LETTER OF NOTIFICATION FOR THE
GLENCOE STATION EXPANSION
PROJECT

PUCO Case No. 16-1609-EL-BLN

Submitted pursuant to OAC 4906-6-05

AEP Ohio Transmission Company, Inc.

September 1, 2016
LETTER OF NOTIFICATION FOR THE GLENCOE STATION EXPANSION PROJECT

LETTER OF NOTIFICATION
Glencoe Station Expansion Project

American Electric Power Ohio Transmission Company, Inc. ("AEP Ohio Transco") provides this Letter of Notification ("LON") to the Ohio Power Siting Board in accordance with the accelerated requirements of Ohio Administrative Code ("O.A.C.") Chapter 4906-6-05.

4906-6-05(B) GENERAL INFORMATION

B(1) The applicant shall provide 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 or construction notice application.

AEP Ohio Transco proposes to expand the existing Glencoe Station to the east and southeast onto a 10.5 acre parcel currently under option for purchase by Ohio Power Company, an affiliate of AEP Ohio Transco and a wholly-owned subsidiary of American Electric Power Company, Inc. ("Project"). The existing station is located approximately 200 feet east of the intersection of Warnock Glencoe Road and Denham Road in Smith Township, Belmont County, Ohio. Figure 1 shows the location of the Project in relation to the surrounding vicinity. The proposed station expansion area is situated adjacent to the south of Warnock Glencoe Road and is being rebuilt to provide increased capacity and system reliability in the eastern Ohio shale gas region, as it will facilitate a future 138 kV loop in the area’s transmission facilities centered at Glencoe Station.

The Project meets the requirements for a Letter of Notification ("LON") because it is within the types of projects defined by Item (4)(b) of 4906-1-01 Appendix A, “Application Requirement Matrix for Electric Power Transmission Lines.” This item states:

Constructing additions to existing electric power transmission stations or converting distribution station to transmission stations where:

(b) There is a greater than twenty percent expansion of the fenced area
B(2) If the proposed project is an electric power transmission line or gas pipeline, the applicant shall provide a statement explaining the need for the proposed facility.

This Project is does not involve an electric power transmission line or gas pipeline; therefore this section is not applicable.

B(3) 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 proposed West Bellaire-Glencoe 138kV Project is listed on page 21 of the 2016 “AEP Ohio Transmission Company Long Term Forecast report to the Public Utilities Commission of Ohio,” Form FE-T9. The station expansion at Glencoe is necessary in order to accommodate the incoming 138kV transmission line and new 138-69kV power transformer, which will be submitted to the OPSB under separate cover as a separate transmission line project. Figure 1 shows the general location of the Project in relation to existing and proposed lines and substation in the vicinity.

B(4) 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 proposed Project is an expansion to an existing transmission station on agricultural land, so it was determined to have minimal impacts associated with socioeconomic, ecological, construction, or engineering of the Project. This site expansion was chosen due to the suitable geography, proximity to 69kV & 138kV transmission lines, and presence of road access for construction and maintenance crews. Upon review, AEP Ohio Transco’s engineering and siting consultants concluded that the expanded Glencoe site at the recommended location for the upgraded substation, as illustrated in Appendix A, is the best option for the proposed Project.

Alternative sites in the region would have had incurred considerably more socioeconomic and environmental impacts due to the need to re-route and extend various transmission lines in order to reach the new site. In addition, the alternatives considered would have been closer to the Glencoe village area, affecting more residents.
B(5) 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.

AEP Ohio Transco informed affected property owners and tenants about the project through several different mediums. Within seven days of filing this LON, AEP Ohio Transco will issue a public notice in a newspaper of general circulation in the project area. The notice will comply with all requirements under O.A.C. Section 4906-6-08(A)(1-6). Further, AEP Ohio Transco will mail a letter, via first class mail, to affected landowners, tenants, contiguous owners and any other landowner AEP Ohio Transco may approach for an easement necessary for the construction, operation, or maintenance of the facility. The letter complies with all the requirements of O.A.C. Section 4906-6-08(B). Additionally, AEP Ohio Transco maintains a website (http://aeptransmission.com/ohio/) which provides the public access to an electronic copy of this LON and the public notice for this LON. A paper copy of the LON will be served to the public library in each political subdivision affected by the project. AEP Ohio Transco also retains right-of-way land agents that discuss project timelines, construction and restoration activities and convey this information to affected owners and tenants.

B(6) The applicant shall provide an anticipated construction schedule and proposed in-service date of the project.

Construction of the station expansion will begin in November 2016. The anticipated in-service date for the Project is June 2019.

B(7) 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.

Figures 1 and 2 provide the proposed Project area on a map of 1:24,000-scale. Figure 1 shows the Project Area on the United States Geological Survey (USGS) 7.5-minute topographic maps of the St. Clairsville (1982), Lansing (1982), Armstrong Mills (1972), and Businessburg (1976) quadrangles. Figure 2 shows the Project area on recent aerial photography, as provided by Bing Maps. To access the Project location from Columbus, take I-70 East for approximately 112 miles to Exit 213 to U.S. 40/National Road. Turn right on U.S. 40 and proceed 0.1 miles to Airport Road. Turn right on Airport Road and proceed 3.2 miles. At OH-149/Belmont Warnock Road, turn left and proceed 2.4 miles to OH-9/Main Street. Turn right and proceed 0.1 miles before turning right on OH-149/Warnock Glencoe.
LETTER OF NOTIFICATION FOR THE GLENCOE STATION EXPANSION PROJECT

Road. After approximately 2.6 miles, Glencoe Station is on the right-hand side of the road. The approximate address of Glencoe Station is 49876 Warnock Glencoe Road, Belmont, Ohio 43718.

B(8) 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.

There are no easements, options, and/or land use agreements that are necessary to construct and operate the facility.

B(9) The applicant shall describe the following information regarding the technical features of the project:

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

The equipment and facilities described below will be installed within the fenced area of the proposed station. Figure 3 provides the proposed layout of the facility.

Breakers: There will be three 3000A, 40kA, 138kV circuit breakers and foundations installed at the switching station.

Switches: Station will contain thirteen 3000A, 100kA, 138kV disconnect switches mounted on tubular steel structures.

Bus Arrangement and Structures: The switching station will utilize a breaker-and-a-half configuration with tubular and tapered tubular steel. Two of four planned breaker and half strings shall be built initially.

Equipment support steel structures will be designed using hot-rolled structural steel shapes such as wide flange, tubing, channels and angles or as folded plate tapered tubular structures. Dead-end structures will be made of tapered tubular steel. All yard structures will be ASTM A36, ASTM A500, or ASTM A572 steel hot-dip galvanized for corrosion protection.
Transformers: The Station will contain one 138/69/13 kV power transformer (either 130 MVA or 200 MVA) and two station service transformers, one at 100KVA, 70kV - 120/240V and one at 50KVA, 13kV – 120/240V.

Control Buildings: The control houses will consist of pre-engineered and factory fabricated 16 Foot by 27 (or 36) Foot metal building to contain all switch control and relay panels and miscellaneous equipment. This would include an RTU, circuit breaker controls and line protection panels, batteries, battery chargers, and other miscellaneous equipment. The control houses will include building HVAC and internal lighting. The switch facility will not be manned. Plumbing facilities are not required.

Other Major Equipment: Other equipment can include, 18 surge arresters, 24 capacitor voltage transformers (CVT’s), and 5 wave traps. A single 28.8 MVAR, 138kV cap bank is also planned.

Lighting systems at the switching station will be necessary for safety, security, and to comply with applicable standards. There are two different illumination levels for switch yard lighting systems. NESC Section 11, Table 111-1 recommends a two foot-candle illumination level in stations for general service lighting. The IES Lighting Handbook, Figure 2-1, recommends a 0.5 foot-candle horizontal illumination level for general security lighting. Security lighting is dusk to dawn intended to illuminate the areas inside the switching station yard that might attract vandalism or theft. Service lighting is switch controlled intended to provide additional lighting for unscheduled callouts to the switching station.

A seven-foot galvanized chain link fence with 3 strands of barbed wire above for an 8--foot overall height shall be installed around the complete switching station installation. The station shall also be provided with a security system.

(b) 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.

This Project involves a station expansion; therefore, this section is not applicable.
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(c) The estimated capital cost of the project.

The 2016 capital cost estimates for the proposed project have been tabulated according to the Federal Energy Regulatory Commission (FERC) Electric Plant Transmission Accounts:

<table>
<thead>
<tr>
<th>FERC Account Number</th>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>350</td>
<td>Land and Land Rights</td>
<td>$314,000</td>
</tr>
<tr>
<td>352</td>
<td>Structures &amp; Improvement</td>
<td>$1,929,913</td>
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<td>353</td>
<td>Substation Equipment</td>
<td>$7,719,653</td>
</tr>
<tr>
<td>354</td>
<td>Towers &amp; Fixtures</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>355</td>
<td>Poles &amp; Fixtures</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>356</td>
<td>Overhead Conductors &amp; Devices</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>357</td>
<td>Underground Conductors &amp; Devices</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>358</td>
<td>Underground-to-overhead Conversion Equipment</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>359</td>
<td>Right-of-way Clearing, Roads, Trails or Other Access</td>
<td>$264,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>$10,227,566</strong></td>
</tr>
</tbody>
</table>

B(10) The applicant shall describe the social and ecological impacts of the project:

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

AEP Ohio Transco’s consultant prepared a Socioeconomic, Land Use, and Agricultural District Review Report. This report is included as Appendix A.

(b) 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.

AEP Ohio Transco’s consultant prepared a Socioeconomic, Land Use, and Agricultural District Review Report. This report is included as Appendix A.

(c) 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.
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An archaeological investigation by Weiler & Associates, Inc. was completed for this project. No significant potential impacts to cultural resources were identified. A copy of the resulting report will be provided to the Ohio Power Siting Board under separate cover.

(d) 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.

There are no local, state or federal governmental agencies known to have requirements that must be met in connection with the construction of the Project.

