soil Map Unit Name: Eel silt loam, occasionally flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No      (If no, explain in Remarks.)  
 Are Vegetation     , Soil     , or Hydrology      significantly disturbed? Are "Normal Circumstances" present? Yes X No       
 Are Vegetation     , Soil     , or Hydrology      naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u>    </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u>    </u>
Hydric Soil Present? Yes <u>X</u> No <u>    </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u>    </u>	
Remarks: Identified in field as W-PJR-20200219-2. PEM Wetland.	

## VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>r=30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
		=Total Cover		
Sapling/Shrub Stratum	(Plot size: <u>r=15'</u> )			
1.				
2.				
3.				
4.				
5.				
		=Total Cover		
Herb Stratum	(Plot size: <u>r=5'</u> )			
1.	<u>Eutrochium maculatum</u>	<u>20</u>	<u>Yes</u>	<u>OBL</u>
2.	<u>Phalaris arundinacea</u>	<u>75</u>	<u>Yes</u>	<u>FACW</u>
3.	<u>Persicaria pensylvanica</u>	<u>5</u>	<u>No</u>	<u>FACW</u>
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		<u>100</u> =Total Cover		
Woody Vine Stratum	(Plot size: <u>r=30'</u> )			
1.				
2.				
		=Total Cover		

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species <u>20</u>	x 1 = <u>20</u>
FACW species <u>80</u>	x 2 = <u>160</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>100</u> (A)	<u>180</u> (B)
Prevalence Index = B/A = <u>1.80</u>	

**Hydrophytic Vegetation Indicators:**

     1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0<sup>1</sup>

     4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

     Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: Wetland as-2

[illegible]

## HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)		
<b>Field Observations:</b>			
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	<input type="text"/>
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	<input type="text"/>
Saturation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	<input type="text"/>
(includes capillary fringe)		<b>Wetland Hydrology Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Astor Extension 138 kV Transmission Line City/County: Franklin County Sampling Date: 2/19/2020  
 Applicant/Owner: AEP State: OH Sampling Point: Wetland AS-3  
 Investigator(s): P. Renner; M. Thomayer Section, Township, Range: T11N R21W

Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): Concave

Slope (%): 1 Lat: 39.896263 Long: -82.843822 Datum: NAD83

Soil Map Unit Name: Westland silty clay loam, Southern Ohio Till Plain, 0 to 2 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No      (If no, explain in Remarks.)

Are Vegetation     , Soil     , or Hydrology      significantly disturbed? Are "Normal Circumstances" present? Yes X No     

Are Vegetation     , Soil     , or Hydrology      naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u>    </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u>    </u>
Hydric Soil Present? Yes <u>X</u> No <u>    </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u>    </u>	
Remarks: Identified in field as W-PJR-20200219-1. PEM Wetland.	

## VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>r=30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>    </u>				
2. <u>    </u>				
3. <u>    </u>				
4. <u>    </u>				
5. <u>    </u>				
		=Total Cover		
Sapling/Shrub Stratum	(Plot size: <u>r=15'</u> )			
1. <u>    </u>				
2. <u>    </u>				
3. <u>    </u>				
4. <u>    </u>				
5. <u>    </u>				
		=Total Cover		
Herb Stratum	(Plot size: <u>r=5'</u> )			
1. <u>Juncus effusus</u>		5	No	OBL
2. <u>Phalaris arundinacea</u>		85	Yes	FACW
3. <u>Symphyotrichum novae-angliae</u>		5	No	FACW
4. <u>Apocynum cannabinum</u>		10	No	FAC
5. <u>    </u>				
6. <u>    </u>				
7. <u>    </u>				
8. <u>    </u>				
9. <u>    </u>				
10. <u>    </u>				
		105	=Total Cover	
Woody Vine Stratum	(Plot size: <u>r=30'</u> )			
1. <u>    </u>				
2. <u>    </u>				
		=Total Cover		

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species <u>5</u>	x 1 = <u>5</u>
FACW species <u>90</u>	x 2 = <u>180</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>105</u> (A)	<u>215</u> (B)
Prevalence Index = B/A = <u>2.05</u>	

**Hydrophytic Vegetation Indicators:**

     1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0<sup>1</sup>

     4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

     Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: Wetland AS-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-3	10YR 3/1	100					Loamy/Clayey	
3-18	10YR 3/1	95	10YR 5/4	5	C	M	Loamy/Clayey	Distinct redox concentrations

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.      <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils <sup>3</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> ? Coast Prairie Redox (A16)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> Very Shallow Dark Surface (F22)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)	<input type="checkbox"/> ? Redox Depressions (F8)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<b>Restrictive Layer (if observed):</b> Type: _____ Depth (inches): _____	<b>Hydric Soil Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

## HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)		

<b>Field Observations:</b> Surface Water Present?    Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present?      Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches):    12 Saturation Present?        Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches):    10 (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	



# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Astor Extension 138 kV Transmission Line City/County: Franklin County Sampling Date: 5/5/2021  
 Applicant/Owner: AEP State: OH Sampling Point: Wetland AS-4  
 Investigator(s): Philip Renner Section, Township, Range: \_\_\_\_\_  
 Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): Concave  
 Slope (%): 1 Lat: 39.944951 Long: -82.830929 Datum: WGS1984  
 Soil Map Unit Name: Bennington-Urban land complex, 0 to 6 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No X  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: PEM Wetland	

## VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>r=30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
		=Total Cover		
Sapling/Shrub Stratum	(Plot size: <u>r=15'</u> )			
1.				
2.				
3.				
4.				
5.				
		=Total Cover		
Herb Stratum	(Plot size: <u>r=5'</u> )			
1.	<u>Phalaris arundinacea</u>	<u>45</u>	<u>Yes</u>	<u>FACW</u>
2.	<u>Typha latifolia</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
3.	<u>Taraxacum officinale</u>	<u>15</u>	<u>No</u>	<u>FACU</u>
4.	<u>Juncus effusus</u>	<u>10</u>	<u>No</u>	<u>OBL</u>
5.				
6.				
7.				
8.				
9.				
10.				
		<u>80</u> =Total Cover		
Woody Vine Stratum	(Plot size: <u>r=30'</u> )			
1.				
2.				
		=Total Cover		

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species <u>20</u>	x 1 = <u>20</u>
FACW species <u>45</u>	x 2 = <u>90</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>15</u>	x 4 = <u>60</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>80</u> (A)	<u>170</u> (B)
Prevalence Index = B/A = <u>2.13</u>	

**Hydrophytic Vegetation Indicators:**

1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0<sup>1</sup>

4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No \_\_\_\_\_

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: Wetland AS-4

[illegible]

## HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)		
<b>Field Observations:</b>			
Surface Water Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches):	<input type="text" value="2"/>
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	<input type="text"/>
Saturation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	<input type="text"/>
(includes capillary fringe)		<b>Wetland Hydrology Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Astor Extension 138 kV Transmission Line City/County: Franklin County Sampling Date: 1/28/2020  
 Applicant/Owner: AEP State: OH Sampling Point: Upland SS-1  
 Investigator(s): P. Renner; M. Thomayer Section, Township, Range: T11N R21W

Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): None

Slope (%): 1 Lat: 39.891936 Long: -82.844108 Datum: NAD83

Soil Map Unit Name: Crosby silt loam, Southern Ohio Till Plain, 2 to 6 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No      (If no, explain in Remarks.)

Are Vegetation     , Soil     , or Hydrology      significantly disturbed? Are "Normal Circumstances" present? Yes X No     

Are Vegetation     , Soil     , or Hydrology      naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>    </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u>    </u> No <u>X</u>
Hydric Soil Present? Yes <u>    </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u>    </u> No <u>X</u>	
Remarks: Identified in field as UP-PJR-20200128-5. Non-wetland data point corresponding to Wetland SS-1.	

## VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>r=30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.0%</u> (A/B)																
1.																					
2.																					
3.																					
4.																					
5.																					
		=Total Cover																			
Sapling/Shrub Stratum	(Plot size: <u>r=15'</u> )				<b>Prevalence Index worksheet:</b> <table border="1"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>5</u></td> <td>x 3 = <u>15</u></td> </tr> <tr> <td>FACU species <u>95</u></td> <td>x 4 = <u>380</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>100</u> (A)</td> <td><u>395</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>3.95</u></td> </tr> </tbody> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>5</u>	x 3 = <u>15</u>	FACU species <u>95</u>	x 4 = <u>380</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>100</u> (A)	<u>395</u> (B)	Prevalence Index = B/A = <u>3.95</u>	
Total % Cover of:	Multiply by:																				
OBL species <u>0</u>	x 1 = <u>0</u>																				
FACW species <u>0</u>	x 2 = <u>0</u>																				
FAC species <u>5</u>	x 3 = <u>15</u>																				
FACU species <u>95</u>	x 4 = <u>380</u>																				
UPL species <u>0</u>	x 5 = <u>0</u>																				
Column Totals: <u>100</u> (A)	<u>395</u> (B)																				
Prevalence Index = B/A = <u>3.95</u>																					
1. <u>Lonicera tatarica</u>	<u>60</u>	<u>Yes</u>	<u>FACU</u>																		
2. <u>Cornus florida</u>	<u>15</u>	<u>No</u>	<u>FACU</u>																		
3. <u>Cornus racemosa</u>	<u>5</u>	<u>No</u>	<u>FAC</u>																		
4.																					
5.																					
		=Total Cover																			
Herb Stratum	(Plot size: <u>r=5'</u> )				<b>Hydrophytic Vegetation Indicators:</b> <u>    </u> 1 - Rapid Test for Hydrophytic Vegetation <u>    </u> 2 - Dominance Test is >50% <u>    </u> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <u>    </u> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <u>    </u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
1. <u>Solidago altissima</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>																		
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					
		=Total Cover																			
Woody Vine Stratum	(Plot size: <u>r=30'</u> )				<b>Hydrophytic Vegetation Present? Yes <u>    </u> No <u>X</u></b>																
1.																					
2.																					
		=Total Cover																			
Remarks: (Include photo numbers here or on a separate sheet.)																					

## SOIL

Sampling Point: Upland SS-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-7	10YR 5/3	100					Loamy/Clayey	
7-18	10YR 5/6	100					Loamy/Clayey	15% gravel

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils <sup>3</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Coast Prairie Redox (A16)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> Very Shallow Dark Surface (F22)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)	<input type="checkbox"/> Redox Depressions (F8)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<b>Restrictive Layer (if observed):</b> Type: _____ Depth (inches): _____	<b>Hydric Soil Present?</b> Yes _____ No <u>X</u>
Remarks:	

## HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)		

<b>Field Observations:</b> Surface Water Present?    Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present?      Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present?        Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Astor Extension 138 kV Transmission Line City/County: Franklin County Sampling Date: 2/19/2020  
 Applicant/Owner: AEP State: OH Sampling Point: Upland AS-1  
 Investigator(s): P. Renner; M. Thomayer Section, Township, Range: S14 T12N R21W

Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): None

Slope (%): 1 Lat: 39.945238 Long: -82.835091 Datum: NAD83

Soil Map Unit Name: Pewamo low carbonate till-Urban land complex, 0 to 2 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No      (If no, explain in Remarks.)

Are Vegetation     , Soil     , or Hydrology      significantly disturbed? Are "Normal Circumstances" present? Yes X No     

Are Vegetation     , Soil     , or Hydrology      naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u>    </u>	Is the Sampled Area within a Wetland? Yes <u>    </u> No <u>X</u>
Hydric Soil Present? Yes <u>    </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u>    </u> No <u>X</u>	
Remarks: Identified in field as UP-PJR-20200219-3. Non-wetland data point corresponding to Wetland AS-1.	

## VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>r=30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)																
1.																					
2.																					
3.																					
4.																					
5.																					
			=Total Cover																		
Sapling/Shrub Stratum	(Plot size: <u>r=15'</u> )				<b>Prevalence Index worksheet:</b> <table border="1"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>95</u></td> <td>x 3 = <u>285</u></td> </tr> <tr> <td>FACU species <u>20</u></td> <td>x 4 = <u>80</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>115</u> (A)</td> <td><u>365</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>3.17</u></td> </tr> </tbody> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>95</u>	x 3 = <u>285</u>	FACU species <u>20</u>	x 4 = <u>80</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>115</u> (A)	<u>365</u> (B)	Prevalence Index = B/A = <u>3.17</u>	
Total % Cover of:	Multiply by:																				
OBL species <u>0</u>	x 1 = <u>0</u>																				
FACW species <u>0</u>	x 2 = <u>0</u>																				
FAC species <u>95</u>	x 3 = <u>285</u>																				
FACU species <u>20</u>	x 4 = <u>80</u>																				
UPL species <u>0</u>	x 5 = <u>0</u>																				
Column Totals: <u>115</u> (A)	<u>365</u> (B)																				
Prevalence Index = B/A = <u>3.17</u>																					
1. <u>Poa pratensis</u>		95	Yes	FAC																	
2. <u>Trifolium repens</u>		20	No	FACU																	
3.																					
4.																					
5.																					
		115	=Total Cover																		
Herb Stratum	(Plot size: <u>r=5'</u> )				<b>Hydrophytic Vegetation Indicators:</b> <u>    </u> 1 - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% <u>    </u> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <u>    </u> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <u>    </u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
1.																					
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					
			=Total Cover																		
Woody Vine Stratum	(Plot size: <u>r=30'</u> )				<b>Hydrophytic Vegetation Present? Yes <u>X</u> No <u>    </u></b>																
1.																					
2.																					
			=Total Cover																		
Remarks: (Include photo numbers here or on a separate sheet.)																					



