



5500 New Albany Rd., Columbus, OH 43054

p. 614.775.4500

f. 614.775.4800

info@emht.com

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ECOLOGICAL ASSESSMENT REPORT

Vaughn Road Flood Mitigation (1641)

Northeast Ohio Regional Sewer District

June 10, 2022

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EXECUTIVE SUMMARY

General Project Information			
Project Name: Vaughn Road Flood Mitigation		Program Type: Other	
ORACLE Number: 1641	Asset Numbers: CY00393, CY00397, CY00398	Lat: 41.288573°	Long: -81.569216°
County: Cuyahoga & Summit	Township/City: City of Brecksville & Sagamore Hills Township	Study area size (ac): 10.9	Date of survey: May 5, 2022
USGS quad: Northfield	HUC-12: 041100020505 & 041100020405	CZMA (Y/N): N	OEPA 401 WQC Eligibility: Ineligible

A routine delineation of waters of the United States, including streams and wetlands, was conducted by EMH&T for the Vaughn Road Flood Mitigation assessment area, located in the City of Brecksville and Sagamore Hills Township, Cuyahoga County and Summit County, Ohio. EMH&T also conducted a literature review concerning threatened and endangered species, cultural resources, and local riparian and wetland setbacks. The site was investigated by EMH&T environmental scientists on May 5, 2022.

The results of this assessment identified the following within the approximately 11-acre Vaughn Road Flood Mitigation assessment area:

- One (1) potentially jurisdictional emergent wetland (0.14 acres);
- Two (2) jurisdictional headwater streams (Stream 1 and Stream 2) totaling 391 linear feet (0.055 acre);
- Approximately 440 linear feet (0.85 acre) of the Cuyahoga River, a jurisdictional river;
- No work should occur in the Cuyahoga River from March 15th to June 30th (per ODNR's in-stream work restrictions for WWH streams), unless an instream work restriction waiver is obtained from ODNR;
- Approximately 3.25 acres of suitable wooded habitat for the Indiana bat, Northern long-eared bat, little brown bat, and tricolored bat was observed within the assessment area in the floodplain forest on the eastern portion of the site and along Stream 1;
- No suitable habitat for other federally-listed species whose range includes Cuyahoga County;
- Suitable habitat for the following state-listed species was identified within the assessment area: Spotted Coral-root, Large-leaved Mountain-rice, Virginia Meadow-beauty, Golden-winged Warbler, Smooth Greensnake, Queensnake, Great Lakes Crayfish, Black-crowned Night-heron, Spotted Turtle, Blanding's Turtle, Lake Sturgeon, Channel Darter, and Bigmouth shiner. However, suitable habitats are marginal, most of these species are mobile and can move out of the way of construction activities, and impacts to these species are unlikely. Avoiding construction during respective nesting and spawning periods would further reduce the likelihood of impacting species.
- The Cuyahoga River is listed as a Group 3 mussel stream, necessitating a mussel survey prior to conducting any work within the Cuyahoga River. Further coordination with ODNR is recommended;

- Two (2) significant archaeological sites are located partially within the assessment area, including the NRHP Vaughn Village site (33-CU-65) and the Riverview Village (33-CU-64) site;
- Portions of the project outside of previously disturbed right-of-way along Vaughn Road have the potential to encounter portions of these archaeological sites, or other undiscovered archaeological sites.

1.0 INTRODUCTION AND SITE DESCRIPTION

A routine delineation of Waters of the United States, including wetlands, was conducted and a report prepared by EMH&T for the approximately 11-acre Vaughn Road Flood Mitigation assessment area, located in the City of Brecksville and Sagamore Hills Township, Cuyahoga County and Summit County, Ohio (as shown on Exhibit 1). This study was performed at the request of and for the exclusive use of the Northeast Ohio Regional Sewer District (NEORS).

The approximate center coordinates of the assessment area are 41.288573°, -81.569216°. The assessment area is located in the Cuyahoga River drainage subbasin (Hydrologic Unit Code [HUC]: 04110002), which drains approximately 812 square miles in northeastern Ohio. The assessment area is covered by the Northcentral and Northeast Regional Supplement (USACE, 2012) and is regulated by the USACE Buffalo District. The assessment area is located partially within the Cuyahoga Valley National Park and partially within the Cleveland Metroparks Brecksville Reservation.