(e) Provide a description of the applicant’s investigation concerning the presence or absence of federal and state designated species (including endangered species, threatened species, rare species, species proposed for listing, species under review for 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.

AEP Ohio Transco’s consultant prepared a Threatened and Endangered Species Report and coordinated with the USFWS and ODNR regarding special status species in the vicinity of the Project area. No impacts to threatened or endangered species are expected. The full Threatened and Endangered Species Report for the Project is included as Appendix B.

(f) 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.

AEP Ohio Transco’s consultant prepared an Areas of Ecological Concern, Wetland Delineation, and Stream Assessment Report. No impacts to wetlands or streams are
LETTER OF NOTIFICATION FOR THE GLENCOE STATION EXPANSION PROJECT

anticipated with the proposed Project. The full Areas of Ecological Concern, Wetland Delineation, and Stream Assessment Report for the Project is included as Appendix C.

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

To the best of AEP Ohio Transco’s knowledge, no unusual conditions exist that would result in environmental, social, health, or safety impacts. Construction and operation of the proposed Project will meet all applicable safety standards established by the Occupational Safety and Health Administration, and will be in accordance with the requirements specified in the latest revision of the National Electrical Safety Code as adopted by the Public Utilities Commission of Ohio. The Stormwater Pollution Prevention Plan, which will include the Access Plan, will be provided to the OPSB under separate cover, after submission of this LON.
FIGURE 2
AERIAL PHOTOGRAPHY OF THE PROJECT VICINITY
APPENDIX A

SOCIOECONOMIC, LAND USE, AND AGRICULTURAL DISTRICT REVIEW REPORT
GLENCOE STATION EXPANSION PROJECT, BELMONT COUNTY, OHIO

SOCIOECONOMIC, LAND USE, AND AGRICULTURAL DISTRICT REVIEW REPORT

Prepared for:
American Electric Power Ohio Transmission Company
700 Morrison Road
Gahanna, Ohio 43230

Prepared by:
AECOM
525 Vine Street, Suite 1800
Cincinnati, Ohio 45202

Project #: 60513121

July 2016
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3.0 AGRICULTURAL DISTRICT LAND ............................................. 2
4.0 CONCLUSION.............................................................................. 2

FIGURES
(follow text)

Number

FIGURE 1 LAND USE MAP
1.0 PROJECT DESCRIPTION

This document presents the socioeconomic, land use, and agricultural district review conducted by AECOM for American Electric Power Ohio Transmission Company's (AEP Ohio Transco) proposed Glencoe Station Expansion Project (Project). AEP Ohio Transco is proposing to expand the existing Glencoe Station from approximately 0.4 acres to approximately 2.0 acres in Smith Township, Belmont County, Ohio.

As part of the Ohio Power Siting Board (OPSB) Letter of Notification (LON) requirements, AEP Ohio Transco is required to assess and report the socioeconomic, land use, and agricultural district characteristics potentially affected by the Project, as stated in Ohio Administrative Code (OAC) Rule 4906-6-05(B)(10)(a) and (b). These rules state:

(10) The applicant shall describe the social and ecological impacts of the project.

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

(b) 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.

AEP Ohio Transco retained AECOM to conduct a desktop review of socioeconomic, land use, and agricultural district land characteristics. A study area was established within 2,000 feet of the proposed station expansion area. This study area is approximately 104 acres. In conjunction with ecological field surveys for the Project, AECOM noted land uses crossed by the Project. This report will be used to assist AEP Ohio Transco’s efforts to avoid or minimize impacts to socioeconomic characteristics and land uses potentially present in the study area during construction activities.

2.0 GENERAL LAND USE DESCRIPTION

Land use within the study area is shown on Figure 1. Current land use characteristics were obtained through review of aerial photography taken in 2013; the United States Geological Survey (USGS) 7.5-minute topographic map of the St. Clairsville, Ohio (1985) quadrangle; and a field reconnaissance conducted in December 2015. The primary land uses within 2,000 feet of the proposed station expansion area include undeveloped woodland, pastures, and residences. Two residences were identified within 2,000 feet, the closest of which is approximately 60 feet to the northwest. Agricultural/pasture land accounts for approximately 24 acres of the 104-acre study area within 2,000 feet, including the entire 2-acre station expansion area (pasture). Transportation corridors are also present within the study area.

The 104 acre study area crosses into the Richland Township in Belmont County. No city boundaries are within the Project study area. General land use trends in the area suggest minimal change or conversion over the last few decades. The rural nature of the Project area suggest little or minimal growth in the immediate Project vicinity.
3.0 AGRICULTURAL DISTRICT LAND

The entire station expansion area and portions of the area within 2,000 feet are used as agricultural/pasture land as shown on Figure 1. AECOM contacted the Belmont County Auditor’s office regarding parcels registered in the agricultural district land program. Based on the information provided for parcels in Smith and Richland Townships, there are no properties registered in the agricultural district land program within one mile of the expansion area. No impacts to agricultural district land parcels are anticipated.

4.0 CONCLUSION

The Project is not expected to significantly impact current socioeconomic characteristics, land use, or agricultural district land in the vicinity. The Project is not expected to negatively impact any future land use plans for the area.
LEGEND:
- Proposed Station Expansion Area
- Existing Station Fence
- Residence
- Agricultural/Pasture Land
- Existing Electric Transmission Line

FIGURE 1
LAND USE MAP

DATE: 7/21/2016
SCALE: 1:6,000
CREATED BY: SJJ
CHECKED BY: ARG
JOB NO. 60513121

GLENCOE STATION EXPANSION PROJECT, BELMONT COUNTY, OHIO

RARE, THREATENED, AND ENDANGERED SPECIES SURVEY REPORT

Prepared for:
American Electric Power Ohio Transmission Company
700 Morrison Road
Gahanna, Ohio 43230

Prepared by:
AECOM
525 Vine Street, Suite 1800
Cincinnati, Ohio 45202

Project #: 60513121

August 2016
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TABLE 2 FEDERALLY LISTED SPECIES THAT COULD INHABIT BELMONT COUNTY, OHIO ..................... 3

ATTACHMENT

Number

ATTACHMENT A AGENCY RESPONSES
1.0 PROJECT DESCRIPTION

This document presents the results of the rare, threatened, and endangered species assessment conducted by AECOM for American Electric Power Ohio Transmission Company’s (AEP Ohio Transco) proposed Glencoe Station Expansion Project (Project). AEP Ohio Transco is proposing to expand the existing 0.6 acre Glencoe Station fenced area to approximately 5.6 acres in Smith Township, Belmont County, Ohio.

As part of the Ohio Power Siting Board (OPSB) Letter of Notification (LON) requirements, AEP Ohio Transco is required to assess and report the federal and state designated species potentially affected by the Project, as stated in Ohio Administrative Code (OAC) Rule 4906-6-05(B)(10)(e). This rule states:

(10) The applicant shall describe the social and ecological impacts of the project:

(e) Provide a description of the applicant's investigation concerning the presence or absence of federal and state designated species (including endangered species, threatened species, rare species, species proposed for listing, species under review for 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.

AEP retained AECOM to conduct rare, threatened, and endangered species review and field surveys within areas crossed by the proposed Project. This report will be used to assist AEP Ohio Transco’s efforts to avoid impacts to threatened and endangered species potentially present in the survey area during construction activities.

2.0 METHODS

The first phase of the survey involved a review of online lists of federal and state species of concern. In addition to the review of available literature, AECOM submitted a request to Ohio Department of Natural Resources (ODNR) Ohio Natural Heritage Database for Geographical Information System (GIS) records of species of concern that were reported within close proximity to the Project. AECOM also submitted coordination letters to the U.S. Fish and Wildlife Service (USFWS) and ODNR soliciting comments on the Project. Agency-identified species and available species-specific information was reviewed to identify the various habitat types that listed species are known to frequent. This information was used during the field survey to assess the potential for these species of concern in, or near the Project study corridor.

AECOM field ecologists conducted a general habitat survey in conjunction with the stream and wetland field surveys on July 21, 2016. The survey area was observed to be undeveloped old field within and directly surrounding the substation expansion area. The survey boundary extends beyond the actual area of proposed impact and includes a stream complex and small wetland area surrounded by upland forest. The southernmost portion of the survey boundary is shown to be within the 100-Year floodplain of Mcmahon Creek.
3.0 RESULTS

3.1 State Listed Threatened or Endangered Species

ODNR provided a corresponding letter response to a request for Ohio Natural Heritage Database GIS records dated July 19, 2016. No GIS records of rare or endangered species are within a one mile radius of the Project. A copy of the letter indicating no Ohio Natural Heritage Database GIS records is included in Attachment A.

AECOM submitted a coordination letter to the ODNR on July 18, 2016, soliciting comments on the Project. AECOM has not received a response regarding the Project from the ODNR to date. Should additional information become available from ODNR, which differs significantly from the above listed species, an addendum report will be provided.