## SOIL

Sampling Point: Upland AS-1

<b>Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)</b>								
Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-8	10YR 5/3	100					Loamy/Clayey	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

☐ Histosol (A1)  
☐ Histic Epipedon (A2)  
☐ Black Histic (A3)  
☐ Hydrogen Sulfide (A4)  
☐ Stratified Layers (A5)  
☐ 2 cm Muck (A10)  
☐ Depleted Below Dark Surface (A11)  
☐ Thick Dark Surface (A12)  
☐ Sandy Mucky Mineral (S1)  
☐ 5 cm Mucky Peat or Peat (S3)

☐ Sandy Gleyed Matrix (S4)  
☐ Sandy Redox (S5)  
☐ Stripped Matrix (S6)  
☐ Dark Surface (S7)  
☐ Loamy Mucky Mineral (F1)  
☐ Loamy Gleyed Matrix (F2)  
☐ Depleted Matrix (F3)  
☐ Redox Dark Surface (F6)  
☐ Depleted Dark Surface (F7)  
☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

☐ Coast Prairie Redox (A16)  
☐ Iron-Manganese Masses (F12)  
☐ Red Parent Material (F21)  
☐ Very Shallow Dark Surface (F22)  
☐ Other (Explain in Remarks)  
  

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<b>Restrictive Layer (if observed):</b> Type:                  gravel Depth (inches):        8	<b>Hydric Soil Present?</b> Yes _____ No <u>X</u>
--	---

Remarks:

## HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)		
<input type="checkbox"/> ? Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)		
<b>Field Observations:</b> Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <input type="text"/> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <input type="text"/> Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <input type="text"/> (includes capillary fringe)		<b>Wetland Hydrology Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Astor Extension 138 kV Transmission Line City/County: Franklin County Sampling Date: 2/19/2020  
 Applicant/Owner: AEP State: OH Sampling Point: Upland AS-2  
 Investigator(s): P. Renner; M. Thomayer Section, Township, Range: T11N R21W  
 Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): Concave  
 Slope (%): 1 Lat: 39.907179 Long: -82.842948 Datum: NAD83  
 Soil Map Unit Name: Eel silt loam, occasionally flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No      (If no, explain in Remarks.)  
 Are Vegetation     , Soil     , or Hydrology      significantly disturbed? Are "Normal Circumstances" present? Yes X No       
 Are Vegetation     , Soil     , or Hydrology      naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>    </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u>    </u> No <u>X</u>
Hydric Soil Present? Yes <u>    </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u>    </u> No <u>X</u>	
Remarks: Identified in field as UP-PJR-20200219-2. Non-wetland data point corresponding to Wetland AS-2.	

## VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>r=30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>20.0%</u> (A/B)																
1.																					
2.																					
3.																					
4.																					
5.																					
		=Total Cover																			
Sapling/Shrub Stratum	(Plot size: <u>r=15'</u> )				<b>Prevalence Index worksheet:</b> <table border="1"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species <u>10</u></td> <td>x 1 = <u>10</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>0</u></td> <td>x 3 = <u>0</u></td> </tr> <tr> <td>FACU species <u>30</u></td> <td>x 4 = <u>120</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>40</u> (A)</td> <td><u>130</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>3.25</u></td> </tr> </tbody> </table>	Total % Cover of:	Multiply by:	OBL species <u>10</u>	x 1 = <u>10</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>0</u>	x 3 = <u>0</u>	FACU species <u>30</u>	x 4 = <u>120</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>40</u> (A)	<u>130</u> (B)	Prevalence Index = B/A = <u>3.25</u>	
Total % Cover of:	Multiply by:																				
OBL species <u>10</u>	x 1 = <u>10</u>																				
FACW species <u>0</u>	x 2 = <u>0</u>																				
FAC species <u>0</u>	x 3 = <u>0</u>																				
FACU species <u>30</u>	x 4 = <u>120</u>																				
UPL species <u>0</u>	x 5 = <u>0</u>																				
Column Totals: <u>40</u> (A)	<u>130</u> (B)																				
Prevalence Index = B/A = <u>3.25</u>																					
1. <u>Juglans nigra</u>		<u>10</u>	<u>Yes</u>	<u>FACU</u>																	
2. <u>Maclura pomifera</u>		<u>5</u>	<u>Yes</u>	<u>FACU</u>																	
3.																					
4.																					
5.																					
		<u>15</u> =Total Cover																			
Herb Stratum	(Plot size: <u>r=5'</u> )				<b>Hydrophytic Vegetation Indicators:</b> <u>    </u> 1 - Rapid Test for Hydrophytic Vegetation <u>    </u> 2 - Dominance Test is >50% <u>    </u> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <u>    </u> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <u>    </u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
1. <u>Phytolacca americana</u>		<u>5</u>	<u>Yes</u>	<u>FACU</u>																	
2. <u>Cicuta maculata</u>		<u>10</u>	<u>Yes</u>	<u>OBL</u>																	
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					
		<u>15</u> =Total Cover																			
Woody Vine Stratum	(Plot size: <u>r=30'</u> )				<b>Hydrophytic Vegetation Present? Yes <u>    </u> No <u>X</u></b>																
1. <u>Lonicera japonica</u>		<u>10</u>	<u>Yes</u>	<u>FACU</u>																	
2.		<u>10</u>																			
		<u>10</u> =Total Cover																			
Remarks: (Include photo numbers here or on a separate sheet.)																					

## SOIL

Sampling Point: Upland AS-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-24	10YR 5/4	100					Loamy/Clayey	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.      <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

<b>Hydric Soil Indicators:</b> <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Dark Surface (S7) <input type="checkbox"/> Loamy Mucky Mineral (F1) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8)
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**Indicators for Problematic Hydric Soils<sup>3</sup>:**  
☐ Coast Prairie Redox (A16)  
☐ Iron-Manganese Masses (F12)  
☐ Red Parent Material (F21)  
☐ Very Shallow Dark Surface (F22)  
☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<b>Restrictive Layer (if observed):</b> Type: _____ Depth (inches): _____	<b>Hydric Soil Present?</b> Yes _____ No <u>X</u>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <u>Primary Indicators (minimum of one is required; check all that apply)</u>				<u>Secondary Indicators (minimum of two required)</u>			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)					
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)					
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)					
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)					
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)					
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)					
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)					
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)					
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)						
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)						

<b>Field Observations:</b> Surface Water Present?    Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present?      Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present?        Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Astor Extension 138 kV Transmission Line City/County: Franklin County Sampling Date: 2/19/2020  
 Applicant/Owner: AEP State: OH Sampling Point: Upland AS-3  
 Investigator(s): P. Renner; M. Thomayer Section, Township, Range: T11N R21W  
 Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): Concave  
 Slope (%): 1 Lat: 39.896704 Long: -82.843716 Datum: NAD83  
 Soil Map Unit Name: Westland silty clay loam, Southern Ohio Till Plain, 0 to 2 percent slopes NWI classification: N/A  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No      (If no, explain in Remarks.)  
 Are Vegetation     , Soil     , or Hydrology      significantly disturbed? Are "Normal Circumstances" present? Yes X No       
 Are Vegetation     , Soil     , or Hydrology      naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>    </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u>    </u> No <u>X</u>
Hydric Soil Present? Yes <u>X</u> No <u>    </u>	
Wetland Hydrology Present? Yes <u>    </u> No <u>X</u>	
Remarks: Identified in field as UP-PJR-20200219-1. Non-wetland data point corresponding to Wetland AS-3.	

## VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>r=30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
		=Total Cover		
Sapling/Shrub Stratum	(Plot size: <u>r=15'</u> )			
1.				
2.				
3.				
4.				
5.				
		=Total Cover		
Herb Stratum	(Plot size: <u>r=5'</u> )			
1.	<u>Setaria faberi</u>	<u>75</u>	<u>Yes</u>	<u>FACU</u>
2.	<u>Phalaris arundinacea</u>	<u>15</u>	<u>No</u>	<u>FACW</u>
3.	<u>Xanthium spinosum</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		<u>100</u> =Total Cover		
Woody Vine Stratum	(Plot size: <u>r=30'</u> )			
1.				
2.				
		=Total Cover		

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>15</u>	x 2 = <u>30</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>85</u>	x 4 = <u>340</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>100</u> (A)	<u>370</u> (B)
Prevalence Index = B/A = <u>3.70</u>	

**Hydrophytic Vegetation Indicators:**

     1 - Rapid Test for Hydrophytic Vegetation

     2 - Dominance Test is >50%

     3 - Prevalence Index is ≤3.0<sup>1</sup>

     4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

     Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes      No X

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: Upland AS-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-4	10YR 3/1	100					Loamy/Clayey	
4-18	10YR 3/1	95	10YR 5/4	5	C	M	Loamy/Clayey	Distinct redox concentrations

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.      <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils <sup>3</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Coast Prairie Redox (A16)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> Very Shallow Dark Surface (F22)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)	<input type="checkbox"/> Redox Depressions (F8)		

<b>Restrictive Layer (if observed):</b> Type: _____ Depth (inches): _____	<b>Hydric Soil Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

## HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)		

<b>Field Observations:</b> Surface Water Present?    Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present?    Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present?    Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)				<b>Wetland Hydrology Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:				
Remarks:				

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Astor Extension 138 kV Transmission Line City/County: Franklin County Sampling Date: 5/5/2021  
 Applicant/Owner: AEP State: OH Sampling Point: Upland AS-4  
 Investigator(s): Philip Renner Section, Township, Range: \_\_\_\_\_  
 Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): Convex  
 Slope (%): 1 Lat: 39.944951 Long: -82.830929 Datum: WGS1984  
 Soil Map Unit Name: Bennington-Urban land complex, 0 to 6 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No X  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes _____ No <u>X</u>	
Wetland Hydrology Present? Yes _____ No <u>X</u>	
Remarks: PEM Wetland	

## VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: <u>r=30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
			=Total Cover	
Sapling/Shrub Stratum	(Plot size: <u>r=15'</u> )			
1.				
2.				
3.				
4.				
5.				
			=Total Cover	
Herb Stratum	(Plot size: <u>r=5'</u> )			
1.	<u>Phalaris arundinacea</u>	<u>10</u>	<u>No</u>	<u>FACW</u>
2.	<u>Poa pratensis</u>	<u>65</u>	<u>Yes</u>	<u>FAC</u>
3.	<u>Taraxacum officinale</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
4.	<u>Trifolium repens</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5.				
6.				
7.				
8.				
9.				
10.				
		<u>95</u>	=Total Cover	
Woody Vine Stratum	(Plot size: <u>r=30'</u> )			
1.				
2.				
			=Total Cover	

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>65</u>	x 3 = <u>195</u>
FACU species <u>20</u>	x 4 = <u>80</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>95</u> (A)	<u>295</u> (B)
Prevalence Index = B/A = <u>3.11</u>	

**Hydrophytic Vegetation Indicators:**

1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0<sup>1</sup>

4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No \_\_\_\_\_

Remarks: (Include photo numbers here or on a separate sheet.)



## SOIL

Sampling Point: Upland AS-4

[illegible]

## HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)		
<b>Field Observations:</b>			
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	
Saturation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	
(includes capillary fringe)		<b>Wetland Hydrology Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

# APPENDIX

## D OEPA ORAM DATA SHEETS

<b>Site:</b> Astor Extension 138 kV Transmission Line	<b>Rater(s):</b> M. Thomayer, P. Renner	<b>Date:</b> 1/28/2020
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0	0
max 6 pts.	subtotal

## Metric 1. Wetland Area (size).

Field ID: W-PJR-20200128-3  
Report ID: Wetland SS-1

Select one size class and assign score.

- ☐ >50 acres (>20.2ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
- ☐ 3 to <10 acres (1.2 to <4ha) (3 pts)
- ☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- ☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- ☒ <0.1 acres (0.04ha) (0 pts)

1	1
max 14 pts.	subtotal

## Metric 2. Upland buffers and surrounding land use.

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- ☐ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- ☒ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- ☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- ☒ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

5	6
max 30 pts.	subtotal

## Metric 3. Hydrology.

3a. Sources of Water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3)
- ☒ Precipitation (1)
- ☐ Seasonal/Intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 (27.6in) (3)
- ☐ 0.4 to 0.7m (15.7 to 27.6in) (2)
- ☒ <0.4m (<15.7in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☐ Recovered (7)
- ☒ Recovering (3)
- ☒ Recent or no recovery (1)

3b. Connectivity. Score all that apply.

- ☐ 100 year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g. forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3d. Duration inundation/saturation. Score one or dbl check.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3)
- ☐ Seasonally inundated (2)
- ☒ Seasonally saturated in upper 30cm (12in) (1)

Check all disturbances observed	
<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile	<input checked="" type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input checked="" type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

5.5	11.5
max 20 pts.	subtotal

## Metric 4. Habitat Alteration and Development.

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☐ Recovered (3)
- ☒ Recovering (2)
- ☒ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☒ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☒ Recovering (3)
- ☒ Recent or no recovery (1)

Check all disturbances observed	
<input checked="" type="checkbox"/> mowing	<input checked="" type="checkbox"/> shrub/sapling removal
<input checked="" type="checkbox"/> grazing	<input checked="" type="checkbox"/> herbaceous/aquatic bed removal
<input checked="" type="checkbox"/> clearcutting	<input checked="" type="checkbox"/> sedimentation
<input checked="" type="checkbox"/> selective cutting	<input type="checkbox"/> dredging
<input checked="" type="checkbox"/> woody debris removal	<input type="checkbox"/> farming
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

11.5
subtotal this page

<b>Site:</b> Astor Extension 138 kV Transmission Line	<b>Rater(s):</b> M. Thomayer, P. Renner	<b>Date:</b> 1/28/2020
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11.5
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subtotal first page

0	11.5
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max 10 pts. subtotal

## Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- ☐ Bog (10)
- ☐ Fen (10)
- ☐ Old growth forest (10)
- ☐ Mature forested wetland (5)
- ☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- ☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
- ☐ Lake Plain Sand Prairies (Oak Openings) (10)
- ☐ Relict Wet Prairies (10)
- ☐ Known occurrence state/federal threatened or endangered species (10)
- ☐ Significant migratory songbird/water fowl habitat or usage (10)
- ☐ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

1	12.5
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max 20 pts. subtotal

## Metric 6. Plant communities, interspersions, microtopography.

### 6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- ☐ Emergent
- ☐ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water
- ☐ Other \_\_\_\_\_

### 6b. horizontal (plan view) Interspersions.

Select only one.