The western portion of the assessment area includes National Park offices and parking lots, a utility corridor, and maintained open space. On the eastern side of the assessment area, the region north of Vaughn Road includes a natural forested area dominated by trees with a dense shrub understory. The region south of Vaughn Road on the eastern side of the assessment area includes a shrub-dominated area with sparser trees. The Cuyahoga River was observed in the middle and on the eastern end of the assessment area.

The assessment area consists primarily of a buffer zone along Vaughn Road and the bridge carrying the roadway across the Cuyahoga River. During a site visit completed by EMH&T on September 29, 2021, a potential wetland feature and a stream feature were observed. Additional areas were added to the original assessment area in spring of 2022, and the new, larger assessment area was investigated on May 5, 2022 by EMH&T environmental scientists. The location and extent of the identified potentially jurisdictional surface water features are summarized in the following sections. The boundaries identified by EMH&T are potential, as only the USACE has the final authority to determine whether a wetland or water is jurisdictional.

2.0 LITERATURE REVIEW

A review was made of available topographic maps, soils maps, and wetland inventory maps. This information helped determine site topography and soil types present. It also identified any previously mapped wetlands and whether any portions of the assessment area were located within mapped floodways.

2.1 Topographic Features

As shown on Exhibit 2, the majority of the assessment area lies between approximately 630 feet and 660 feet in elevation (National Geodetic Vertical Datum) according to the United States Geological Survey (USGS) 7.5' Series *Northfield, Ohio* quadrangle (USGS, 1980). The Cuyahoga River is mapped flowing through the eastern end of the assessment area. No other streams, drainageways, marsh symbols, or open water ponds are mapped for the assessment area.

2.2 Mapped Soils

According to the *Web Soil Surveys* for Cuyahoga County and Summit County, Ohio (Soil Survey Geographic Database [SSURGO]-Natural Resource Conservation Service [NRCS], 2017) (Exhibit 3A), five (5) soil unit types are mapped for the assessment area. The mapped soils are listed in Table 1 along with their hydric status. According to the *Soil Survey of Cuyahoga County, Ohio* and the *Soil Survey of Summit County, Ohio* (United States Department of Agriculture [USDA], 1980), one (1) drainageway is mapped within the assessment area, corresponding to the Cuyahoga River. A drainageway is also shown flowing through the western end of the assessment area and into the Cuyahoga River to the north. This feature approximately corresponds to the observed location of Stream 1. A drainageway is also mapped flowing along Highland Road in the eastern end of the assessment area. This feature approximately corresponds to the observed location of Stream 2. A drainageway is also mapped east of the Cuyahoga River, flowing parallel to the River. This was historically the path of the Ohio and Erie Canal, which is no longer present within the assessment area. No other streams, drainageways, marsh symbols or open water ponds are noted within the assessment area (Exhibit 3B).

TABLE 1
Onsite Mapped Soils

Mapped Soil Unit	Map Unit Symbol	Hydric Status	Hydric Inclusions (%)	Location of Hydric Inclusions
Chagrin silt loam, alkaline	Ck	Non-hydric	-	-
Chagrin silt loam, occasionally flooded	Ch	Non-hydric	-	-
Holly silt loam, alkaline	Hy	Hydric	-	-
Tioga variant loam	Th	Non-hydric	-	-
Udorthents, loamy	Ua	Non-hydric	-	-

A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA-NRCS, 2018). As shown on the *Web Soil Survey* for Cuyahoga County, Ohio and for Summit County (Exhibit 3A), Holly silt loam is a hydric soil mapped within the assessment area. The remaining mapped soils within the assessment area are non-hydric.

2.3 Hydrologic Conditions

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) was reviewed for the assessment area (FEMA, 2010 and FEMA 2016). As shown on Exhibit 4, a majority of the assessment area lies within Zone X (unshaded), which are areas mapped outside of the 500-year floodplain. Low areas within or directly adjacent to the Cuyahoga River are located within Zone AE, which are the areas within the 100-year floodplain with base flood elevations determined.