To address the Project’s potential to impact state protected species, AECOM conducted a web based literature review of the ODNR State Listed Wildlife Species List, June 2015, to identify what species potentially occur in Belmont County, Ohio. Table 1 lists the species identified during the ODNR literature review.

| TABLE 1 |
| STATE LISTED SPECIES THAT COULD INHABIT |
| BELMONT COUNTY, OHIO |

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>State Status</th>
<th>General Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indiana Bat</td>
<td><em>Myotis sodalis</em></td>
<td>Endangered</td>
<td>Seasonal clearing restrictions</td>
</tr>
<tr>
<td>Amphibian-Salamander</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastern Hellbender</td>
<td><em>Cryptobranchus alleganiensis</em></td>
<td>Endangered</td>
<td>No in-stream work planned</td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Banded Killfish</td>
<td><em>Fundulus diaphanus menona</em></td>
<td>Endangered</td>
<td>No in-stream work planned</td>
</tr>
<tr>
<td>Tippecanoe Darter</td>
<td><em>Etheostoma Tippecanoe</em></td>
<td>Threatened</td>
<td>No in-stream work planned</td>
</tr>
<tr>
<td>Channel Darter</td>
<td><em>Percina copelandi</em></td>
<td>Threatened</td>
<td>No in-stream work planned</td>
</tr>
<tr>
<td>River Darter</td>
<td><em>Percina shumardi</em></td>
<td>Threatened</td>
<td>No in-stream work planned</td>
</tr>
<tr>
<td>Paddlefish</td>
<td><em>Polyodon spathula</em></td>
<td>Threatened</td>
<td>No in-stream work planned</td>
</tr>
<tr>
<td>Insects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>River Jewelwing</td>
<td><em>Calopteryx aequabilis</em></td>
<td>Endangered</td>
<td></td>
</tr>
<tr>
<td>Bivalves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butterfly</td>
<td><em>Ellipsaria lineolata</em></td>
<td>Endangered</td>
<td>No in-stream work planned</td>
</tr>
<tr>
<td>Black Sandshell</td>
<td><em>Ligumia recta</em></td>
<td>Threatened</td>
<td>No in-stream work planned</td>
</tr>
</tbody>
</table>
TABLE 1
STATE LISTED SPECIES THAT COULD INHABIT BELMONT COUNTY, OHIO

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>State Status</th>
<th>General Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threehorn Wartyback</td>
<td>Obliquaria reflexa</td>
<td>Threatened</td>
<td>No in-stream work planned</td>
</tr>
</tbody>
</table>

**Indiana bat comments:** The Indiana bat, a federally and state endangered species, is a potential inhabitant of Belmont County. Due to no tree clearing needed, this Project is not likely to impact this species.

**Eastern hellbender comments:** The eastern hellbender (Cryptobranchus alleganiensis alleganiensis), a state endangered species and a federally listed species of concern, is a potential inhabitant of Belmont County. This aquatic salamander inhabits perennial streams with large flat rocks. Due to the location and that no in-water work is proposed, this Project is not likely to impact this species.

**Fish comments:** The western banded killfish (Fundulus diaphanus menona), Tippecanoe darter (Etheostoma Tippecanoe), channel darter (Percina copelandi), river darter (Percina shumardi), and paddlefish (Polyodon spathula) are state listed species and potential inhabitants of Belmont County. Due to the location and that no in-water work is proposed, this Project is not likely to impact this species.

**Mussel comments:** The butterfly (Ellipsaria lineolate), black sandshell (Ligumia recta), and threehorn wartyback (Obliquaria reflexa) are state listed species and potential inhabitants of Belmont County. Due to the location and that no in-water work is proposed, this Project is not likely to impact this species.

No state species of concern or signs of these species, and no unique habitats were observed during the field survey. Based on the lack of tree clearing and no in-stream work required within the Project area and general lack of habitat, no state species of concern are expected to be impacted by the proposed Project.

3.2  Federal Listed Threatened or Endangered Species

To address the Project’s potential to impact federally protected species, AECOM conducted a web based literature review of the USFWS Ohio County Distribution List of Federally Listed Species by Ohio Counties, November 2015, to identify what species potentially occur in Belmont County, Ohio. Table 2 lists the two species identified during the USFWS literature review.

TABLE 2
FEDERALLY LISTED SPECIES THAT COULD INHABIT BELMONT COUNTY, OHIO

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Federal Status</th>
<th>General Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiana bat</td>
<td>Myotis sodalis</td>
<td>Endangered</td>
<td>Seasonal clearing restrictions</td>
</tr>
</tbody>
</table>
TABLE 2
FEDERALLY LISTED SPECIES THAT COULD INHABIT
BELMONT COUNTY, OHIO

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Federal Status</th>
<th>General Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern long-eared bat</td>
<td>Myotis septentrionalis</td>
<td>Threatened</td>
<td>Seasonal clearing restrictions</td>
</tr>
</tbody>
</table>

Federally Listed Species by Ohio Counties, November, 2015.

AECOM submitted a coordination letters to the USFWS on July 18, 2016, soliciting comments on the Project. AECOM has not received a response regarding the Project from USFWS to date. Should additional information become available from USFWS, which differs significantly from the above listed species, an addendum report will be provided.

**Indiana Bat:** The federal government lists the Indiana bat as endangered in Ohio. Winter Indiana bat hibernacula include caves and mines, while summer habitat typically includes tree species exhibiting exfoliating bark or cavities that can be used for roosting. The 8- to 10-inch diameter size classes of several species of hickory (Carya spp.), oak (Quercus spp.), ash (Fraxinus spp.), birch (Betula spp.), and elm (Ulmus spp.) have been found to be utilized by the Indiana bat. These tree species and many others may be used when dead, if there are adequately sized patches of loosely-adhering bark or open cavities. The structural configuration of forest stands favored for roosting includes a mixture of loose-barked trees with 60 to 80 percent canopy closure and a low density sub-canopy (less than 30 percent between about 6 feet high and the base canopy). The suitability of roosting habitat for foraging or the proximity to suitable foraging habitat is critical to the evaluation of a particular tree stand. An open subcanopy zone, under a moderately dense canopy, is important to allow maneuvering while catching insect prey. Proximity to water is critical, because insect prey density is greater over or near open water. The Project development area is entirely undeveloped old field and therefore not suitable Indiana bat roosting or foraging habitat. The potential to impact this species appears very low to none.

**Northern Long-Eared Bat:** The federal government lists this species as Threatened in Ohio. As with the Indiana bat, winter northern long-eared bat hibernacula include caves and mines, while summer habitat typically includes tree species exhibiting exfoliating bark or cavities that can be used for roosting. Northern long-eared bat has also been found, albeit rarely, roosting in structures like barns and sheds. Similar to the Indiana bat, characteristics within the Project area suggest it is not likely to inhabit the proposed work areas.

**4.0 SUMMARY**

AEP retained AECOM to conduct a rare, threatened, and endangered species literature review for areas located within 1,000 feet of the proposed Project, a field survey within the proposed Project 200-foot survey corridor, and conduct coordination with USFWS, ONHD and ODNR. This report will be used to assist AEP’s efforts to avoid impacts to rare, threatened, and endangered species potentially present in the study area during construction activities. The field survey was conducted by AECOM field biologists.
on July 21, 2016. No species of concern or signs of these species, and no unique habitats were observed. No species of concern are expected to be impacted by the proposed Project.

5.0 CONCLUSION

Based upon the nature of the Project, review of available current literature, review of federal and state records of threatened and endangered species, and the field survey conducted on July 21, 2016, it is not anticipated that federal or state threatened or endangered species will be impacted by the Project as currently planned. At this time, AECOM understands that no tree clearing or in-water work is necessary for the Project as proposed.

AECOM submitted a coordination letter to the USFWS and ODNR on July 18, 2016, soliciting comments on the Project. AECOM has not received a response regarding the Project from either agency to date. Should additional information become available from USFWS or ODNR, which differs significantly from the above listed species, an addendum report will be provided.
ATTACHMENT A

AGENCY RESPONSES
July 19, 2016

Benjamin Otto
AECOM
525 Vine St.
Cincinnati, OH 45202

Dear Mr. Otto,

After reviewing the Natural Heritage Database, I find the Division of Wildlife has no records of rare or endangered species in the Glencoe Station Expansion project area, including a one mile radius, in Smith and Richland Townships, Belmont County, Ohio. We are unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges, parks or forests or other protected natural areas within a one mile radius of the project area.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. This letter only represents a review of rare species and natural features data within the Ohio Natural Heritage Database. It does not fulfill coordination under the National Environmental Policy Act (NEPA) or the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S. C. 661 et seq.) and does 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.

Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

Debbie Woischke
Ohio Natural Heritage Database Program
APPENDIX C

AREAS OF ECOLOGICAL CONCERN, WETLAND DETERMINATION, AND STREAM ASSESSMENT REPORT
GLENCOE STATION EXPANSION PROJECT, BELMONT COUNTY, OHIO

AREAS OF ECOLOGICAL CONCERN, WETLAND DETERMINATION, AND STREAM ASSESSMENT REPORT

Prepared for:
American Electric Power Ohio Transmission Company
700 Morrison Road
Gahanna, Ohio 45230

Prepared by:
AECOM
525 Vine Street, Suite 1800
Cincinnati, Ohio 45202

Project #: 60513121

August 2016
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</thead>
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<td>REPRESENTATIVE WETLAND and STREAM PHOTOGRAPHS</td>
</tr>
</tbody>
</table>
1.0 PROJECT DESCRIPTION

This document presents the results of the wetland and stream assessment conducted by AECOM for American Electric Power Ohio Transmission Company’s (AEP Ohio Transco) proposed Glencoe Station Expansion Project (Project). AEP Ohio Transco is proposing to expand the existing 0.6-acre Glencoe Station fenced area to approximately 5.6 acres in Smith Township, Belmont County, Ohio.

As part of the Ohio Power Siting Board (OPSB) Letter of Notification (LON) requirements, AEP Ohio Transco is required to describe the investigation concerning the presence or absence of areas of ecological concern as stated in Ohio Administrative Code (OAC) Rule 4906-6-05(B)(10)(f). This rule states:

(10) The applicant shall describe the social and ecological impacts of the project.

(f) 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.

AEP Ohio Transco retained AECOM to review areas of ecological concern, as defined above, within the proposed Project vicinity and conduct a field survey of waters of the U.S. within the limits of the proposed station expansion. This report will be used to assist AEP Ohio Transco’s efforts to avoid impacts to areas of ecological concern present in the survey area during construction.

2.0 METHODS

2.1 Special Status Ecological Areas

AECOM reviewed maps and Geographical Information System (GIS) data in order to identify national and state forests and parks, designated or proposed wilderness areas, national and state wild and scenic rivers, wildlife areas, wildlife refuges, wildlife management areas, and wildlife sanctuaries in the Project vicinity. GIS data sources included the Ohio Department of Natural Resources (ODNR) Ohio Natural Heritage Database and federal land and parks layers available from Environmental Systems Research Institute (ESRI). Property ownership within 1,000 feet of the Project was reviewed to identify parcels that may have special status. AECOM also noted land use during the field reconnaissance conducted on July 21, 2016.