- ☐ High (5)
- ☐ Moderately high(4)
- ☐ Moderate (3)
- ☐ Moderately low (2)
- ☐ Low (1)
- ☒ None (0)

### 6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☒ Nearly absent <5% cover (0)
- ☐ Absent (1)

### 6d. Microtopography.

Score all present using 0 to 3 scale.

- ☐ Vegetated hummocks/tussocks
- ☐ Coarse woody debris >15cm (6in)
- ☐ Standing dead >25cm (10in) dbh
- ☐ Amphibian breeding pools

### Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

### Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

### Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

### Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

12.5
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**End of Quantitative Rating. Complete Categorization Worksheets.**

**Site:** Astor Extension 138 kV Transmission Line**Rater(s):** M. Thomayer, P. Renner**Date:** 2/19/2020

Field ID: W-PJR-20200219-3

Report ID: Wetland AS-1

0	0
max 6 pts.	subtotal

**Metric 1. Wetland Area (size).**

Select one size class and assign score.

- ☐ >50 acres (>20.2ha) (6 pts)  
☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)  
☐ 10 to <25 acres (4 to <10.1ha) (4 pts)  
☐ 3 to <10 acres (1.2 to <4ha) (3 pts)  
☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)  
☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)  
☒ <0.1 acres (0.04ha) (0 pts)

1	1
max 14 pts.	subtotal

**Metric 2. Upland buffers and surrounding land use.**

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)  
☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)  
☐ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)  
☒ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)  
☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)  
☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)  
☒ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

5	6
max 30 pts.	subtotal

**Metric 3. Hydrology.**

3a. Sources of Water. Score all that apply.

- ☐ High pH groundwater (5)  
☐ Other groundwater (3)  
☒ Precipitation (1)  
☐ Seasonal/Intermittent surface water (3)  
☐ Perennial surface water (lake or stream) (5)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 (27.6in) (3)  
☐ 0.4 to 0.7m (15.7 to 27.6in) (2)  
☒ <0.4m (<15.7in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)  
☐ Recovered (7)  
☐ Recovering (3)  
☒ Recent or no recovery (1)

3b. Connectivity. Score all that apply.

- ☐ 100 year floodplain (1)  
☒ Between stream/lake and other human use (1)  
☐ Part of wetland/upland (e.g. forest), complex (1)  
☐ Part of riparian or upland corridor (1)

3d. Duration inundation/saturation. Score one or dbl check.

- ☐ Semi- to permanently inundated/saturated (4)  
☐ Regularly inundated/saturated (3)  
☐ Seasonally inundated (2)  
☒ Seasonally saturated in upper 30cm (12in) (1)

Check all disturbances observed

- ☐ ditch  
☐ tile  
☐ dike  
☐ weir  
☐ stormwater input

- ☐ point source (nonstormwater)  
☒ filling/grading  
☒ road bed/RR track  
☐ dredging  
☐ other \_\_\_\_\_

3	9
max 20 pts.	subtotal

**Metric 4. Habitat Alteration and Development.**

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)  
☐ Recovered (3)  
☐ Recovering (2)  
☒ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)  
☐ Very good (6)  
☐ Good (5)  
☐ Moderately good (4)  
☐ Fair (3)  
☐ Poor to fair (2)  
☒ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)  
☐ Recovered (6)  
☐ Recovering (3)  
☒ Recent or no recovery (1)

Check all disturbances observed

- ☒ mowing  
☒ grazing  
☒ clearcutting  
☒ selective cutting  
☒ woody debris removal  
☐ toxic pollutants

- ☒ shrub/sapling removal  
☐ herbaceous/aquatic bed removal  
☐ sedimentation  
☐ dredging  
☒ farming  
☐ nutrient enrichment

9
subtotal this page

<b>Site:</b> Astor Extension 138 kV Transmission Line	<b>Rater(s):</b> M. Thomayer, P. Renner	<b>Date:</b> 2/19/2020
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9

subtotal first page

0	9
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max 10 pts.

subtotal

**Metric 5. Special Wetlands.**

Check all that apply and score as indicated.

- ☐ Bog (10)
- ☐ Fen (10)
- ☐ Old growth forest (10)
- ☐ Mature forested wetland (5)
- ☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- ☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
- ☐ Lake Plain Sand Prairies (Oak Openings) (10)
- ☐ Relict Wet Prairies (10)
- ☐ Known occurrence state/federal threatened or endangered species (10)
- ☐ Significant migratory songbird/water fowl habitat or usage (10)
- ☐ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

2	11
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max 20 pts.

subtotal

**Metric 6. Plant communities, interspersions, microtopography.****6a. Wetland Vegetation Communities.**

Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- ☐ Emergent
- ☐ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water
- ☐ Other \_\_\_\_\_

**6b. horizontal (plan view) Interspersions.**

Select only one.

- ☐ High (5)
- ☐ Moderately high(4)
- ☐ Moderate (3)
- ☐ Moderately low (2)
- ☐ Low (1)
- ☒ None (0)

**6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage**

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☐ Nearly absent <5% cover (0)
- ☒ Absent (1)

**6d. Microtopography.**

Score all present using 0 to 3 scale.

- ☐ 0 Vegetated hummocks/tussocks
- ☐ 0 Coarse woody debris >15cm (6in)
- ☐ 0 Standing dead >25cm (10in) dbh
- ☐ 0 Amphibian breeding pools

**Vegetation Community Cover Scale**

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

**Narrative Description of Vegetation Quality**

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

**Mudflat and Open Water Class Quality**

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

**Microtopography Cover Scale**

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

11

**End of Quantitative Rating. Complete Categorization Worksheets.**



<b>Site:</b> Astor Extension 138 kV Transmission Line	<b>Rater(s):</b> M. Thomayer, P. Renner	<b>Date:</b> 2/19/2020
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1	1
max 6 pts.	subtotal

## Metric 1. Wetland Area (size).

Field ID: W-PJR-20200219-2  
Report ID: Wetland AS-2

Select one size class and assign score.

- ☐ >50 acres (>20.2ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
- ☐ 3 to <10 acres (1.2 to <4ha) (3 pts)
- ☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- ☒ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- ☐ <0.1 acres (0.04ha) (0 pts)

4	5
max 14 pts.	subtotal

## Metric 2. Upland buffers and surrounding land use.

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- ☒ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- ☒ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- ☐ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

12	17
max 30 pts.	subtotal

## Metric 3. Hydrology.

3a. Sources of Water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3)
- ☒ Precipitation (1)
- ☒ Seasonal/Intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 (27.6in) (3)
- ☐ 0.4 to 0.7m (15.7 to 27.6in) (2)
- ☒ <0.4m (<15.7in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☒ Recovered (7)
- ☒ Recovering (3)
- ☐ Recent or no recovery (1)

3b. Connectivity. Score all that apply.

- ☐ 100 year floodplain (1)
- ☒ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g. forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3d. Duration inundation/saturation. Score one or dbl check.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3)
- ☐ Seasonally inundated (2)
- ☒ Seasonally saturated in upper 30cm (12in) (1)

Check all disturbances observed	
<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile	<input checked="" type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input checked="" type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

7.5	24.5
max 20 pts.	subtotal

## Metric 4. Habitat Alteration and Development.

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☒ Recovered (3)
- ☒ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☒ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☒ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed	
<input type="checkbox"/> mowing	<input checked="" type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input checked="" type="checkbox"/> herbaceous/aquatic bed removal
<input checked="" type="checkbox"/> clearcutting	<input checked="" type="checkbox"/> sedimentation
<input type="checkbox"/> selective cutting	<input type="checkbox"/> dredging
<input type="checkbox"/> woody debris removal	<input type="checkbox"/> farming
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

24.5
subtotal this page

<b>Site:</b> Astor Extension 138 kV Transmission Line	<b>Rater(s):</b> M. Thomayer, P. Renner	<b>Date:</b> 2/19/2020
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24.5

subtotal first page

0	24.5
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max 10 pts.

subtotal

## Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- ☐ Bog (10)
- ☐ Fen (10)
- ☐ Old growth forest (10)
- ☐ Mature forested wetland (5)
- ☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- ☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
- ☐ Lake Plain Sand Prairies (Oak Openings) (10)
- ☐ Relict Wet Prairies (10)
- ☐ Known occurrence state/federal threatened or endangered species (10)
- ☐ Significant migratory songbird/water fowl habitat or usage (10)
- ☐ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

-2	22.5
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max 20 pts.

subtotal

## Metric 6. Plant communities, interspersions, microtopography.

### 6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- ☐ Emergent
- ☐ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water
- ☐ Other \_\_\_\_\_

### 6b. horizontal (plan view) Interspersions.

Select only one.

- ☐ High (5)
- ☐ Moderately high(4)
- ☐ Moderate (3)
- ☐ Moderately low (2)
- ☐ Low (1)
- ☒ None (0)

### 6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- ☐ Extensive >75% cover (-5)
- ☒ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☐ Nearly absent <5% cover (0)
- ☐ Absent (1)

### 6d. Microtopography.

Score all present using 0 to 3 scale.

- ☐ 0 Vegetated hummocks/tussocks
- ☐ 0 Coarse woody debris >15cm (6in)
- ☐ 0 Standing dead >25cm (10in) dbh
- ☐ 0 Amphibian breeding pools

### Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

### Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

### Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

### Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

22.5

**End of Quantitative Rating. Complete Categorization Worksheets.**

<b>Site:</b> Astor Extension 138 kV Transmission Line	<b>Rater(s):</b> M. Thomayer, P. Renner	<b>Date:</b> 2/19/2020
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2	2
max 6 pts.	subtotal

## Metric 1. Wetland Area (size).

Field ID: W-PJR-20200219-1  
Report ID: Wetland AS-3

Select one size class and assign score.

- ☐ >50 acres (>20.2ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
- ☐ 3 to <10 acres (1.2 to <4ha) (3 pts)
- ☒ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- ☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- ☐ <0.1 acres (0.04ha) (0 pts)

1	3
max 14 pts.	subtotal

## Metric 2. Upland buffers and surrounding land use.

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- ☐ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- ☒ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- ☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- ☒ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

11	14
max 30 pts.	subtotal

## Metric 3. Hydrology.

3a. Sources of Water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3)
- ☒ Precipitation (1)
- ☐ Seasonal/Intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 (27.6in) (3)
- ☒ 0.4 to 0.7m (15.7 to 27.6in) (2)
- ☐ <0.4m (<15.7in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☒ Recovered (7)
- ☒ Recovering (3)
- ☐ Recent or no recovery (1)

3b. Connectivity. Score all that apply.

- ☐ 100 year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g. forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3d. Duration inundation/saturation. Score one or dbl check.

- ☐ Semi- to permanently inundated/saturated (4)
- ☒ Regularly inundated/saturated (3)
- ☐ Seasonally inundated (2)
- ☐ Seasonally saturated in upper 30cm (12in) (1)

Check all disturbances observed	
<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile	<input checked="" type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

7.5	21.5
max 20 pts.	subtotal

## Metric 4. Habitat Alteration and Development.

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☒ Recovered (3)
- ☒ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☒ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☒ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed	
<input checked="" type="checkbox"/> mowing	<input checked="" type="checkbox"/> shrub/sapling removal
<input checked="" type="checkbox"/> grazing	<input checked="" type="checkbox"/> herbaceous/aquatic bed removal
<input checked="" type="checkbox"/> clearcutting	<input checked="" type="checkbox"/> sedimentation
<input checked="" type="checkbox"/> selective cutting	<input type="checkbox"/> dredging
<input checked="" type="checkbox"/> woody debris removal	<input type="checkbox"/> farming
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

21.5
subtotal this page

<b>Site:</b> Astor Extension 138 kV Transmission Line	<b>Rater(s):</b> M. Thomayer, P. Renner	<b>Date:</b> 2/19/2020
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21.5

subtotal first page

0	21.5
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max 10 pts.

subtotal

## Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- ☐ Bog (10)
- ☐ Fen (10)
- ☐ Old growth forest (10)
- ☐ Mature forested wetland (5)
- ☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- ☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
- ☐ Lake Plain Sand Prairies (Oak Openings) (10)
- ☐ Relict Wet Prairies (10)
- ☐ Known occurrence state/federal threatened or endangered species (10)
- ☐ Significant migratory songbird/water fowl habitat or usage (10)
- ☐ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

-1	20.5
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max 20 pts.

subtotal

## Metric 6. Plant communities, interspersions, microtopography.

### 6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- ☐ Emergent
- ☐ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water
- ☐ Other \_\_\_\_\_

### 6b. horizontal (plan view) Interspersions.

Select only one.

- ☐ High (5)
- ☐ Moderately high(4)
- ☐ Moderate (3)
- ☐ Moderately low (2)
- ☐ Low (1)
- ☒ None (0)

### 6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- ☐ Extensive >75% cover (-5)
- ☒ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☐ Nearly absent <5% cover (0)
- ☐ Absent (1)

### 6d. Microtopography.

Score all present using 0 to 3 scale.

- ☐ 0 Vegetated hummocks/tussocks
- ☐ 0 Coarse woody debris >15cm (6in)
- ☐ 0 Standing dead >25cm (10in) dbh
- ☐ 1 Amphibian breeding pools

### Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

### Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

### Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

### Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

20.5

**End of Quantitative Rating. Complete Categorization Worksheets.**

<b>Site:</b>	<b>Rater(s):</b>	<b>Date:</b>
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max 6 pts.	subtotal

## Metric 1. Wetland Area (size).

Select one size class and assign score.