Floodplains were evaluated based on the Federal Emergency Management Agency's (FEMA) Flood Map Viewer (https://hazards.fema.gov/wps/portal/mapviewer).
2.2 Wetland Assessment

The purpose of the field survey was to assess whether wetlands and other “waters of the U.S.” exist within the Project survey area. Prior to conducting field surveys, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps and U.S. Geological Survey (USGS) 7.5-minute topographic maps were reviewed as an exercise to identify the occurrence and location of potential wetland areas. NWI wetlands are areas of potential wetland that have been identified from USFWS aerial photograph interpretation which have typically 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 website states that the NWI maps are not intended or designed for jurisdictional wetland identification or location.

In July 2016, AECOM ecologists walked the approximately 15.3-acre Project survey area to conduct a wetland delineation and stream assessment. During the field survey, the physical boundaries of observed water features were recorded using sub-decimeter accurate Trimble Global Positioning System (GPS) units. The GPS data was imported into ArcMap GIS software, where the data was then reviewed and edited for accuracy.

The Project survey area was evaluated according to the procedures outlined in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual (1987 Manual) (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Regional Supplement) (2012). The Regional Supplement was released in January 2012 by the USACE to address regional wetland characteristics and improve the accuracy and efficiency of wetland delineation procedures. The 1987 Manual and Regional Supplement define wetlands as areas that have positive evidence of three environmental parameters: hydric soils, wetland hydrology, and hydrophytic vegetation. Wetland boundaries are placed where one or more of these parameters give way to upland characteristics.

Since quantitative data were not available for any of the identified wetlands, AECOM utilized the routine delineation method described in the 1987 Manual and Regional Supplement that consisted of a pedestrian site reconnaissance, including identifying the vegetation communities, soils identification, a geomorphologic assessment of hydrology, and notation of disturbance.

Wetland Classifications: Wetlands were classified based on the naming convention found in Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al, 1979). All identified wetlands within the survey area were classified as freshwater, Palustrine systems, which include non-tidal wetlands dominated by trees, shrubs, emergents, mosses, or lichens. Two Palustrine wetland classes were identified within the Project survey area and are as follows:

- **PEM** – Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.
- **PSS** – Scrub/shrub wetlands are characterized by woody vegetation that is less than three inches diameter at breast height (DBH), and greater than 3.28 feet tall. The woody angiosperms (i.e. small trees or shrubs) in this broad leaved deciduous community have relatively wide, flat leaves that are shed annually during the cold or dry season.

**Ohio Rapid Assessment Method v. 5.0:** The Ohio Environmental Protection Agency’s (OEPA) Ohio Rapid Assessment Method (ORAM) for Wetlands Version 5.0 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 (CWA). 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 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).

### 2.3 Stream and River Crossings

Regulatory activities under the Clean Water Act provide authority for states to issue water quality standards and “designated uses” to all waters of the U.S. 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 Ohio EPA’s Methods for Assessing Habitat in Flowing Waters: Using Ohio EPA’s Qualitative Habitat Evaluation Index (Rankin, 2006) and Field Evaluation Manual for Ohio’s Primary Headwater Habitat Streams, Version 3 (Davic, 2012).

OEPA Qualitative Habitat Evaluation Index: The qualitative habitat evaluation index (QHEI) 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 Ohio EPA 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).

OEPA Primary Headwater Habitat Evaluation Index: 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$^2$ (259 ha), and a maximum depth of water pools equal to or less than 15.75 inches (40 cm)" (Davic, 2012).

Headwater streams are scored on the basis of channel substrate composition, bankfull width, and maximum pool depth. Assessments result in a score (0 to 100) that is converted to a specific PHWH stream class. Streams that are scored from 0 to 29.9 are typically grouped into "Class 1 PHWH Streams", 30 to 69.9 are "Class 2 PHWH Streams", and 70 to 100 are "Class 3 PHWH Streams". Technically, a stream can score relatively high, but actually belong in a lower class, and vice-versa. According to the OEPA, if the stream score falls into a class and the scorer feels that based on site observations that score does not reflect the actual stream class, a decision-making flow chart can be used to determine appropriate PHWH stream class using the HHEI protocol (Davic, 2012). Evidence of anthropogenic alterations to the natural channel will result in a “Modified” qualifier for the stream.

3.0 RESULTS

3.1 Special Status Ecological Areas

AECOM conducted a review of published resources and consulted with agencies to identify national or state forests and parks, designated or proposed wilderness areas, national and state wild and scenic rivers, wildlife areas, wildlife refuges, wildlife management areas, wildlife sanctuaries and floodplains.
crossed by and in the immediate vicinity of the Project. There are no known special status ecological areas within one mile of the Project.

According to the FEMA National Flood Hazard Layer (NFHL) (GIS shapefile), approximately 15 percent of the Project survey area is located within Flood Zone A, an area inundated by a percent annual chance of flooding for which no base flood elevations have been determined. The remaining 85 percent of the Project survey area, including the entire Project station expansion area, is located outside of the 100-year floodplain. No changes in flood elevations are anticipated as a result of the Project.

3.2 Wetland Assessment

**National Wetland Inventory Map Review:** According to the NWI map of the St. Clairsville, Ohio quadrangle, one mapped NWI wetland is located within the Project survey area. The mapped NWI wetland corresponds with one of the wetlands (Wetland 2) identified during AECOM’s field survey. The mapped NWI wetland is classified as R5UBH; Riverine, unknown perennial, unconsolidated bottom, permanently flooded.

**Wetland Delineation:** Two wetlands, totaling approximately 0.1 acre, were delineated within the approximately 15.3-acre Project survey area as shown in Table 1. Some wetland boundaries extend beyond the Project survey area, but only portions of those wetlands identified within the study area were assessed. Additionally, AECOM commonly splits wetlands where there is an obvious break between Cowardin wetland types. This split results in each wetland section being assessed independently; however, AECOM recognizes that split wetland sections are a component of a larger wetland complex.

The two wetlands identified within the Project survey area are of two different wetland habitat types. Wetland 1 was identified as a PEM/PSS wetland, while Wetland 2 was identified as a PEM wetland.

ORAM scores for Wetland 1 and Wetland 2 are 36 and 30.5, respectively. Both of the assessed wetlands were classified as Category 2 wetlands. No Category 1 or 3 wetlands were identified in the Project survey area.

The location and approximate extents of the wetlands, as delineated within the Project survey area are shown on Figure 1. Completed USACE and ORAM forms are provided in Attachment A. Representative color photographs taken of the wetlands are provided in Attachment C.

3.3 Stream and River Crossings

AECOM identified four streams, totaling 1,419 linear feet, within the approximately 15.3-acre Project survey area as shown in Table 2. One perennial stream totaling 697 linear feet was found within the survey area. Additionally, two intermittent streams totaling 573 linear feet and one ephemeral stream totaling 149 linear feet were also observed.
Qualitative Habitat Evaluation Index:

No streams were assessed using the QHEI methodology for streams with drainage areas greater than one square mile.

Primary Headwater Habitat Evaluation Index:

Four streams, totaling 1,419 linear feet, were assessed using the HHEI methodology for streams with drainage areas less than one square mile. All four streams were assessed as Modified Class 2 streams. No Class 1 or 3 streams were identified within the Project survey area.

The locations of identified streams within the survey area are shown on Figure 1. Completed HHEI forms for each stream are provided in Attachment B. Representative color photographs are provided in Attachment C.

AECOM has preliminarily determined that all assessed streams within the survey area appear to be jurisdictional (i.e., waters of the U.S.), as they all appear to be tributaries that flow into or combine with other streams (waters of the U.S).

3.4 Ponds

No ponds were identified within the Project survey area.

4.0 SUMMARY

No known special status ecological areas were identified within a mile of the Project. Eighty-five percent of the Project survey area is located outside of the FEMA 100-year floodplain, while the remaining 15 percent is located within Flood Zone A. The substation expansion area is located entirely outside of the FEMA 100-year floodplain. No changes in flood elevation are anticipated as a result of the Project.

Two wetlands, totaling approximately 0.1 acre, were identified within the Project survey area. Both of the identified wetlands were classified as Category 2 wetlands. No Category 1 or Category 3 wetlands were identified during the field surveys. Four streams were identified within the Project survey area, totaling 1,419 linear feet. One of these streams was identified as perennial, two as intermittent, and one as ephemeral.

5.0 CONCLUSION

This report will be used to assist AEP Ohio Transco's efforts to avoid special status ecological areas, wetlands, and streams to the extent possible during construction of the Project, thereby minimizing impacts to these features identified within the Project area. Due to the planned use of timber matting for access roads and work pads while working in wetlands and streams, no permanent impacts are anticipated. Erosion control methods including silt fencing are expected to be used where appropriate to minimize runoff-related impacts to stream channels and wetlands. As a result, significant impacts to waters of the U.S. are not anticipated.
The field survey results presented herein apply to the existing and reasonably foreseeable site conditions at the time of our assessment. They cannot apply to site changes of which AECOM is unaware and has not had the opportunity to review. Changes in the condition of a property may occur with time due to natural processes or human impacts at the project site or on adjacent properties. Changes in applicable standards may also occur as a result of legislation or the expansion of knowledge over time. Accordingly, the findings of this report may become invalidated, wholly or in part, by changes beyond the control of AECOM.
6.0 REFERENCES


Rankin, Edward T. 2006. Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI). Ohio EPA Ecological Assessment Section, Division of Surface Water, Columbus, Ohio.


### TABLE 1
WETLANDS IDENTIFIED WITHIN THE PROJECT SURVEY AREA

<table>
<thead>
<tr>
<th>Report Name</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Cowardin Wetland Type</th>
<th>ORAM Score</th>
<th>ORAM Category</th>
<th>Acreage within Survey Corridor</th>
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</thead>
<tbody>
<tr>
<td>Wetland 1</td>
<td>40.013547</td>
<td>-80.892716</td>
<td>PEM/PSS</td>
<td>36</td>
<td>2</td>
<td>0.06</td>
</tr>
<tr>
<td>Wetland 2</td>
<td>40.014012</td>
<td>-80.893408</td>
<td>PEM</td>
<td>30.5</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>Total: 2 Wetlands</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>0.09</strong></td>
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### TABLE 2
STREAMS IDENTIFIED WITHIN THE PROJECT SURVEY AREA

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<thead>
<tr>
<th>Report Name</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Flow Regime</th>
<th>Score</th>
<th>Form</th>
<th>Stream Class</th>
<th>Max Pool Depth (inches)</th>
<th>Bankfull Width (feet)</th>
<th>Length within Survey Corridor (feet)</th>
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</thead>
<tbody>
<tr>
<td>Stream 1</td>
<td>40.015235</td>
<td>-80.893497</td>
<td>Ephemeral</td>
<td>31</td>
<td>HHEI</td>
<td>Modified Class 2</td>
<td>0</td>
<td>1.5</td>
<td>149</td>
</tr>
<tr>
<td>Stream 2</td>
<td>40.014171</td>
<td>-80.892787</td>
<td>Intermittent</td>
<td>35</td>
<td>HHEI</td>
<td>Modified Class 2</td>
<td>1</td>
<td>2</td>
<td>351</td>
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<tr>
<td>Stream 3</td>
<td>40.013704</td>
<td>-80.892282</td>
<td>Intermittent</td>
<td>36</td>
<td>HHEI</td>
<td>Modified Class 2</td>
<td>1</td>
<td>1.5</td>
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<td>Stream 4</td>
<td>40.014233</td>
<td>-80.893477</td>
<td>Perennial</td>
<td>65</td>
<td>HHEI</td>
<td>Modified Class 2</td>
<td>5</td>
<td>3.5</td>
<td>697</td>
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<tr>
<td><strong>Total:</strong></td>
<td><strong>4 Streams</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>1,419</strong></td>
</tr>
</tbody>
</table>
FIGURE 1
ECOLOGICAL SURVEY RESULTS
JOB NO. 60513121
Glencoe Station
Station Expansion

LEGEND:
- Existing Station
- Expansion Area
- Ecological Survey Area
- Delineated Ephemeral Stream
- Delineated Intermittent Stream
- Delineated Perennial Stream
- Delineated Wetland
- 100-year Floodplain

Basemap Source: ArcGIS Online:
Bing Maps Hybrid & World Street Map
**Hydrophytic Vegetation Present?** | Yes | No |  | Yes | No |
---|---|---|---|---|---
**Hydric Soil Present?** | Yes | No |  | Yes | No |
**Wetland Hydrology Present?** | Yes | No |  | Yes | No |

### Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

- **Hydrology**

#### Wetland Hydrology Indicators:

**Primary Indicators (minimum of one required; check all that apply)**
- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] True Aquatic Plants (B14)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

#### Secondary Indicators (minimum of two required)
- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [x] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry Season Water Table (C2)
- [ ] Clayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [x] FAC-neutral Test (D5)

#### Field Observations:

- **Surface Water Present?** | Yes | No | Depth (inches): ____________
- **High Water Table Present?** | Yes | No | Depth (inches): ____________
- **Saturation Present?** | Yes | No | Depth (inches): ____________

**Wetland Hydrology Present?** | Yes | No |
---|---|---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

### Remarks:

- Hydrology comes from small stream coming off hillside and seep at toe of slope.
### VEGETATION (Five/Four Strata) - Use scientific names of plants.

#### Sampling Point: w-mdt-072116-01

<table>
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<th>Dominant Species</th>
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#### Tree Stratum (Plot size: ___________)

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<th>Relative Strat. Cover</th>
<th>Indicator Status</th>
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<tbody>
<tr>
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**Total % Cover** = Total Cover = 0

#### Sapling-Sapling/Shrub Stratum (Plot size: ___________)

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<tbody>
<tr>
<td>1</td>
<td><em>Salix nigra</em></td>
<td>10</td>
<td>66.7% OBL</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><em>Acer negundo</em></td>
<td>5</td>
<td>33.3% FAC</td>
<td></td>
</tr>
<tr>
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**Total % Cover** = Total Cover = 15

#### Shrub Stratum (Plot size: ___________)

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<tbody>
<tr>
<td>1</td>
<td><em>Carex lurida</em></td>
<td>5</td>
<td>4.8% OBL</td>
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<tr>
<td>2</td>
<td><em>Leersia oryzoides</em></td>
<td>5</td>
<td>4.8% OBL</td>
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</tr>
<tr>
<td>3</td>
<td><em>Leersia virginica</em></td>
<td>10</td>
<td>9.5% FACW</td>
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<tr>
<td>4</td>
<td><em>Impatiens capensis</em></td>
<td>80</td>
<td>76.2% FACW</td>
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<tr>
<td>5</td>
<td><em>Rosa multiflora</em></td>
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<td>4.8% FACU</td>
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#### Herb Stratum (Plot size: ___________)

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<td>9.5% FACW</td>
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<td><em>Impatiens capensis</em></td>
<td>80</td>
<td>76.2% FACW</td>
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<td><em>Rosa multiflora</em></td>
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<td>4.8% FACU</td>
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**Total % Cover** = Total Cover = 0

#### Woody Vine Stratum (Plot size: ___________)

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</table>

**Total % Cover** = Total Cover = 0

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

---

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.*

---

**Hydrophytic Vegetation Indicators:**

- [ ] Rapid Test for Hydrophytic Vegetation
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- [x] Problematic Hydrophytic Vegetation (Explain)

---

### Definition of Vegetation Strata:

#### Four Vegetation Strata:

- **Tree Stratum** - Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- **Sapling/shrub stratum** - Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- **Shrub Stratum** - Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) tall.
- **Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height.**

#### Five Vegetation Strata:

- **Tree** - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) tall.
- **Sapling stratum** - Consists of woody plants, excluding vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.
- **Shrub stratum** - Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.
- **Herb stratum** - Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.
- **Woody vines** - Consists of all woody vines greater than 3.28 ft in height.

---

Eastern Mountains and Piedmont - Version 2.0
### Soil Sampling Point:

- **Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

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<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
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<td>10YR</td>
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<td>M</td>
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</tbody>
</table>

1 Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains  
2Location:  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) (LRR N)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7)
- Polyvariegated Surface (S8) (MLRA 147, 148)
- Thin Dark Surface (S9) (MLRA 147, 148)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- Umbric Surface (F13) (MLRA 136, 122)
- Piedmont Floodplain Soils (F19) (MLRA 148)
- Red Parent Material (F21) (MLRA 127, 147)

### Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Coast Prairie Redox (A16) (MLRA 147, 148)
- Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

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

### Restrictive Layer (if observed):

- **Type:**
  - **Depth (inches):**

### Remarks:

Hydric Soil Present?  Yes ☐  No ☐
**WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region**

**Project/Site:** Glencoe Substation  
**City/County:** Belmont  
**Investigator(s):** MDT  
**State:** OH  
**Sampling Date:** 21-Jul-16  
**Applicant/Owner:** AEP  
**Sampling Point:** w-mdt-072116-02  
**Section, Township, Range:** S 6 T T6N R R4W

**Landform (hillslope, terrace, etc.):** Floodplain  
**Local relief (concave, convex, none):** concave  
**Slope:** 0.0% / 0.0°

**Subregion (LRR or MLRA):** LRR N  
**Datum:** NAD83

**Lat.:** -80.893262  
**Long.:** -80.893262  
**City/County:** Belmont  
**Section, Township, Range:** S 6 T T6N R R4W

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

**Are Vegetation, Soil, or Hydrology significantly disturbed?**  
- Yes ☑  
- No ☐  
(If needed, explain any answers in Remarks.)

**Are "Normal Circumstances" present?**  
- Yes ☑  
- No ☐

**Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.**

| Hydrophytic Vegetation Present? | Yes ☑  
| Hydric Soil Present? | Yes ☑  
| Wetland Hydrology Present? | Yes ☑  
| Is the Sampled Area within a Wetland? | Yes ☑  

**Remarks:**  
PEM wetland along perennial stream.

**Hydrology**

**Wetland Hydrology Indicators:**  
- Surface Water (A1)  
- High Water Table (A2)  
- Saturation (A3)  
- Water Mark (B1)  
- Sediment Deposits (B2)  
- Drift deposits (B3)  
- Algal Mat or Crust (B4)  
- Iron Deposits (B5)  
- Inundation Visible on Aerial Imagery (B7)  
- Water-Stained Leaves (B9)  
- Aquatic Fauna (B13)  
- True Aquatic Plants (B14)  
- Hydrogen Sulfide Odor (C1)  
- Oxidized Rhizospheres along Living Roots (C3)  
- Presence of Reduced Iron (C4)  
- Recent Iron Reduction in Tilled Soils (C6)  
- Thin Muck Surface (C7)  
- Other (Explain in Remarks)  
- Other (Explain in Remarks)  

**Secondary Indicators (minimum of two required):**  
- Surface Soil Cracks (B6)  
- Sparsely Vegetated Concave Surface (B8)  
- Drainage Patterns (B10)  
- Moss Trim Lines (B16)  
- Dry Season Water Table (C2)  
- Crayfish Burrows (C8)  
- Saturation Visible on Aerial Imagery (C9)  
- Stunted or Stressed Plants (D1)  
- Geomorphic Position (D2)  
- Shallow Aquitard (D3)  
- Microtopographic Relief (D4)  
- FAC-neutral Test (D5)

**Field Observations:**

| Surface Water Present? | Yes ☑  
| Water Table Present? | Yes ☑  
| Saturation Present? (includes capillary fringe) | Yes ☑  

**Depth (inches):**

| Surface Water |  
| Water Table |  
| Saturation (includes capillary fringe) |  

**Wetland Hydrology Present?**  
- Yes ☑  
- No ☐

**Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:**

**Remarks:**  
hydrology comes from perennial stream

US Army Corps of Engineers  
Eastern Mountains and Piedmont - Version 2.0
### VEGETATION (Five/Four Strata) - Use scientific names of plants.