- ☐ >50 acres (>20.2ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
- ☐ 3 to <10 acres (1.2 to <4ha) (3 pts)
- ☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- ☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- ☐ <0.1 acres (0.04ha) (0 pts)

max 14 pts.	subtotal

## Metric 2. Upland buffers and surrounding land use.

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- ☐ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- ☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- ☐ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

max 30 pts.	subtotal

## Metric 3. Hydrology.

3a. Sources of Water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3)
- ☐ Precipitation (1)
- ☐ Seasonal/Intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 (27.6in) (3)
- ☐ 0.4 to 0.7m (15.7 to 27.6in) (2)
- ☐ <0.4m (<15.7in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☐ Recovered (7)
- ☐ Recovering (3)
- ☐ Recent or no recovery (1)

3b. Connectivity. Score all that apply.

- ☐ 100 year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g. forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3d. Duration inundation/saturation. Score one or dbl check.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3)
- ☐ Seasonally inundated (2)
- ☐ Seasonally saturated in upper 30cm (12in) (1)

Check all disturbances observed	
<input type="checkbox"/> ditch <input type="checkbox"/> tile <input type="checkbox"/> dike <input type="checkbox"/> weir <input type="checkbox"/> stormwater input	<input type="checkbox"/> point source (nonstormwater) <input type="checkbox"/> filling/grading <input type="checkbox"/> road bed/RR track <input type="checkbox"/> dredging <input type="checkbox"/> other _____

max 20 pts.	subtotal

## Metric 4. Habitat Alteration and Development.

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☐ Recovered (3)
- ☐ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☐ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☐ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed	
<input type="checkbox"/> mowing <input type="checkbox"/> grazing <input type="checkbox"/> clearcutting <input type="checkbox"/> selective cutting <input type="checkbox"/> woody debris removal <input type="checkbox"/> toxic pollutants	<input type="checkbox"/> shrub/sapling removal <input type="checkbox"/> herbaceous/aquatic bed removal <input type="checkbox"/> sedimentation <input type="checkbox"/> dredging <input type="checkbox"/> farming <input type="checkbox"/> nutrient enrichment

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subtotal this page

<b>Site:</b>	<b>Rater(s):</b>	<b>Date:</b>
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subtotal first page

max 10 pts.	subtotal

## Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- ☐ Bog (10)
- ☐ Fen (10)
- ☐ Old growth forest (10)
- ☐ Mature forested wetland (5)
- ☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- ☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
- ☐ Lake Plain Sand Prairies (Oak Openings) (10)
- ☐ Relict Wet Prairies (10)
- ☐ Known occurrence state/federal threatened or endangered species (10)
- ☐ Significant migratory songbird/water fowl habitat or usage (10)
- ☐ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

max 20 pts.	subtotal

## Metric 6. Plant communities, interspersions, microtopography.

### 6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- ☐ Emergent
- ☐ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water
- ☐ Other \_\_\_\_\_

### 6b. horizontal (plan view) Interspersion.

Select only one.

- ☐ High (5)
- ☐ Moderately high(4)
- ☐ Moderate (3)
- ☐ Moderately low (2)
- ☐ Low (1)
- ☐ None (0)

### 6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☐ Nearly absent <5% cover (0)
- ☐ Absent (1)

### 6d. Microtopography.

Score all present using 0 to 3 scale.

- ☐ Vegetated hummocks/tussucks
- ☐ Coarse woody debris >15cm (6in)
- ☐ Standing dead >25cm (10in) dbh
- ☐ Amphibian breeding pools

### Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

### Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

### Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

### Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

**End of Quantitative Rating. Complete Categorization Worksheets.**



# APPENDIX

## E OEPA HHEI DATA SHEETS



# Primary Headwater Habitat Evaluation Form

**48****HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION Astor Extension 138 kV Transmission Line

SITE NUMBER Stream AS-1 RIVER BASIN Scioto DRAINAGE AREA (mi<sup>2</sup>) 0.40

LENGTH OF STREAM REACH (ft) 200 LAT. 39.94496 LONG. -82.83469 RIVER CODE        RIVER MILE       

DATE 02/19/20 SCORER PJR/MDT COMMENTS Intermittent Stream

**NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions**

**STREAM CHANNEL MODIFICATIONS:** ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<input type="text"/> 0%	<input checked="" type="checkbox"/> SILT [3 pt]	<input type="text"/> 70%
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<input type="text"/> 0%	<input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<input type="text"/> 30%
<input type="checkbox"/> BEDROCK [16 pt]	<input type="text"/> 0%	<input type="checkbox"/> FINE DETRITUS [3 pts]	<input type="text"/> 0%
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<input type="text"/> 0%	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	<input type="text"/> 0%
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<input type="text"/> 0%	<input type="checkbox"/> MUCK [0 pts]	<input type="text"/> 0%
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<input type="text"/> 0%	<input type="checkbox"/> ARTIFICIAL [3 pts]	<input type="text"/> 0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.00%

**(A)**

Substrate Percentage Check

**(B)****SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:**6**TOTAL NUMBER OF SUBSTRATE TYPES:**2**HHEI Metric Points****Substrate Max = 40**8**A + B**

2. **Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

**COMMENTS**       **MAXIMUM POOL DEPTH (centimeters):**20**Pool Depth Max = 30**25

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

**COMMENTS**       **AVERAGE BANKFULL WIDTH (meters):**1.20**Bankfull Width Max=30**15**This information must also be completed****RIPARIAN ZONE AND FLOODPLAIN QUALITY**

☆NOTE: River Left (L) and Right (R) as looking downstream☆

**RIPARIAN WIDTH**

L	R
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**COMMENTS**       **FLOODPLAIN QUALITY**

L	R
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

L	R
<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):**

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

**COMMENTS**       

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):**

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

**STREAM GRADIENT ESTIMATE**

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☒ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

**ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):**

Stream ID: Stream AS-1

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score  (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☒ WWH Name: Big Walnut Creek Distance from Evaluated Stream   
☐ CWH Name:  Distance from Evaluated Stream   
☐ EWH Name:  Distance from Evaluated Stream

**MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION**

USGS Quadrangle Name: Reynoldsburg NRCS Soil Map Page:  NRCS Soil Map Stream Order   
County: Franklin Township / City: Truro Township

**MISCELLANEOUS**

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation:  Quantity:   
Photograph Information:   
Elevated Turbidity? (Y/N): ☐ N Canopy (% open):  95%  
Were samples collected for water chemistry? (Y/N): ☐ N (Note lab sample no. or id. and attach results) Lab Number:   
Field Measures: Temp (°C)  Dissolved Oxygen (mg/l)  pH (S.U.)  Conductivity (µmhos/cm)   
Is the sampling reach representative of the stream (Y/N): ☒ Y If not, please explain:

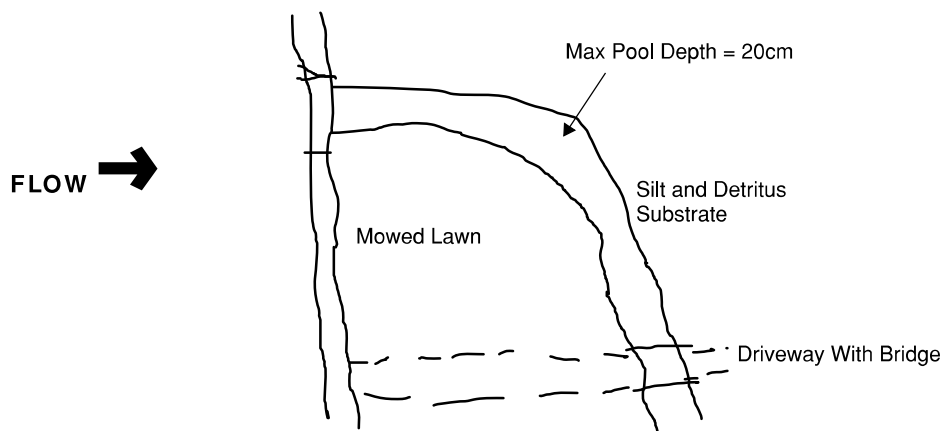
Additional comments/description of pollution impacts:

**BIOTIC EVALUATION**

Performed? (Y/N): ☐ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)  
Fish Observed? (Y/N): ☐ N Voucher? (Y/N): ☐ N Salamanders Observed? (Y/N): ☐ N Voucher? (Y/N): ☐ N  
Frogs or Tadpoles Observed? (Y/N): ☐ N Voucher? (Y/N): ☐ N Aquatic Macroinvertebrates Observed? (Y/N): ☐ N Voucher? (Y/N): ☐ N  
Comments Regarding Biology:

**DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





# Primary Headwater Habitat Evaluation Form

**44****HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION Astor Extension 138 kV Transmission Line

SITE NUMBER Stream AS-2 RIVER BASIN Scioto DRAINAGE AREA (mi<sup>2</sup>) 0.01

LENGTH OF STREAM REACH (ft) 200 LAT. 39.93510 LONG. -82.83017 RIVER CODE        RIVER MILE       

DATE 02/19/20 SCORER PJR/MDT COMMENTS Intermittent Stream

**NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions**

**STREAM CHANNEL MODIFICATIONS:** ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<input type="text"/> 0%	<input checked="" type="checkbox"/> SILT [3 pt]	<input type="text"/> 40%
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<input type="text"/> 0%	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<input type="text"/> 0%
<input type="checkbox"/> BEDROCK [16 pt]	<input type="text"/> 0%	<input type="checkbox"/> FINE DETRITUS [3 pts]	<input type="text"/> 0%
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<input type="text"/> 0%	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	<input type="text"/> 10%
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<input type="text"/> 0%	<input type="checkbox"/> MUCK [0 pts]	<input type="text"/> 0%
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<input type="text"/> 0%	<input checked="" type="checkbox"/> ARTIFICIAL [3 pts]	<input type="text"/> 50%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.00%

**(A)**

Substrate Percentage Check

**(B)****SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:**6**TOTAL NUMBER OF SUBSTRATE TYPES:**3**HHEI Metric Points****Substrate Max = 40**9**A + B**

2. **Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

<input checked="" type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

**COMMENTS**       **MAXIMUM POOL DEPTH (centimeters):**36**Pool Depth Max = 30**20

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

**COMMENTS**       **AVERAGE BANKFULL WIDTH (meters):**1.20**Bankfull Width Max=30**15**This information must also be completed****RIPARIAN ZONE AND FLOODPLAIN QUALITY**

☆NOTE: River Left (L) and Right (R) as looking downstream☆

**RIPARIAN WIDTH**

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

**COMMENTS**       **FLOODPLAIN QUALITY**

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

**FLOW REGIME (At Time of Evaluation) (Check ONLY one box):**

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

**COMMENTS**       **SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):**

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

**STREAM GRADIENT ESTIMATE**

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☒ Moderate to Severe ☐ Severe (10 ft/100 ft)

**ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):**

Stream ID: Stream AS-2

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score  (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☒ WWH Name: Blacklick Creek Distance from Evaluated Stream   
☐ CWH Name:  Distance from Evaluated Stream   
☐ EWH Name:  Distance from Evaluated Stream

**MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION**

USGS Quadrangle Name: Reynoldsburg NRCS Soil Map Page:  NRCS Soil Map Stream Order   
County: Franklin Township / City: Truro Township

**MISCELLANEOUS**

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation:  Quantity:   
Photograph Information:   
Elevated Turbidity? (Y/N): ☐ N Canopy (% open):  20%  
Were samples collected for water chemistry? (Y/N): ☐ N (Note lab sample no. or id. and attach results) Lab Number:   
Field Measures: Temp (°C)  Dissolved Oxygen (mg/l)  pH (S.U.)  Conductivity (µmhos/cm)   
Is the sampling reach representative of the stream (Y/N): ☒ Y If not, please explain:

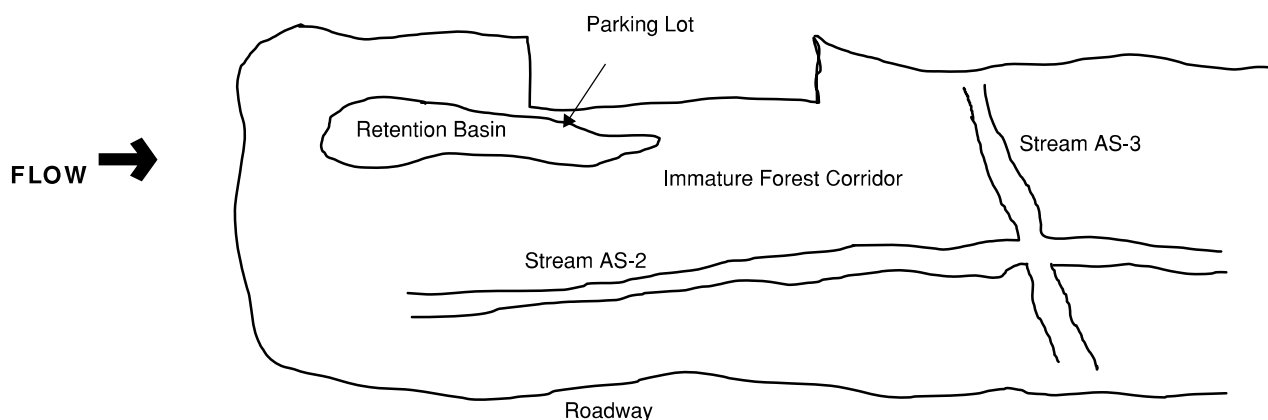
Additional comments/description of pollution impacts:

**BIOTIC EVALUATION**

Performed? (Y/N): ☐ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)  
Fish Observed? (Y/N): ☐ N Voucher? (Y/N): ☐ N Salamanders Observed? (Y/N): ☐ N Voucher? (Y/N): ☐ N  
Frogs or Tadpoles Observed? (Y/N): ☐ N Voucher? (Y/N): ☐ N Aquatic Macroinvertebrates Observed? (Y/N): ☐ N Voucher? (Y/N): ☐ N  
Comments Regarding Biology:

**DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





# Primary Headwater Habitat Evaluation Form

**36****HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION Astor Extension 138 kV Transmission Line

SITE NUMBER Stream AS-3 RIVER BASIN Scioto DRAINAGE AREA (mi<sup>2</sup>) 0.26

LENGTH OF STREAM REACH (ft) 200 LAT. 39.93485 LONG. -82.83015 RIVER CODE        RIVER MILE       

DATE 02/19/20 SCORER PJR/MDT COMMENTS Intermittent Stream

**NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions**

**STREAM CHANNEL MODIFICATIONS:** ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<input type="text"/> 0%	<input type="checkbox"/> SILT [3 pt]	<input type="text"/> 0%
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<input type="text"/> 0%	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<input type="text"/> 5%
<input type="checkbox"/> BEDROCK [16 pt]	<input type="text"/> 0%	<input type="checkbox"/> FINE DETRITUS [3 pts]	<input type="text"/> 0%
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<input type="text"/> 10%	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	<input type="text"/> 0%
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<input type="text"/> 20%	<input type="checkbox"/> MUCK [0 pts]	<input type="text"/> 0%
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<input type="text"/> 0%	<input checked="" type="checkbox"/> ARTIFICIAL [3 pts]	<input type="text"/> 65%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.1

**(A)**

Substrate Percentage Check

**(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12

TOTAL NUMBER OF SUBSTRATE TYPES: 4

**HHEI Metric Points**

Substrate Max = 40

**16**

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

<input type="checkbox"/> > 30 centimeters [20 pts]	<input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS        MAXIMUM POOL DEPTH (centimeters): 5

Pool Depth Max = 30

**15**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS        AVERAGE BANKFULL WIDTH (meters): 0.90

Bankfull Width Max=30

**5**

**This information must also be completed**

**RIPARIAN ZONE AND FLOODPLAIN QUALITY** ☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS       

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

**FLOW REGIME (At Time of Evaluation) (Check ONLY one box):**

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS       

**SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):**

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

**STREAM GRADIENT ESTIMATE**

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☒ Moderate to Severe ☐ Severe (10 ft/100 ft)



**ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):**

Stream ID: Stream AS-3

**QHEI PERFORMED?** - ☐ Yes ☒ No QHEI Score  (If Yes, Attach Completed QHEI Form)

**DOWNSTREAM DESIGNATED USE(S)**

☒ WWH Name: Blacklick Creek Distance from Evaluated Stream   
☐ CWH Name:  Distance from Evaluated Stream   
☐ EWH Name:  Distance from Evaluated Stream

**MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION**

USGS Quadrangle Name: Reynoldsburg NRCS Soil Map Page:  NRCS Soil Map Stream Order   
 County: Franklin Township / City: Truro Township

**MISCELLANEOUS**

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation:  Quantity:   
 Photograph Information:   
 Elevated Turbidity? (Y/N): ☒ N Canopy (% open):  20%  
 Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number:   
 Field Measures: Temp (°C)  Dissolved Oxygen (mg/l)  pH (S.U.)  Conductivity (µmhos/cm)   
 Is the sampling reach representative of the stream (Y/N): ☒ Y If not, please explain:

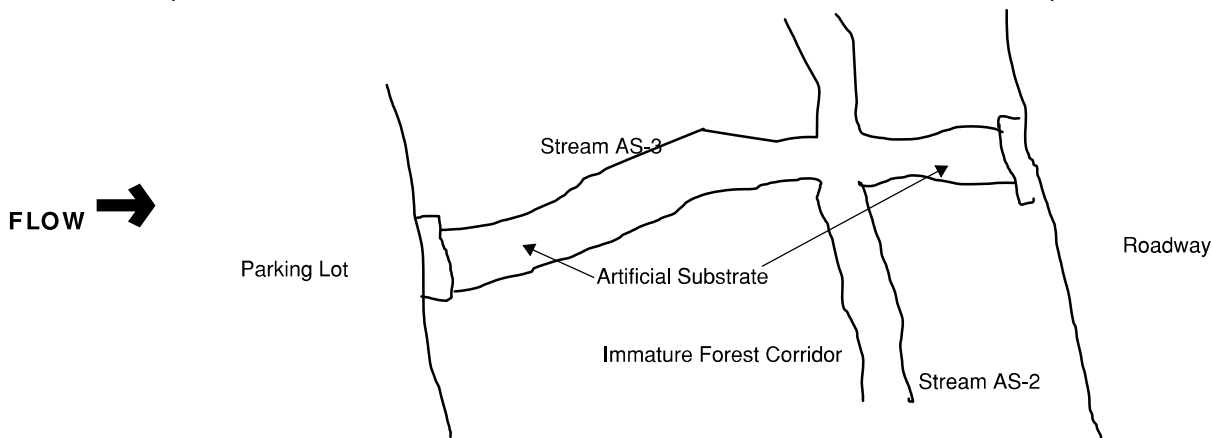
Additional comments/description of pollution impacts:

**BIOTIC EVALUATION**

Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)  
 Fish Observed? (Y/N): ☒ N Voucher? (Y/N): ☒ N Salamanders Observed? (Y/N): ☒ N Voucher? (Y/N): ☒ N  
 Frogs or Tadpoles Observed? (Y/N): ☒ N Voucher? (Y/N): ☒ N Aquatic Macroinvertebrates Observed? (Y/N): ☒ N Voucher? (Y/N): ☒ N  
 Comments Regarding Biology:

**DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





# Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

70

SITE NAME/LOCATION Astor Extension 138 kV Transmission Line

SITE NUMBER Stream AS-5 RIVER BASIN Scioto DRAINAGE AREA (mi<sup>2</sup>) 0.81

LENGTH OF STREAM REACH (ft) 200 LAT. 39.92757 LONG. -82.83095 RIVER CODE        RIVER MILE       

DATE 02/19/20 SCORER PJR/MDT COMMENTS Perennial Stream

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

## STREAM CHANNEL MODIFICATIONS:

☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0%	<input checked="" type="checkbox"/> SILT [3 pt]	60%
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0%	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	0%
<input type="checkbox"/> BEDROCK [16 pt]	0%	<input type="checkbox"/> FINE DETRITUS [3 pts]	0%
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	0%	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0%
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	35%	<input type="checkbox"/> MUCK [0 pts]	5%
<input type="checkbox"/> SAND (<2 mm) [6 pts]	0%	<input type="checkbox"/> ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.00%

(A)

Substrate Percentage Check

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12

TOTAL NUMBER OF SUBSTRATE TYPES: 3

## HHEI Metric Points

Substrate Max = 40

15

A + B

Pool Depth Max = 30

25

Bankfull Width Max=30

30

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS        MAXIMUM POOL DEPTH (centimeters): 19

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS        AVERAGE BANKFULL WIDTH (meters): 5.40

This information must also be completed

## RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

### RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

COMMENTS       

### FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

## FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS       

## SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

## STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☒ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

**ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):**

Stream ID: Stream AS-5

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score  (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☒ WWH Name: Blacklick Creek Distance from Evaluated Stream   
☐ CWH Name:  Distance from Evaluated Stream   
☐ EWH Name:  Distance from Evaluated Stream

**MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION**

USGS Quadrangle Name: Reynoldsburg NRCS Soil Map Page:  NRCS Soil Map Stream Order   
County: Franklin Township / City: Truro Township

**MISCELLANEOUS**

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation:  Quantity:   
Photograph Information:   
Elevated Turbidity? (Y/N): ☒ N Canopy (% open):  0%  
Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number:   
Field Measures: Temp (°C)  Dissolved Oxygen (mg/l)  pH (S.U.)  Conductivity (µmhos/cm)   
Is the sampling reach representative of the stream (Y/N): ☒ Y If not, please explain:

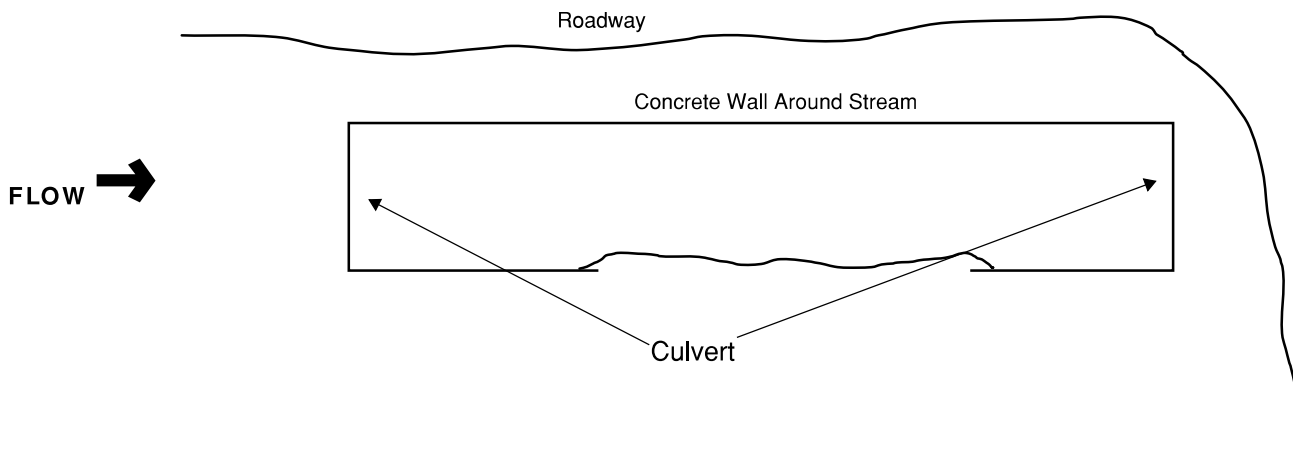
Additional comments/description of pollution impacts:

**BIOTIC EVALUATION**

Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)  
Fish Observed? (Y/N): ☒ N Voucher? (Y/N): ☒ N Salamanders Observed? (Y/N): ☒ N Voucher? (Y/N): ☒ N  
Frogs or Tadpoles Observed? (Y/N): ☒ N Voucher? (Y/N): ☒ N Aquatic Macroinvertebrates Observed? (Y/N): ☒ N Voucher? (Y/N): ☒ N  
Comments Regarding Biology:

**DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



# APPENDIX

## F OEPA QHEI DATA SHEETS

Stream &amp; Location: Stream AS-6, Astor Extension 138 kV Transmission Line RM: Date: 2 / 19 / 20

Scorers Full Name &amp; Affiliation: P. Renner, WSP USA

River Code: STORET #: Lat./ Long.: 39.91047 / 82.83495 Office verified location ☐

## 1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 &amp; average)

BEST TYPES		OTHER TYPES		ORIGIN		QUALITY	
	POOL RIFFLE		POOL RIFFLE				
<input type="checkbox"/> BLDR / SLABS [10]		<input type="checkbox"/> HARDPAN [4]		<input type="checkbox"/> LIMESTONE [1]		<input type="checkbox"/> HEAVY [-2]	<b>Substrate</b> 13 Maximum 20
<input type="checkbox"/> BOULDER [9]		<input type="checkbox"/> DETRITUS [3]		<input checked="" type="checkbox"/> TILLS [1]		<input checked="" type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> COBBLE [8]	20 10	<input type="checkbox"/> MUCK [2]		<input type="checkbox"/> WETLANDS [0]		<input type="checkbox"/> NORMAL [0]	
<input checked="" type="checkbox"/> GRAVEL [7]	80 90	<input type="checkbox"/> SILT [2]	10	<input type="checkbox"/> HARDPAN [0]		<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]		<input type="checkbox"/> ARTIFICIAL [0]		<input type="checkbox"/> SANDSTONE [0]		<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]				<input type="checkbox"/> RIP/RAP [0]		<input checked="" type="checkbox"/> MODERATE [-1]	
(Score natural substrates; ignore sludge from point-sources)				<input type="checkbox"/> LACUSTURINE [0]		<input type="checkbox"/> NORMAL [0]	
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more [2] <input checked="" type="checkbox"/> 3 or less [0]				<input type="checkbox"/> SHALE [-1]		<input type="checkbox"/> NONE [1]	
Comments				<input type="checkbox"/> COAL FINES [-2]			

## 2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

## AMOUNT

Check ONE (Or 2 &amp; average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="1"/> OVERHANGING VEGETATION [1]	<input type="1"/> ROOTWADS [1]	<input type="1"/> AQUATIC MACROPHYTES [1]	<input type="1"/> MODERATE 25-75% [7]
<input type="1"/> SHALLOWS (IN SLOW WATER) [1]	<input type="1"/> BOULDERS [1]	<input type="1"/> LOGS OR WOODY DEBRIS [1]	<input checked="" type="checkbox"/> SPARSE 5-<25% [3]
<input type="1"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments

Cover  
Maximum 20  
6

## 3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 &amp; average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input checked="" type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Channel  
Maximum 20  
8

## 4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank &amp; average)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY			
L	R	L	R	L	R	L	R
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]				
<input checked="" type="checkbox"/> MODERATE [2]	<input checked="" type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]				
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input checked="" type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]				
	<input checked="" type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]					
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]					

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian  
Maximum 10  
5

## 5] POOL / GLIDE AND RIFFLE / RUN QUALITY

## MAXIMUM DEPTH

Check ONE (ONLY!)

- ☐ > 1m [6]  
☐ 0.7-<1m [4]  
☒ 0.4-<0.7m [2]  
☐ 0.2-<0.4m [1]  
☐ < 0.2m [0]

## CHANNEL WIDTH

Check ONE (Or 2 &amp; average)

- ☐ POOL WIDTH > RIFFLE WIDTH [2]  
☐ POOL WIDTH = RIFFLE WIDTH [1]  
☒ POOL WIDTH < RIFFLE WIDTH [0]

## CURRENT VELOCITY

Check ALL that apply

- ☐ TORRENTIAL [-1] ☐ SLOW [1]  
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]  
☐ FAST [1] ☐ INTERMITTENT [-2]  
☒ MODERATE [1] ☐ EDDIES [1]

Indicate for reach - pools and riffles.

## Recreation Potential

## Primary Contact

## Secondary Contact

(circle one and comment on back)

Comments

Pool /  
Current  
Maximum 12  
3

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 &amp; average).

☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments

Riffle /  
Run  
Maximum 8  
06] GRADIENT ( 10.77 ft/mi) DRAINAGE AREA ( 3.75 mi<sup>2</sup>)

- ☐ VERY LOW - LOW [2-4]  
☐ MODERATE [6-10]  
☒ HIGH - VERY HIGH [10-6]

%POOL: 0.3 %GLIDE: 0.4  
%RUN: 0.1 %RIFFLE: 0.2

Gradient  
Maximum 10  
8

A) SAMPLED REACH

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

METHOD STAGE

☐ BOAT

☒ WADE

☐ L. LINE

☐ OTHER

1st--sample pass-- 2nd

☐ HIGH

☒ UP

☐ NORMAL

☐ LOW

☐ DRY

DISTANCE

☐ 0.5 Km

☐ 0.2 Km

☐ 0.15 Km

☒ 0.12 Km

☐ OTHER

CLARITY

1st --sample pass-- 2nd

☐ < 20 cm

☐ 20-<40 cm

☐ 40-70 cm

☐ > 70 cm/ CTB

☐ SECCHI DEPTH

meters

CANOPY

1st pass 2nd

☐ > 85%- OPEN

☐ 55%-<85%

☒ 30%-<55%

☐ 10%-<30%

☐ <10%- CLOSED

B) AESTHETICS

☐ NUISANCE ALGAE

☐ INVASIVE MACROPHYTES

☐ EXCESS TURBIDITY

☐ DISCOLORATION

☐ FOAM / SCUM

☐ OIL SHEEN

☐ TRASH / LITTER

☐ NUISANCE ODOR

☐ SLUDGE DEPOSITS

☐ CSOs/SSOs/OUTFALLS

D) MAINTENANCE

☐ PUBLIC / PRIVATE / BOTH / NA

☐ ACTIVE / HISTORIC / BOTH / NA

☐ YOUNG-SUCCESSION-OLD

☐ SPRAY / SNAG / REMOVED

☐ MODIFIED / DIPPED OUT / NA

☐ LEVEED / ONE SIDED

☐ RELOCATED / CUTOFFS

☐ MOVING-BEDLOAD-STABLE

☐ ARMoured / SLUMPS

☐ ISLANDS / SCoured

☐ IMPOUNDED / DESICCATED

☐ FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

E) ISSUES

☐ WWTP / CSO / NPDES / INDUSTRY

☐ HARDENED / URBAN / DIRT&GRIME

☐ CONTAMINATED / LANDFILL

☐ BMPs-CONSTRUCTION-SEDIMENT

☐ LOGGING / IRRIGATION / COOLING

☐ BANK / EROSION / SURFACE

☐ FALSE BANK / MANURE / LAGOON

☐ WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE

☐ ACID / MINE / QUARRY / FLOW

☐ NATURAL / WETLAND / STAGNANT

☐ PARK / GOLF / LAWN / HOME

☐ ATMOSPHERE / DATA PAUCITY

F) MEASUREMENTS

☐  $\bar{x}$  width

☐  $\bar{x}$  depth

☐ max. depth

☐  $\bar{x}$  bankfull width

☐ bankfull  $\bar{x}$  depth

☐ W/D ratio

☐ bankfull max. depth

☐ floodprone  $x^2$  width

☐ entrench. ratio

Legacy Tree:

Stream Drawing:

Stream &amp; Location: \_\_\_\_\_ RM: \_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Scorer's Full Name & Affiliation: \_\_\_\_\_  
River Code: \_\_\_\_ STORET #: \_\_\_\_ Lat./Long.: \_\_\_\_ /8 \_\_\_\_ Office verified location ☐1] **SUBSTRATE** Check ONLY Two substrate TYPE BOXES;  
estimate % or note every type present

Check ONE (Or 2 &amp; average)

BEST TYPES		OTHER TYPES		ORIGIN		QUALITY	
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> POOL	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	<div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; margin: 0 auto;"></div> <div style="text-align: center;">Substrate Maximum 20</div>
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> COBBLE [8]		<input type="checkbox"/> MUCK [2]		<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> NORMAL [0]	
<input type="checkbox"/> GRAVEL [7]		<input type="checkbox"/> SILT [2]		<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]		<input type="checkbox"/> ARTIFICIAL [0]		<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]				<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> MODERATE [-1]	
						<input type="checkbox"/> NORMAL [0]	
						<input type="checkbox"/> NONE [1]	

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☐ 3 or less [0]

Comments \_\_\_\_\_

2] **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 &amp; average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments \_\_\_\_\_

Cover  
Maximum  
203] **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments \_\_\_\_\_

Channel  
Maximum  
204] **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)  
River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION TILLAGE	
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]				
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]				
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]				
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]					
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]					

Comments \_\_\_\_\_

Indicate predominant land use(s)  
past 100m riparian.  
Riparian  
Maximum  
105] **POOL / GLIDE AND RIFFLE / RUN QUALITY**

MAXIMUM DEPTH

Check ONE (ONLY!)

- ☐ > 1m [6]  
☐ 0.7-<1m [4]  
☐ 0.4-<0.7m [2]  
☐ 0.2-<0.4m [1]  
☐ < 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 &amp; average)

- ☐ POOL WIDTH > RIFFLE WIDTH [2]  
☐ POOL WIDTH = RIFFLE WIDTH [1]  
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

- ☐ TORRENTIAL [-1] ☐ SLOW [1]  
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]  
☐ FAST [1] ☐ INTERMITTENT [-2]  
☐ MODERATE [1] ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential

Primary Contact

Secondary Contact

(circle one and comment on back)

Pool /  
Current  
Maximum  
12Indicate for functional riffles; Best areas must be large enough to support a population  
of riffle-obligate species:

Check ONE (Or 2 &amp; average).

☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments \_\_\_\_\_

Riffle /  
Run  
Maximum  
86] **GRADIENT**

DRAINAGE AREA

ft/mi  
mi<sup>2</sup>

- ☐ VERY LOW - LOW [2-4]  
☐ MODERATE [6-10]  
☐ HIGH - VERY HIGH [10-6]

%POOL:

%GLIDE:

%RUN:

%RIFFLE:

Gradient  
Maximum  
10



Check ALL that apply

---

---

---

---

---

## STAGE

- | 1st-sample pass-                | 2nd                      |
|---------------------------------|--------------------------|
| <input type="checkbox"/> HIGH   | <input type="checkbox"/> |
| <input type="checkbox"/> UP     | <input type="checkbox"/> |
| <input type="checkbox"/> NORMAL | <input type="checkbox"/> |
| <input type="checkbox"/> LOW    | <input type="checkbox"/> |
| <input type="checkbox"/> DRY    | <input type="checkbox"/> |

☐ 0.5 Km  
☐ 0.2 Km  
☐ 0.15 Km  
☐ 0.12 Km  
☐ OTHER

1st	--sample pass--	2nd
<input type="checkbox"/>	< 20 cm	<input type="checkbox"/>
<input type="checkbox"/>	20-<40 cm	<input type="checkbox"/>
<input type="checkbox"/>	40-70 cm	<input type="checkbox"/>
<input type="checkbox"/>	> 70 cm/ CTB	<input type="checkbox"/>
<input type="checkbox"/>	SECCHI DEPTH	<input type="checkbox"/>

- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSE

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

## AREA DEPTH

**POOL:**  $\square > 100\text{ft}^2$   $\square > 3\text{ft}$

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

PUBLIC / PRIVATE / BOTH / NA  
ACTIVE / HISTORIC / BOTH / NA  
YOUNG-SUCCESSION-OLD  
SPRAY - SNAG / REMOVED  
MODIFIED / DIPPED OUT / NA  
LEVEED / ONE SIDED  
RELOCATED / CUTOFFS  
MOVING-BEDLOAD-STABLE  
ARMOURED / SLUMPS  
ISLANDS / SCOURD  
IMPOUNDED / DESICCATED  
FLOOD CONTROL / DRAINAGE

WWTP / CSO / NPDES / INDUSTRY  
HARDENED / URBAN / DIRT&GRIME  
CONTAMINATED / LANDFILL  
BMPs-CONSTRUCTION-SEDIMENT  
LOGGING / IRRIGATION / COOLING  
BANK / EROSION / SURFACE  
FALSE BANK / MANURE / LAGOON  
WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
ACID / MINE / QUARRY / FLOW  
NATURAL / WETLAND / STAGNANT  
PARK / GOLF / LAWN / HOME  
ATMOSPHERE / DATA PAUCITY

$\bar{x}$  width  
 $\bar{x}$  depth  
 max. depth  
 $\bar{x}$  bankfull width  
 bankfull  $\bar{x}$  depth  
 W/D ratio  
 bankfull max. depth  
 floodprone  $x^2$  width  
 entrench. ratio

*Legacy Tree:*

# APPENDIX

## G REPRESENTATIVE PHOTOGRAPHS

**PHOTOGRAPH 1**



Wetland AS-1 (PEM), facing north on February 19, 2020.

**PHOTOGRAPH 2**



Wetland AS-1 (PEM), facing south on February 19, 2020.



**PHOTOGRAPH 3**



Wetland AS-1 (PEM), facing east on February 19, 2020.

**PHOTOGRAPH 4**



Wetland AS-1 (PEM), facing west on February 19, 2020.



**PHOTOGRAPH 5**



Wetland AS-1 (PEM), soil pit on February 19, 2020.

**PHOTOGRAPH 6**



Upland AS-1, facing north on February 19, 2020.



**PHOTOGRAPH 7**



Upland AS-1, facing south on February 19, 2020.

**PHOTOGRAPH 8**



Wetland AS-2 (PEM), facing north on February 19, 2020.



**PHOTOGRAPH 9**



Wetland AS-2 (PEM), facing south on February 19, 2020.

**PHOTOGRAPH 10**



Wetland AS-2 (PEM), facing east on February 19, 2020.



**PHOTOGRAPH 11**



Wetland AS-2 (PEM), facing west on February 19, 2020.

**PHOTOGRAPH 12**



Wetland AS-2 (PEM), soil pit on February 19, 2020.



**PHOTOGRAPH 13**



Upland AS-2, facing north on February 19, 2020.

**PHOTOGRAPH 14**



Upland AS-3, facing south on February 19, 2020.



**PHOTOGRAPH 15**



Wetland AS-3 (PEM), facing north on February 19, 2020.

**PHOTOGRAPH 16**



Wetland AS-3 (PEM), facing south on February 19, 2020.



**PHOTOGRAPH 17**



Wetland AS-3 (PEM), facing east on February 19, 2020.

**PHOTOGRAPH 18**



Wetland AS-3 (PEM), facing west on February 19, 2020.



**PHOTOGRAPH 19**



Wetland AS-3 (PEM), soil pit on February 19, 2020.

**PHOTOGRAPH 20**



Upland AS-3, facing north on February 19, 2020.



**PHOTOGRAPH 21**



Wetland AS-4 (PEM), facing north on May 5, 2020.

**PHOTOGRAPH 22**



Wetland AS-4 (PEM), facing south on May 5, 2020.



**PHOTOGRAPH 23**



Wetland AS-4 (PEM), facing east on May 5, 2020.

**PHOTOGRAPH 24**



Wetland AS-4 (PEM), facing west on May 5, 2020.



**PHOTOGRAPH 25**



Wetland AS-4 (PEM), soil pit on May 5, 2020.

**PHOTOGRAPH 26**



Upland AS-4, facing north on May 5, 2020.



**PHOTOGRAPH 27**



Upland AS-3, facing south on February 19, 2020.

**PHOTOGRAPH 28**



Wetland SS-1 (PSS), facing north on January 28, 2020.



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**PHOTOGRAPH 29**



Wetland SS-1 (PSS), facing south on January 28, 2020.

**PHOTOGRAPH 30**



Wetland SS-1 (PSS), facing east on January 28, 2020.



**PHOTOGRAPH 31**



Wetland SS-1 (PSS), facing west on January 28, 2020.

**PHOTOGRAPH 32**



Wetland SS-1 (PSS), soil pit on January 28, 2020.



**PHOTOGRAPH 33**



Upland SS-1, facing north on January 28, 2020.

**PHOTOGRAPH 34**



Upland SS-1, soil pit on January 28, 2020.



**PHOTOGRAPH 35**



Stream AS-2 (intermittent) facing downstream on February 19, 2020.

**PHOTOGRAPH 36**



Stream AS-2 (intermittent) facing upstream on February 19, 2020.