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: ___________)</th>
<th>Absolute Cover</th>
<th>Relevant Strata Cover</th>
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<tr>
<th>Sapling-Sapling/Shrub Stratum (Plot size: ___________)</th>
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<th>Relevant Strata Cover</th>
<th>Indicator Status</th>
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<tr>
<td>1. Salix nigra</td>
<td>5%</td>
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<td>OBL</td>
</tr>
<tr>
<td>2. Acer negundo</td>
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<table>
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<td>2. Impatiens capensis</td>
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<td>FACW</td>
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<td><strong>95.0%</strong></td>
<td><strong>FACW</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Herb Stratum (Plot size: ___________)</th>
<th>Absolute Cover</th>
<th>Relevant Strata Cover</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Phalaris arundinacea</td>
<td>95%</td>
<td>95.0%</td>
<td>FACW</td>
</tr>
<tr>
<td>2. Impatiens capensis</td>
<td>5%</td>
<td>5.0%</td>
<td>FACW</td>
</tr>
<tr>
<td>3.</td>
<td>0%</td>
<td>0%</td>
<td>FACW</td>
</tr>
<tr>
<td>4.</td>
<td>0%</td>
<td>0%</td>
<td>FACW</td>
</tr>
<tr>
<td>5.</td>
<td>0%</td>
<td>0%</td>
<td>FACW</td>
</tr>
<tr>
<td>6.</td>
<td>0%</td>
<td>0%</td>
<td>FACW</td>
</tr>
<tr>
<td>7.</td>
<td>0%</td>
<td>0%</td>
<td>FACW</td>
</tr>
<tr>
<td><strong>Total Cover</strong></td>
<td><strong>95</strong></td>
<td><strong>95.0%</strong></td>
<td><strong>FACW</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Woody Vine Stratum (Plot size: ___________)</th>
<th>Absolute Cover</th>
<th>Relevant Strata Cover</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0%</td>
<td>0%</td>
<td>OBL</td>
</tr>
<tr>
<td>2.</td>
<td>0%</td>
<td>0%</td>
<td>OBL</td>
</tr>
<tr>
<td>3.</td>
<td>0%</td>
<td>0%</td>
<td>OBL</td>
</tr>
<tr>
<td>4.</td>
<td>0%</td>
<td>0%</td>
<td>OBL</td>
</tr>
<tr>
<td>5.</td>
<td>0%</td>
<td>0%</td>
<td>OBL</td>
</tr>
<tr>
<td>6.</td>
<td>0%</td>
<td>0%</td>
<td>OBL</td>
</tr>
<tr>
<td><strong>Total Cover</strong></td>
<td><strong>0</strong></td>
<td><strong>0%</strong></td>
<td><strong>OBL</strong></td>
</tr>
</tbody>
</table>

### Sampling Point: w-mdt-072116-02

#### 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: **5** *x 1 = 5** *(A)*
  - FACW species: **100** *x 2 = 200** *(B)*
  - FAC species: **5** *x 3 = 15** *(A)*
  - FACU species: **0** *x 4 = 0** *(A)*
  - UPL species: **0** *x 5 = 0** *(A)*
- **Column Totals:** **110** *(A) 220** *(B)*
- Prevalence Index = **B/A = 2.000** *(B)*

#### Hydrophytic Vegetation Indicators:
- ✓ Rapid Test for Hydrophytic Vegetation
- ✓ Prevalence Index is ≤3.0
- □ Morphological Adaptations *(Provide supporting data in Remarks or on a separate sheet)*
- □ Problematic Hydrophytic Vegetation *(Explain)*

#### Definition of Vegetation Strata:

**Four Vegetation Strata:**
- **Tree Stratum** - Consists of woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- **Sapling/shrub stratum** - Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- **Herb stratum** - Consists of all herbaceous (non-woody) plants, regardless of size, and all other plants less than 3.28 ft tall.
- **Woody vines** - Consists of all woody vines greater than 3.28 ft in height.

**Five Vegetation Strata:**
- **Tree** - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).
- **Sapling/shrub stratum** - Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.
- **Shrub stratum** - Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.
- **Herb stratum** - Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.
- **Woody vines** - Consists of all woody vines, regardless of height.

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

---

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.*

**US Army Corps of Engineers**

Eastern Mountains and Piedmont - Version 2.0
### Soil

**Sampling Point:** w-mdt-072116-02

#### Profile Description:
(Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12</td>
<td>10YR</td>
<td>95</td>
<td>10YR</td>
<td>5/8</td>
<td>C</td>
<td>M</td>
<td>Silty Clay Loam</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

1 Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

#### Hydric Soil Indicators:
- Histosol (A1)
- Histic Epipedon (A2)
- Redox Dark Surface (A16) (MLRA 147, 148)
- Black Histic (A3)
- Depleted Below Dark Surface (A11)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) (LRR N)
- Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Thin Dark Surface (S9) (MLRA 147, 148)
- Loamy Gleyed Matrix (F2)
- Sandy Gleyed Matrix (F21) (MLRA 147, 148)
- Sandy Gleyed Matrix (F2) (MLRA 147, 148)
- Sandy Gleyed Matrix (F21) (MLRA 147, 148)
- Dark Surface (S7) (MLRA 147, 148)
- Polyvalue Below Surface (S8) (MLRA 147, 148)
- Thin Dark Surface (S9) (MLRA 147, 148)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- Umbric Surface (F13) (MLRA 136, 122)
- Piedmont Floodplain Soils (F19) (MLRA 148)
- Red Parent Material (F21) (MLRA 127, 147)

#### Indicators for Problematic Hydric Soils:
- 2 cm Muck (A10) (MLRA 147)
- Coast Prairie Redox (A16) (MLRA 147, 148)
- Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

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

#### Hydric Soil Present?
- Yes [✓]
- No [ ]

### Remarks:

**Restrictive Layer (if observed):**

- Type:
- Depth (inches):

**Hydric Soil Indicators:**

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) (LRR N)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Muck Mineral (S1) (LRR N, MLRA 147, 148)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7)
- Polyvalue Below Surface (S8) (MLRA 147, 148)
- Thin Dark Surface (S9) (MLRA 147, 148)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- Umbric Surface (F13) (MLRA 136, 122)
- Piedmont Floodplain Soils (F19) (MLRA 148)
- Red Parent Material (F21) (MLRA 127, 147)

3 Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
ATTACHMENT A.2

OHIO RAPID ASSESSMENT METHOD (ORAM) FORMS
### 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) (2 pts)
- 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- <0.1 acres (0.04ha) (0 pts)

**Field Id:** w-mdt-07/21/2016-01

<table>
<thead>
<tr>
<th>Metric 2. Upland buffers and surrounding land use.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>max 14 pts. subtotal</strong></td>
</tr>
<tr>
<td>2a. Calculate average buffer width. Select only one and assign score. Do not double check.</td>
</tr>
<tr>
<td>WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)</td>
</tr>
<tr>
<td>MEDIUM. Buffers average 25m to &lt;50m (82 to &lt;164ft) around wetland perimeter (4)</td>
</tr>
<tr>
<td>NARROW. Buffers average 10m to &lt;25m (32ft to &lt;82ft) around wetland perimeter (1)</td>
</tr>
<tr>
<td>VERY NARROW. Buffers average &lt;10m (&lt;32ft) around wetland perimeter (0)</td>
</tr>
<tr>
<td>2b. Intensity of surrounding land use. Select one or double check and average.</td>
</tr>
<tr>
<td>VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (/)</td>
</tr>
<tr>
<td>LOW. Old field (&gt;10 years), shrubland, young second growth forest. (5)</td>
</tr>
<tr>
<td>MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)</td>
</tr>
<tr>
<td>MEDIUM. 1/2 Acre. Urban, industrial, open pasture, row cropping, mining, construction. (1)</td>
</tr>
</tbody>
</table>

**Metric 3. Hydrology.**

**max 30 pts. subtotal**

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)
- Maximum water depth. Select one.
  - >0.7 (27.6in) (3)
  - 0.4 to 0.7m (15.7 to 27.6in) (2)
  - 0.4m (<15.7in) (1)
  - Seasonally inundated (2)
- 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)

3c. Duration inundation/saturation. Score one or dbl check.
- Semi- to permanently inundated/saturated (4)
- Regularly inundated/saturated (3)
- Seasonally inundated in upper 30cm (12in) (1)

3d. Modifications to natural hydrologic regime. Score one or double check and average.
- Check all disturbances observed
  - ditch
  - point source (nonstormwater)
  - fill
  - road bed/RR track
  - weir
  - stormwater input
  - Other:

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

**max 20 pts. subtotal**

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
- herbaceous/aquatic bed removal
- sedimentation
- dredging
- toxic pollutants
- shrub/sapling removal
- farming
- nutrient enrichment
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 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 5 Qualitative Rating (-10)

Metric 6. Plant communities, interspersion, microtopography.

6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

Aquatic bed
1. Emergent
2. Shrub
3. Forest
4. Mudflats
5. Open water
6. 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

Category 2

36 GRAND TOTAL (max 100 pts)
### Metric 1. Wetland Area (size).

<table>
<thead>
<tr>
<th>Size Class</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;50 acres (&gt;20.2ha)</td>
<td>6 pts</td>
</tr>
<tr>
<td>25 to &lt;50 acres</td>
<td>5 pts</td>
</tr>
<tr>
<td>10 to &lt;25 acres</td>
<td>4 pts</td>
</tr>
<tr>
<td>3 to &lt;10 acres</td>
<td>3 pts</td>
</tr>
<tr>
<td>0.3 to &lt;3 acres</td>
<td>2 pts</td>
</tr>
<tr>
<td>0.1 to &lt;0.3 acres</td>
<td>1 pt</td>
</tr>
<tr>
<td>&lt;0.1 acres</td>
<td>0 pts</td>
</tr>
</tbody>
</table>

Wetland Area: 0.03 acres

### 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 to <50m (164ft to <164ft) around wetland perimeter (7)
- Medium: Buffers average 25m to <25m (82ft to <82ft) around wetland perimeter (4)
- Narrow: Buffers average 10m to <10m (32ft to <32ft) 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), shrubland, 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)

### 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)

3b. Connectivity. Score all that apply.