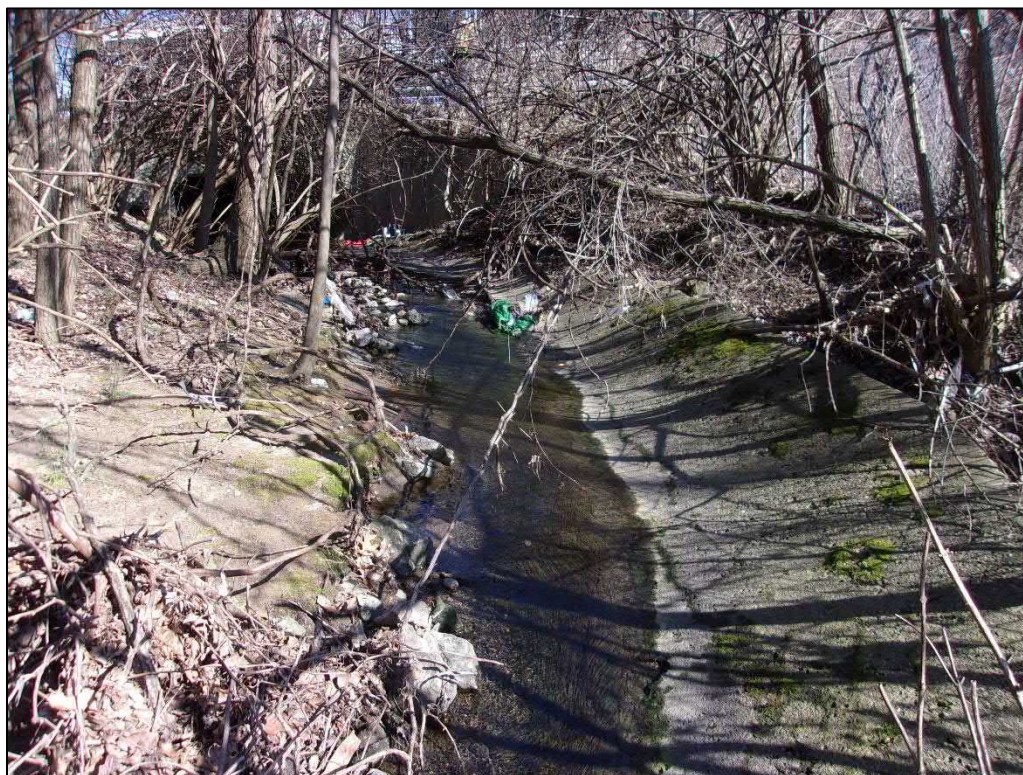


**PHOTOGRAPH 37**



Stream AS-2 (intermittent) substrate on February 19, 2020.

**PHOTOGRAPH 38**



Stream AS-3 (intermittent) facing upstream on February 19, 2020.



**PHOTOGRAPH 39**



Stream AS-3 (intermittent) facing downstream on February 19, 2020.

**PHOTOGRAPH 40**



Stream AS-3 (intermittent) substrate on February 19, 2020.

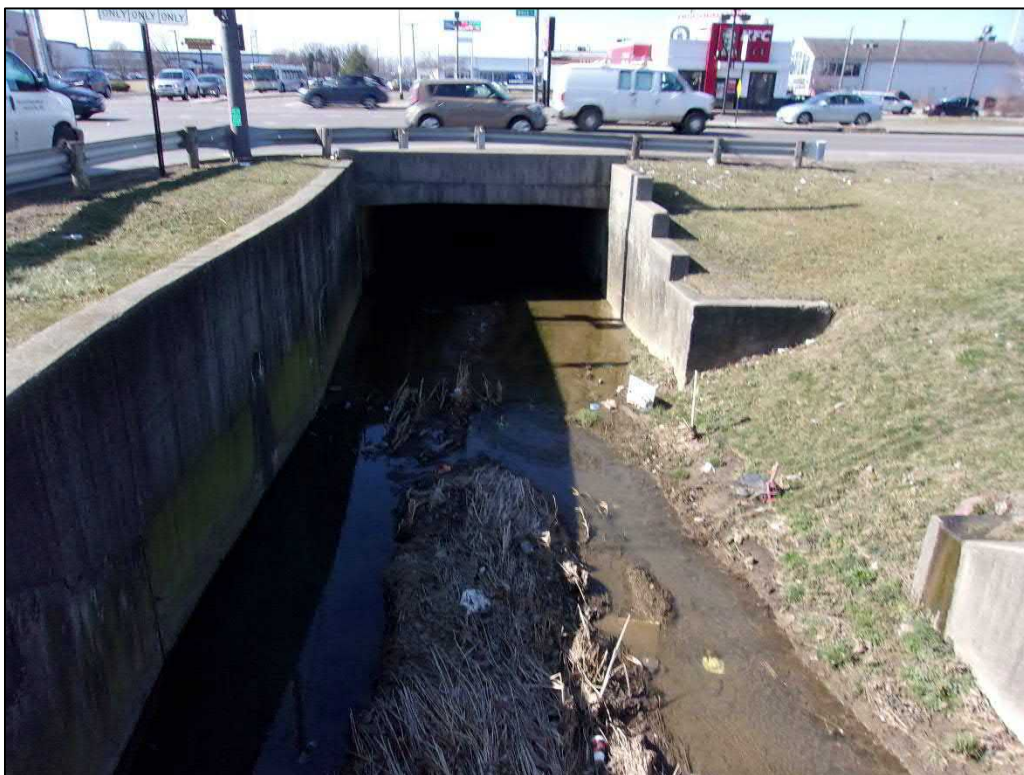


**PHOTOGRAPH 41**



Stream AS-5 (perennial) facing upstream on February 19, 2020.

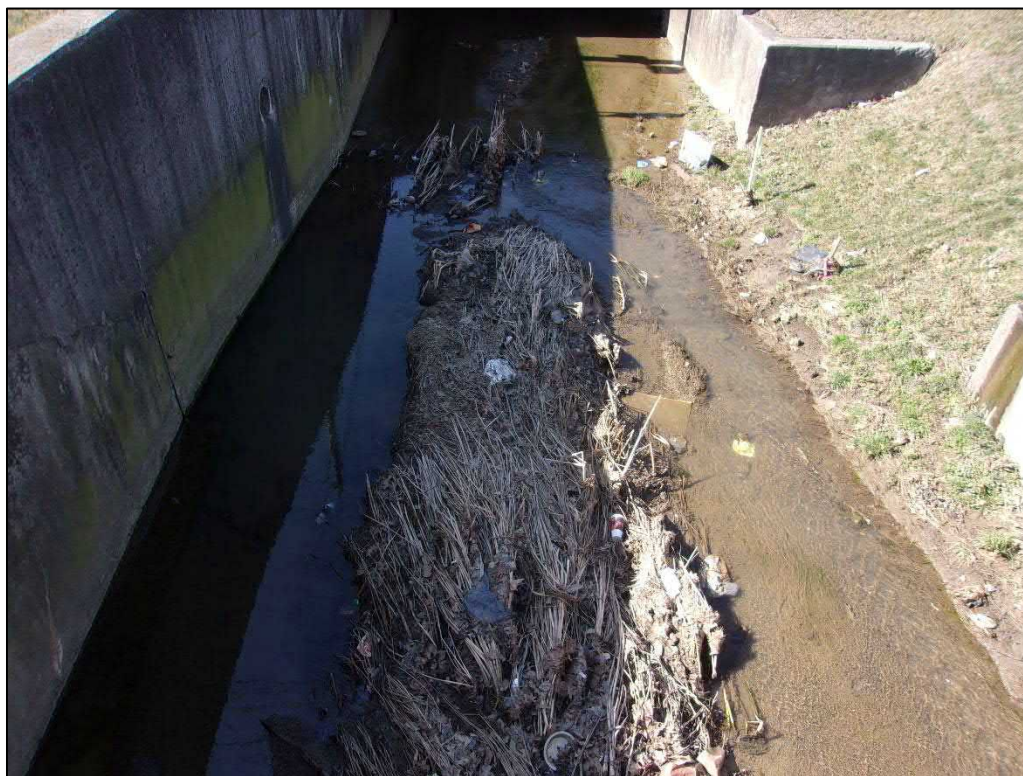
**PHOTOGRAPH 42**



Stream AS-5 (perennial) facing downstream on February 19, 2020.



**PHOTOGRAPH 43**



Stream AS-5 (perennial) substrate on February 19, 2020.

**PHOTOGRAPH 44**



Stream AS-6 (perennial) facing upstream on February 19, 2020.



**PHOTOGRAPH 45**



Stream AS-6 (perennial) facing downstream on February 19, 2020.

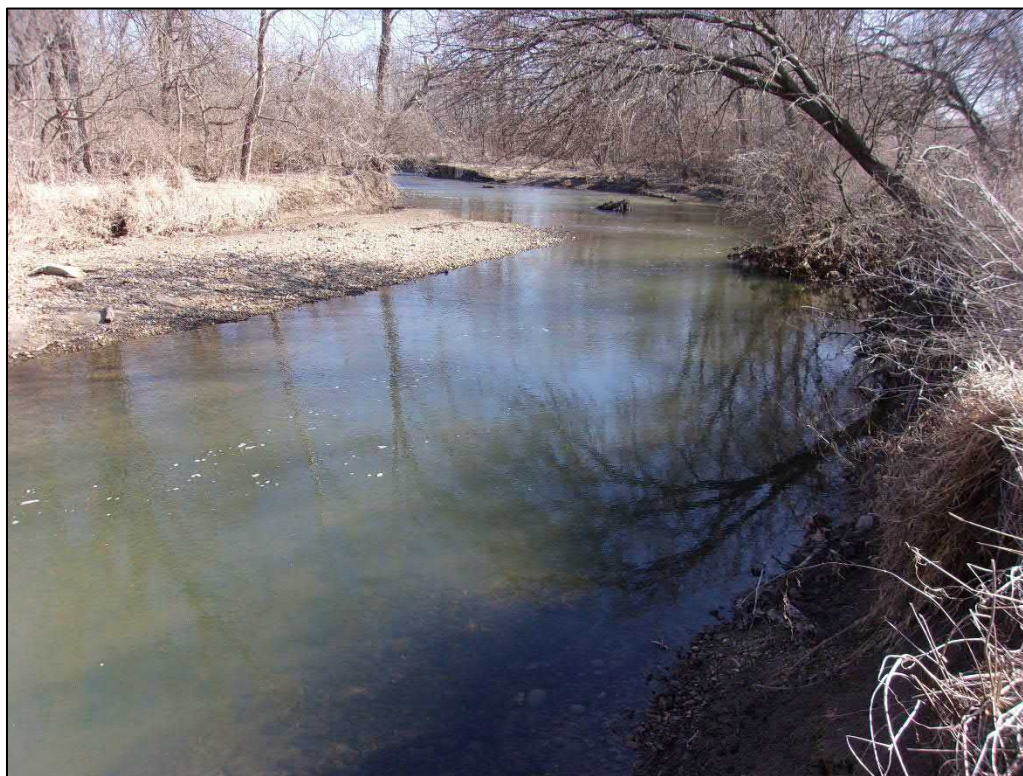
**PHOTOGRAPH 46**



Stream AS-6 (perennial) substrate on February 19, 2020.



**PHOTOGRAPH 47**



Stream AS-7 (perennial) facing upstream on February 19, 2020.

**PHOTOGRAPH 48**



Stream AS-7 (perennial) facing downstream on February 19, 2020.

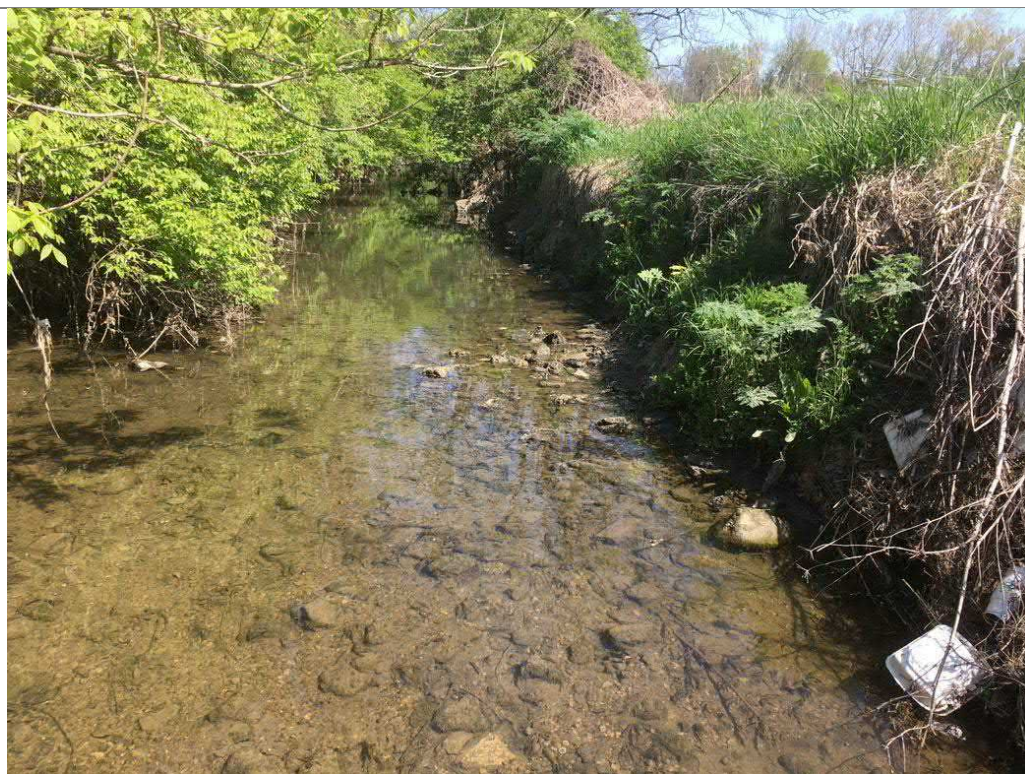


**PHOTOGRAPH 49**



Stream AS-7 (perennial) substrate on February 19, 2020.

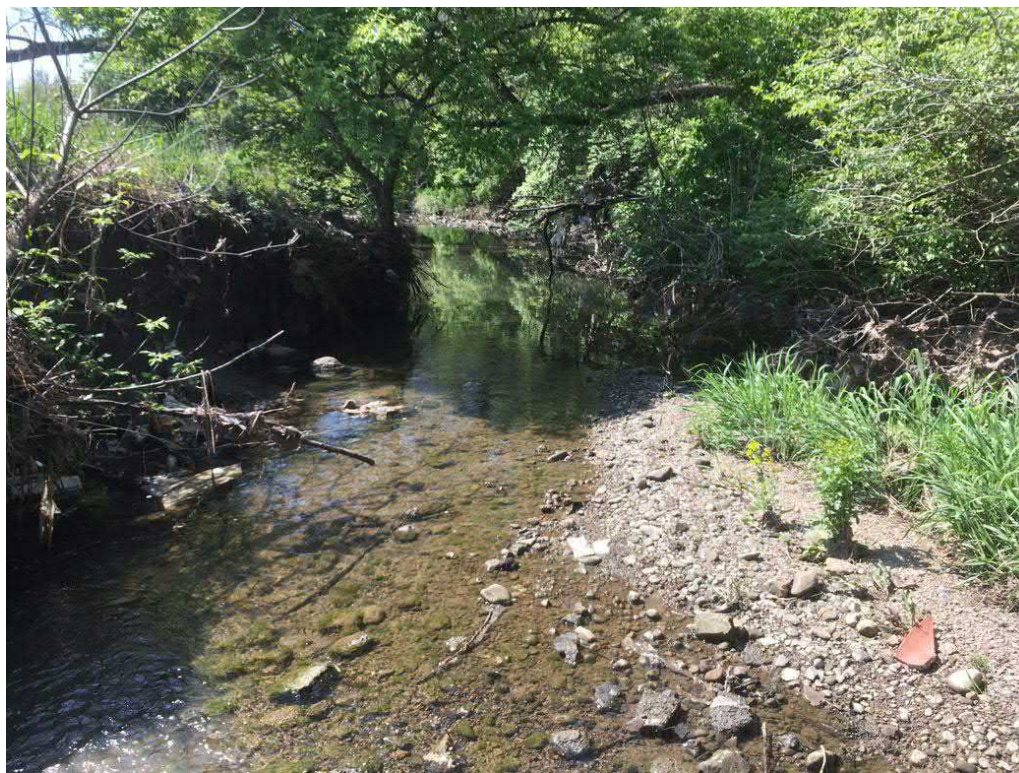
**PHOTOGRAPH 50**



Stream AS-8 (perennial) facing upstream on May 5, 2021



**PHOTOGRAPH 51**



Stream AS-8 (perennial) facing downstream on May 5, 2021

**PHOTOGRAPH 52**



Stream AS-8 (perennial) substrate on May 5, 2021



**PHOTOGRAPH 53**



Detention Basin AS-6 facing west on February 19, 2020.

**PHOTOGRAPH 54**



Detention Basin AS-7 facing north on February 19, 2020.



**PHOTOGRAPH 55**



Detention Basin AS-5 facing southeast on February 19, 2020.

**PHOTOGRAPH 56**



Detention Basin AS-4 facing north on February 19, 2020.



**Project  
Title:**

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**PHOTOGRAPH 57**



Detention Basin AS-3 facing west on February 19, 2020.

**PHOTOGRAPH 58**



Detention Basin AS-2 facing north on February 19, 2020.

**Project  
Title:**

**Astor Extension 138 kV Transmission Line Rebuild Project**

**PHOTOGRAPH 59**



Detention Basin AS-1 facing south on February 19, 2020.

# APPENDIX

## H AGENCY COORDINATION



## Renner, Philip

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**From:** Ohio, FW3 <ohio@fws.gov>  
**Sent:** Thursday, March 12, 2020 8:41 AM  
**To:** Renner, Philip  
**Subject:** Astor Extension 138 kV Trans Line Rebuild Project, Franklin Co. (AEP)



UNITED STATES DEPARTMENT OF THE INTERIOR  
U.S. Fish and Wildlife Service  
Ecological Services Office  
4625 Morse Road, Suite 104  
Columbus, Ohio 43230  
(614) 416-8993 / Fax (614) 416-8994



TAILS# 03E15000-2020-TA-1006

Dear Mr. Renner,

We have received your recent correspondence regarding potential impacts to federally listed species in the vicinity of the above referenced project. There are no federal wilderness areas, wildlife refuges or designated critical habitat within the vicinity of the project area. We recommend that proposed activities minimize water quality impacts, including fill in streams and wetlands. Best management practices should be utilized to minimize erosion and sedimentation.

**FEDERALLY LISTED, PROPOSED, AND CANDIDATE SPECIES COMMENTS:** Due to the project type, size, location, and the proposed implementation of seasonal tree cutting (clearing of trees  $\geq 3$  inches diameter at breast height between October 1 and March 31) to avoid impacts to the federally listed endangered Indiana bat (*Myotis sodalis*) and threatened northern long-eared bat (*Myotis septentrionalis*), we do not anticipate adverse effects to any federally endangered, threatened, proposed or candidate species. Should the project design change, or during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the U.S. Fish and Wildlife Service (Service) should be initiated to assess any potential impacts.

If there is a federal nexus for the project (e.g., federal funding provided, federal permits required to construct), no tree clearing should occur on any portion of the project area until consultation under section 7 of the Endangered Species Act (ESA), between the Service and the federal action agency, is completed. We recommend that the federal action agency submit a determination of effects to this office, relative to the Indiana bat and northern long-eared bat, for our review and concurrence.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), ESA, and are consistent with the intent of the National Environmental Policy Act of 1969 and the Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed section 7 consultation document. We recommend that the project be coordinated with the Ohio Department of Natural Resources due to the potential for the project to affect state listed species and/or state lands. Contact John Kessler, Environmental Services Administrator, at (614) 265-6621 or at [john.kessler@dnr.state.oh.us](mailto:john.kessler@dnr.state.oh.us).

If you have questions, or if we can be of further assistance in this matter, please contact our office at (614) 416-8993 or [ohio@fws.gov](mailto:ohio@fws.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read "Patrice M. Ashfield". The signature is stylized with a large, looping initial "P" and a long, sweeping underline.

Patrice M. Ashfield  
Field Office Supervisor



# Ohio Department of Natural Resources

MIKE DeWINE, GOVERNOR

MARY MERTZ, DIRECTOR

## Office of Real Estate

*John Kessler, Chief*

2045 Morse Road – Bldg. E-2

Columbus, OH 43229

Phone: (614) 265-6621

Fax: (614) 267-4764

April 14, 2020

Philip Renner  
WSP USA  
312 Elm Street, Suite 2500  
Cincinnati, Ohio 45202

**Re:** 20-216; Astor Extension 138 kV Transmission Line Rebuild Project

**Project:** The proposed project involves rebuilding approximately 4.83 miles of the Astor Extension 138 kV Transmission Line.

**Location:** The proposed project is located in Truro and Madison Townships, Franklin County, Ohio.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

**Natural Heritage Database:** The Natural Heritage Database has the following records at or within a one-mile radius of the project area:

Walter A. Tucker State Nature Preserve – Columbus & Franklin Co. Metro Parks  
Blacklick Woods Metro Park – Columbus & Franklin Co. Metro Parks  
Pickerington Ponds Metro Park – Columbus & Franklin Co. Metro Parks  
Blacklick Creek Greenway Trail – Columbus & Franklin Co. Metro Parks

The review was performed on the project area you specified in your request as well as an additional one-mile radius. Records searched date from 1980. This information is provided to inform you of features present within your project area and vicinity.

Please note that Ohio has not been completely surveyed and we rely on receiving information from many sources. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although all types of plant communities have been surveyed, we only maintain records on the highest quality areas.



**Fish and Wildlife:** The Division of Wildlife (DOW) has the following comments.

The DOW recommends that impacts to streams, wetlands and other water resources be avoided and minimized to the fullest extent possible, and that best management practices be utilized to minimize erosion and sedimentation.

The project is within the range of the Indiana bat (*Myotis sodalis*), a state endangered and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees to include: shagbark hickory (*Carya ovata*), shellbark hickory (*Carya laciniosa*), bitternut hickory (*Carya cordiformis*), black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*), shingle oak (*Quercus imbricaria*), northern red oak (*Quercus rubra*), slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), sassafras (*Sassafras albidum*), post oak (*Quercus stellata*), and white oak (*Quercus alba*). Indiana bat roost trees consists of trees that include dead and dying trees with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. However, Indiana bats are also dependent on the forest structure surrounding roost trees. If suitable habitat occurs within the project area, the DOW recommends trees be conserved. If suitable habitat occurs within the project area and trees must be cut, the DOW recommends cutting occur between October 1 and March 31. If suitable trees must be cut during the summer months, the DOW recommends a net survey be conducted between June 1 and August 15, prior to any cutting. Net surveys should incorporate either nine net nights per square 0.5 kilometer of project area, or four net nights per kilometer for linear projects. If no tree removal is proposed, this project is not likely to impact this species.

The project is within the range of the purple cat's paw (*Epioblasma o. obliquata*), a state endangered and federally endangered mussel, the clubshell (*Pleurobema clava*), a state endangered and federally endangered mussel, the northern riffleshell (*Epioblasma torulosa rangiana*), a state endangered and federally endangered mussel, the rayed bean (*Villosa fabalis*), a state endangered and federally endangered mussel species, the rabbitsfoot (*Quadrula cylindrica cylindrica*), a state endangered and federal candidate mussel, the snuffbox (*Epioblasma triquetra*), a state endangered and federal endangered mussel, the long solid (*Fusconaia maculata maculata*), a state endangered mussel, the Ohio pigtoe (*Pleurobema cordatum*), a state endangered mussel, the pocketbook (*Lampsilis ovata*), a state endangered mussel, the washboard (*Megaloniais nervosa*), a state endangered mussel, the elephant-ear (*Elliptio crassidens crassidens*), a state endangered mussel, the black sandshell (*Ligumia recta*), a state threatened mussel, the threehorn wartyback (*Obliquaria reflexa*), a state threatened mussel, the pondhorn (*Unio merus tetralasmus*), a state threatened mussel, and the fawnsfoot (*Truncilla donaciformis*), a state threatened mussel.

This project must not have an impact on freshwater native mussels at the project site. This applies to both listed and non-listed species. Per the Ohio Mussel Survey Protocol (2020), all Group 2, 3, and 4 streams (Appendix A) require a mussel survey. Per the Ohio Mussel Survey Protocol, Group 1 streams (Appendix A) and unlisted streams with a watershed of 5 square miles or larger above the point of impact should be assessed using the Reconnaissance Survey for Unionid Mussels (Appendix B) to determine if mussels are present. Mussel surveys may be recommended for these streams as well. This is further explained within the Ohio Mussel Survey Protocol. Therefore, if in-water work is planned in any stream that meets any of the above criteria, the DOW recommends the applicant provide information to indicate no mussel impacts will occur. If this is not possible, the DOW recommends a professional malacologist conduct a

mussel survey in the project area. If mussels that cannot be avoided are found in the project area, as a last resort, the DOW recommends a professional malacologist collect and relocate the mussels to suitable and similar habitat upstream of the project site. Mussel surveys and any subsequent mussel relocation should be done in accordance with the Ohio Mussel Survey Protocol. The Ohio Mussel Survey Protocol (2020) can be found at:

<http://wildlife.ohiodnr.gov/portals/wildlife/pdfs/licenses%20&%20permits/OH%20Mussel%20Survey%20Protocol.pdf>

The project is within the range of the Scioto madtom (*Noturus trautmani*), a state endangered and federally endangered fish, the popeye shiner (*Notropis ariommus*), a state endangered fish, the northern brook lamprey (*Ichthyomyzon fossor*), a state endangered fish, the spotted darter (*Etheostoma maculatum*), a state endangered fish, the shortnose gar (*Lepisosteus platostomus*), a state endangered fish, the tonguetied minnow (*Exoglossum laurae*), a state threatened fish, the paddlefish (*Polyodon spathula*) a state threatened fish, and the Tippecanoe darter (*Etheostoma tippecanoe*), a state threatened fish. The DOW recommends no in-water work in perennial streams from April 15 to June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed in a perennial stream, this project is not likely to impact these or other aquatic species.

The project is within the range of the upland sandpiper (*Bartramia longicauda*), a state endangered bird. Nesting upland sandpipers utilize dry grasslands including native grasslands, seeded grasslands, grazed and ungrazed pasture, hayfields, and grasslands established through the Conservation Reserve Program (CRP). If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of April 15 to July 31. If this type of habitat will not be impacted, this project is not likely to impact this species.

Due to the potential of impacts to federally listed species, as well as to state listed species, we recommend that this project be coordinated with the U.S. Fish & Wildlife Service.

**Water Resources:** The Division of Water Resources has the following comment.

The local floodplain administrator should be contacted concerning the possible need for any floodplain permits or approvals for this project. Your local floodplain administrator contact information can be found at the website below.

[http://water.ohiodnr.gov/portals/soilwater/pdf/floodplain/Floodplain%20Manager%20Community%20Contact%20List\\_8\\_16.pdf](http://water.ohiodnr.gov/portals/soilwater/pdf/floodplain/Floodplain%20Manager%20Community%20Contact%20List_8_16.pdf)

ODNR appreciates the opportunity to provide these comments. Please contact Sarah Tebbe, Environmental Specialist, at (614) 265-6397 or [Sarah.Tebbe@dnr.state.oh.us](mailto:Sarah.Tebbe@dnr.state.oh.us) if you have questions about these comments or need additional information.

Mike Pettegrew  
Environmental Services Administrator (Acting)

**This foregoing document was electronically filed with the Public Utilities  
Commission of Ohio Docketing Information System on**

**1/20/2023 11:13:18 AM**

**in**

**Case No(s). 23-0040-EL-BLN**

Summary: Correspondence Letter of Notification. electronically filed by Hector Garcia-Santana on behalf of AEP Ohio Transmission Company, Inc.