- 100 year floodplain (1)
- Part of wetland/upland (e.g. forest), complex (1)
- Part of riparian or upland corridor (1)

3c. Maximum water depth. Select one.

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

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

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

### 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)

### Note:

- Remove or improve all human disturbances observed.
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 Plain Sand Prairies (Oak Openings) (10)
- Relict Wet Prairies (10)
- Known occurrence state/federal threatened or endangered species (10)
- Significant migratory songbird/waterfowl habitat or usage (10)
- Category 1 Wetland. See Question 5 Qualitative Rating (-10)

Metric 6. Plant communities, interspersion, microtopography.

6a. Wetland Vegetation Communities.
Score all present using 0 to 3 scale.

Aquatic bed
- 0 Absent or comprises <0.1ha (0.2471 acres) contiguous area
- 1 Extensive >75% cover (-5)
- 2 Moderate 25-75% cover (-3)
- 3 Nearly absent <5% cover (0)
- Absent (1)

Emergent
- 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

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 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

Category 2

GRAND TOTAL (max 100 pts)
ATTACHMENT B

STREAM FORMS
Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 31

SITE NAME/LOCATION: Glencoe Station Expansion

SITE NUMBER: 3

RIVER BASIN: 

DRAINAGE AREA (mi²): 

LENGTH OF STREAM REACH (ft): 

LAT. LONG. RIVER CODE RIVER MILE 

DATE: 07/21/16

SCORER: MDT

COMMENTS: ephemeral flow regime

NOTE: Complete All Items On This Form - Refer to “Field Evaluation Manual for Ohio’s PHWH Streams” for Instructions

STREAM CHANNEL MODIFICATIONS: 

- NONE / NATURAL CHANNEL
- RECOVERED
- RECOVERING
- RECENT OR NO RECOVERY

FLORA MODIFICATIONS: 

- SPECTRUM
- NATURAL
- MODIFIED
- RECOVERED
- RECOVERING
- RECENT OR NO RECOVERY

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.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PERCENT</th>
<th>TYPE</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bldr Slabs [16 pts]</td>
<td>0%</td>
<td>SILT [3 pt]</td>
<td>10%</td>
</tr>
<tr>
<td>Boulder (&gt;256 mm)</td>
<td>0%</td>
<td>Leaf Pack/Woody Debris [3 pts]</td>
<td>0%</td>
</tr>
<tr>
<td>Bedrock [16 pt]</td>
<td>0%</td>
<td>Fine Detritus [3 pts]</td>
<td>0%</td>
</tr>
<tr>
<td>Cobbles (65-256 mm)</td>
<td>20%</td>
<td>Clay or Hardpan [0 pt]</td>
<td>0%</td>
</tr>
<tr>
<td>Gravel (2-64 mm)</td>
<td>45%</td>
<td>Muck [0 pt]</td>
<td>0%</td>
</tr>
<tr>
<td>Sand (&lt;2 mm)</td>
<td>10%</td>
<td>Artificial [3 pts]</td>
<td>15%</td>
</tr>
<tr>
<td>Artifical [3 pts]</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 20.00%

SCORE OF TWO MOST PREDOMINANT SUBSTRATE TYPES: 21

TOTAL NUMBER OF SUBSTRATE TYPES: 5

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):

- > 30 centimeters [20 pts]
- > 22.5 - 30 cm [30 pts]
- > 10 - 22.5 cm [25 pts]

COMMENTS: MAXIMUM POOL DEPTH (Inches): 0.00

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

- > 4.0 meters (> 13') [30 pts]
- > 3.0 - 4.0 m (> 9' 7" - 13') [25 pts]
- > 1.5 - 3.0 m (> 5' 0" - 9' 7") [20 pts]

COMMENTS: AVERAGE BANKFULL WIDTH (Feet): 1.50

RIPARIAN ZONE AND FLOODPLAIN QUALITY

- L (Per Bank)
- R (Most Predominant per Bank)

<table>
<thead>
<tr>
<th>L</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

L R

- Conservation Tillage
- Urban or Industrial
- Open Pasture, Row Crop
- Mining or Construction

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

- Stream Flowing
- Subsurface flow with isolated pools (Interstitial)
- Moist Channel, isolated pools, no flow (Intermittent)
- Dry channel, no water (Ephemeral)

COMMENTS: ephemeral

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

- None
- 0.5
- 1.0
- 2.0
- 3.0

STREAM GRADIENT ESTIMATE

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

This information must also be completed

October 24, 2002 Revision

PHWH Form Page - 1
ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? □ Yes ☑ No QHEI Score __________ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _______________________________ 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: _______________________________ NRCS Soil Map Page: _______ NRCS Soil Map Stream Order: _______

County: ______________________________________ Township / City: ___________________________

MISCELLANEOUS

Base Flow Conditions? (Y/N): ____ Date of last precipitation: __________ Quantity: __________

Photograph Information: _______________________________________________________________________________________________

Elevated Turbidity? (Y/N): ____ Canopy (% open): __________

Were samples collected for water chemistry? (Y/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) ____ If not, please explain: _______________________________________________________________________________________________

Additional comments/description of pollution impacts: _______________________________________________________________________________________________

BIOTIC EVALUATION

Performed? (Y/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) ____ Voucher? (Y/N) ____ Salamanders Observed? (Y/N) ____ Voucher? (Y/N) ____

Frogs or Tadpoles Observed? (Y/N) ____ Voucher? (Y/N) ____ Aquatic Macroinvertebrates Observed? (Y/N) ____ Voucher? (Y/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

**SITE NAME/LOCATION**: Glencoe Station Expansion

**SITE NUMBER**: 4

**RIVER BASIN**: 

**DRAINAGE AREA (mi^2)**: 

**LENGTH OF STREAM REACH (ft)**: 

**LAT.**

**LONG.**

**RIVER CODE**: 

**RIVER MILE**: 

**DATE**: 07/21/16

**SCORER**: MDT

**COMMENTS**: intermittent flow high gradient stream

**NOTE**: Complete All Items On This Form - Refer to “Field Evaluation Manual for Ohio’s PHWH Streams” for Instructions

**STREAM CHANNEL MODIFICATIONS**: NONE / NATURAL CHANNEL

### 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.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PERCENT</th>
<th>TYPE</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bldr Slabs [16 pts]</td>
<td>0%</td>
<td>Boulder (&gt;256 mm) [16 pts]</td>
<td>0%</td>
</tr>
<tr>
<td>Boulder (&gt;256 mm) [16 pts]</td>
<td>0%</td>
<td>Cobble (65-256 mm) [12 pts]</td>
<td>40%</td>
</tr>
<tr>
<td>Cobble (65-256 mm) [12 pts]</td>
<td>0%</td>
<td>Gravel (2-64 mm) [9 pts]</td>
<td>35%</td>
</tr>
<tr>
<td>Gravel (2-64 mm) [9 pts]</td>
<td>0%</td>
<td>Sand (&lt;2 mm) [6 pts]</td>
<td>10%</td>
</tr>
<tr>
<td>Sand (&lt;2 mm) [6 pts]</td>
<td>0%</td>
<td>Leaf Pack/Woody Debris [3 pts]</td>
<td>0%</td>
</tr>
<tr>
<td>Leaf Pack/Woody Debris [3 pts]</td>
<td>0%</td>
<td>Fine Detritus [0 pts]</td>
<td>0%</td>
</tr>
<tr>
<td>Fine Detritus [0 pts]</td>
<td>0%</td>
<td>Clay or Hardpan [0 pt]</td>
<td>0%</td>
</tr>
<tr>
<td>Clay or Hardpan [0 pt]</td>
<td>0%</td>
<td>Muck [0 pts]</td>
<td>0%</td>
</tr>
<tr>
<td>Muck [0 pts]</td>
<td>0%</td>
<td>Artificial [3 pts]</td>
<td>0%</td>
</tr>
<tr>
<td>Artificial [3 pts]</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 40.00% (A)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 21

TOTAL NUMBER OF SUBSTRATE TYPES: 4

### 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:

- > 30 centimeters [20 pts]
- > 22.5 - 30 cm [30 pts]
- > 10 - 22.5 cm [25 pts]
- > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- > 1.0 m (<='3' 3") [6 pts]
- < 5 cm [5 pts]
- NO WATER OR MOIST CHANNEL [0 pts]

**COMMENTS**: 

**MAXIMUM POOL DEPTH (centimeters)**: 1.00

### 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements)

Check ONLY one box:

- > 4.0 meters (> 13') [30 pts]
- > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
- > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
- > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- > 1.0 m (<='3' 3") [6 pts]
- 1.0 m (<=3' 3") [5 pts]
- > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]

**COMMENTS**: 

**AVERAGE BANKFULL WIDTH (feet)**: 2.00

### RIPARIAN ZONE AND FLOODPLAIN QUALITY

**RIPARIAN WIDTH**

<table>
<thead>
<tr>
<th>L</th>
<th>R</th>
<th>Per Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>Wide &gt;10m</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Moderate 5-10m</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Narrow &lt;5m</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>None</td>
</tr>
</tbody>
</table>

**FLOODPLAIN QUALITY**

<table>
<thead>
<tr>
<th>L</th>
<th>R</th>
<th>Most Predominant per Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>Mature Forest, Wetland</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Immature Forest, Shrub or Old Field</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Residential, Park, New Field</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Fenced Pasture</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Mining or Construction</td>
</tr>
</tbody>
</table>

**COMMENTS**: 

### FLOW REGIME (At Time of Evaluation)

Check ONLY one box:

- Stream Flowing
- Subsurface flow with isolated pools (Interstitial)

**COMMENTS**: intermittent

### SINUOSITY (Number of bends per 61 m (200 ft) of channel)

Check ONLY one box:

<table>
<thead>
<tr>
<th>L</th>
<th>R</th>
<th>Number of Bends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✓</td>
<td>None</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>0.5</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>1.0</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>1.5</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>2.0</td>
</tr>
<tr>
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<td>✓</td>
<td>2.5</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>3.0</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>&gt;3</td>
</tr>
</tbody>
</table>

**STREAM GRADIENT ESTIMATE**

<table>
<thead>
<tr>
<th>L</th>
<th>R</th>
<th>Gradient</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>Flat (0.5 ft/100 ft)</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Flat to Moderate</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Moderate (2 ft/100 ft)</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Moderate to Severe</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Severe (10 ft/100 ft)</td>
</tr>
</tbody>
</table>

**HHEI Score (sum of metrics 1, 2, 3)**: 35

**DATE**: October 24, 2002

**Rev**: PHWH Form Page - 1
ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED?  □ Yes  ☑ No  QHEI Score __________  (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: ___________________________________________________________  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: ___________________________________________  NRCS Soil Map Page: _______  NRCS Soil Map Stream Order: _______

County: ___________________________________________  Township / City: ___________________________________________

MISCELLANEOUS

Base Flow Conditions? (Y/N): _______  Date of last precipitation: ___________________  Quantity: _______

Photograph Information: _______________________________________________________________________________________________

Elevated Turbidity? (Y/N): _______  Canopy (% open): _______

Were samples collected for water chemistry? (Y/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): _______  If not, please explain: ___________________________________________

Additional comments/description of pollution impacts: ________________________________________________________________

BIOTIC EVALUATION

Performed? (Y/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)


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.
SITE NAME/LOCATION: Glencoe Station Expansion

SITE NUMBER: 1

RIVER BASIN: _____________________

DRAINAGE AREA (mi²): __________

LENGTH OF STREAM REACH (ft): __________

LAT.: __________

LONG.: __________

RIVER CODE: __________

RIVER MILE: __________

DATE: 07/21/16

SCORER: MDT

COMMENTS: intermittent flow high gradient stream

NOTE: Complete All Items On This Form - Refer to “Field Evaluation Manual for Ohio’s PHWH 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.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PERCENT</th>
<th>TYPE</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLDR SLABS [16 pts]</td>
<td>0%</td>
<td>SILT [3 pt]</td>
<td>5%</td>
</tr>
<tr>
<td>BOULDER (&gt;256 mm) [16 pts]</td>
<td>5%</td>
<td>LEAF PACK/WOODY DEBRIS [3 pts]</td>
<td>0%</td>
</tr>
<tr>
<td>BEDROCK [16 pt]</td>
<td>0%</td>
<td>FINE DETRITUS [3 pts]</td>
<td>0%</td>
</tr>
<tr>
<td>COBBLE (65-256 mm) [12 pts]</td>
<td>60%</td>
<td>CLAY or HARDPAN [0 pt]</td>
<td>0%</td>
</tr>
<tr>
<td>GRAVEL (2-64 mm) [9 pts]</td>
<td>20%</td>
<td>MUCK [0 pts]</td>
<td>0%</td>
</tr>
<tr>
<td>SAND (&lt;2 mm) [6 pts]</td>
<td>10%</td>
<td>ARTIFICIAL [3 pts]</td>
<td>0%</td>
</tr>
</tbody>
</table>

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 65.00%

SCORE OF TWO MOST PREDOMINANT SUBSTRATE TYPES: 21

TOTAL NUMBER OF SUBSTRATE TYPES: 5

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):

- > 30 centimeters [20 pts]
- > 22.5 - 30 cm [30 pts]
- > 10 - 22.5 cm [25 pts]
- > 5 cm - 10 cm [15 pts]
- < 5 cm [5 pts]
- NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS: ____________________________

MAXIMUM POOL DEPTH (Inches): 1.00

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

- > 4.0 meters (> 13') [30 pts]
- > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
- > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]
- > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
- > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]
- > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- < 1.0 m (<=3' 3") [6 pts]

COMMENTS: ____________________________

AVERAGE BANKFULL WIDTH (Feet): 1.50

RIPARIAN ZONE AND FLOODPLAIN QUALITY:

RIPARIAN WIDTH

L R

Wide >10m

Moderate 5-10m

Narrow <5m

None

FLOODPLAIN QUALITY

L R

Conservation Tillage

Urban or Industrial

Open Pasture, Row Crop

Mining or Construction

COMMENTS: ____________________________

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

Stream Flowing

Subsurface flow with isolated pools (Interstitial)

Moist Channel, isolated pools, no flow (Intermittent)

Dry channel, no water (Ephemeral)

COMMENTS: ____________________________

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

None

0.5

1.0

1.5

2.0

2.5

3.0

>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):

QHEI PERFORMED?  [ ] Yes  [ ] No  QHEI Score __________ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

[ ] WWH Name: __________________________ 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: ___________________________ NRCS Soil Map Page: ______ NRCS Soil Map Stream Order ______
County: ___________________________ Township / City: ___________________________

MISCELLANEOUS

Base Flow Conditions? (Y/N): ______ Date of last precipitation: __________ Quantity: 0.00

Photograph Information:

Elevated Turbidity? (Y/N): [ ] Canopy (% open): ______

Were samples collected for water chemistry? (Y/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) ______ If not, please explain: __________________________________________________________________________

Additional comments/description of pollution impacts: __________________________________________________________________________

BIOTIC EVALUATION

Performed? (Y/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) ______ Voucher? (Y/N) ______ Salamanders Observed? (Y/N) ______ Voucher? (Y/N) ______
Frogs or Tadpoles Observed? (Y/N) ______ Voucher? (Y/N) ______ Aquatic Macroinvertebrates Observed? (Y/N) ______ Voucher? (Y/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) :

Glencoe Station Expansion

SITE NAME/LOCATION ___________________________________ ______________________________________________________________

SITE NUMBER ______________ RIVER BASIN _______________________ DRAINAGE AREA (mi²) __________

LENGTH OF STREAM REACH (ft) ___________ LAT. ____________ LONG. ___________ RIVER CODE ___________ RIVER MILE ___________

DATE ______________  SCORER _________________ COMMENTS ____________________________________________________________

NOTE: Complete All Items On This Form - Refer to “Field Evaluation Manual for Ohio’s PHWH Streams” for Instructions

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

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
Wide >10m ☑ ☑
Moderate 5-10m ☑ ☑
Narrow <5m ☑ ☑
None ☑ ☑

FLOODPLAIN QUALITY

L  R
Mature Forest, Wetland ☑ ☑
Immature Forest, Shrub or Old Field ☑ ☑
Residential, Park, New Field ☑ ☑
Fenced Pasture ☑ ☑
Mining or Construction ☑ ☑

COMMENTS ____________________________________________________

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

Stream Flowing ☑ ☑
Subsurface flow with isolated pools (Interstitial) ☑ ☑
 Moist Channel, isolated pools, no flow (Intermittent)
Dry channel, no water (Ephemeral)

COMMENTS ____________________________________________________

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

None ☑ ☑ 1.0 ☑ ☑ 2.0 ☑ ☑ 3.0 ☑ ☑
0.5 1.5 2.5 >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)

October 24, 2002 Revision  PHWH Form Page - 1
ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? [ ] Yes [x] No [ ] QHEI Score [ ] (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

[ ] WWH Name: ____________________________ 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: ____________________________ NRCS Soil Map Page: ______ NRCS Soil Map Stream Order: ______

County: ______________________________________ Township / City: ____________________________

MISCELLANEOUS

Base Flow Conditions? (Y/N): [ ] Y [ ] N  Date of last precipitation: ________ Quantity: ________

Photograph Information: ____________________________

Elevated Turbidity? (Y/N): [x] 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) [ ] Y  Dissolved Oxygen (mg/l) [ ]  pH (S.U.) [ ]  Conductivity (µmhos/cm) [ ]

Is the sampling reach representative of the stream (Y/N): [x] Y  If not, please explain: ____________________________

Additional comments/description of pollution impacts: ____________________________

BIOTIC EVALUATION

Performed? (Y/N): [x] 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)


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.

October 24, 2002  Revision

PHWH Form Page - 2
ATTACHMENT C

REPRESENTATIVE WETLAND AND STREAM PHOTOGRAPHS
<table>
<thead>
<tr>
<th>Photo No. 1</th>
<th>Date: July 21, 2016</th>
</tr>
</thead>
</table>
| Description: | Facing south  
Wetland 2  
PEM Wetland  
Wetland is southeast of the station expansion footprint within riparian of perennial stream (Stream 4). |

<table>
<thead>
<tr>
<th>Photo No. 2</th>
<th>Date: July 21, 2016</th>
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</thead>
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| Description: | Facing downstream  
Stream 1  
Ephemeral  
High gradient stream on eastern edge of survey area. |
PHOTOGRAPHIC RECORD  
Streams and Wetlands

Client Name: AEP Ohio Transco  
Site Location: Glencoe Station Expansion Project  
Project No. 60513121

<table>
<thead>
<tr>
<th>Photo No.</th>
<th>Date:</th>
<th>Description:</th>
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<tbody>
<tr>
<td>3</td>
<td>July 21, 2016</td>
<td>Facing downstream Stream 2 intermittent Intermittent stream on eastern edge of survey area.</td>
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<table>
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<tr>
<th>Photo No.</th>
<th>Date:</th>
<th>Description:</th>
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<tbody>
<tr>
<td>4</td>
<td>July 21, 2016</td>
<td>Facing downstream Stream 4 Perennial Perennial stream running north to south east of the substation expansion area.</td>
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