As shown on Exhibit 5, the United States Fish and Wildlife Service's (USFWS) National Wetland Inventory Map (NWI) was reviewed for the assessment area (USFWS, 2019). Three (3) NWI features are mapped within the assessment area. One (1) Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded (R2UBH) feature and one (1) Riverine, Unknown Perennial, Unconsolidated Bottom, Permanently Flooded (R5UBH) feature were mapped directly parallel and

adjacent to each other, both flowing south to north through the eastern edge of the study area. Based on EMH&T's site visit, the mapped riverine features correspond to the location of the Cuyahoga River and floodplain areas adjacent to the river channel. One (1) Palustrine, Unconsolidated Bottom, Intermittently Exposed (PUBG) pond feature was mapped slightly overlapping the north-central part of the study area. Based on EMH&T's site visit, no feature was observed in this mapped location.

2.4 Threatened and Endangered Species

Federally-Listed Species

Per a review of the USFWS Information for Planning and Consultation (IPaC) website, the project is located within the range of the following federally-listed species, including:

- Indiana bat (*Myotis sodalis*) – Endangered
- Northern long-eared bat (*Myotis septentrionalis*) – Threatened
- Piping plover (*Charadrius melodus*) – Endangered
- Rufa red knot (*Calidris canutus rufa*) – Threatened
- Northern wild monkshood (*Aconitum noveboracense*) – Threatened

Additionally, *Haliaeetus leucocephalus* (bald eagle) is protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

The assessment area was evaluated for the presence of these species by assessing the habitats located in the assessment area. No species-specific surveys were conducted.

Indiana bat and Northern long-eared bat: Suitable habitat for bat species includes a wide variety of forested habitats where bats may roost, forage, and travel. This includes woodlots, fencerows, riparian forests, and other wooded corridors which contain potential roosts. Living or dead trees three inches diameter at breast height (dbh) or greater with shedding or peeling bark or cavities may serve as roosting trees for the Indiana bat and/or the northern long-eared bat. Individual trees with these characteristics may be considered suitable habitat when they are within 1,000 feet of other wooded habitat. In addition, man-made structures such as bridges, sheds, and barns may serve as roosting habitat for the northern long-eared bat.

- During the field investigation, multiple (greater than 15) suitable bat roost trees were identified within the assessment area (3.25 acres). The floodplain forest on the eastern side of the assessment area near the Cuyahoga River was characterized by mature sycamore and cottonwood trees, many of which had exfoliating bark and/or crevices for roosting. The riparian corridor surrounding Stream 1 was also dominated by cottonwood trees with suitable roosting characteristics. Representative photographs of typical bat roost trees within the assessment area are included in the Photographs section of this document.
- As defined above, the entirety of the forested habitat within the assessment area would provide suitable foraging and roosting habitat for bats. Additionally, trees located in the shrub-dominated western portion of the assessment area that exhibited suitable roosting characteristics are within 1,000 feet of adjacent forest and would be considered suitable habitat for bats.

- Additionally, crevices and cracks along the expansion grooves and connection points between the bridge deck and abutments were observed on the bridge carrying Vaughn Road across the Cuyahoga River. These constitute suitable roosting habitat for bats.
- No winter hibernacula were observed within the assessment area.

Piping plover: The piping plover is a small shorebird that nests on beaches along the shorelines of the Great Lakes. No suitable habitat exists in the assessment area.

Rufa red knot: Rufa red knot prefers open mudflats and occasionally beaches and flooded fields. They prefer wide, flat, open sandy beaches with very little grass or other vegetation. No suitable habitat exists in the assessment area.

Northern wild monkshood: Northern monkshood is typically found on shaded to partially shaded cliffs, algific talus slopes, or on cool, streamside sites. These areas have cool soil conditions, cold air drainage, or cold groundwater flowage. On algific talus slopes, these conditions are caused by the outflow of cool air and water from ice contained in underground fissures. These fissures are connected to sinkholes and are a conduit for the air flows. Algific talus slope systems are relatively rare, and are associated with karst landscapes. No suitable habitat exists in the assessment area.

Bald eagle: The bald eagle prefers open bodies of water with an abundance of fish, and requires old growth and mature stands of trees for roosting and nesting. One (1) bald eagle was observed flying overhead during the site visit but no nests were observed in the assessment area. No large stands of mature trees were observed within the assessment area.

Due to potential impacts to federally-listed species, coordination with the US Fish & Wildlife Service (USFWS) is recommended.

State-Protected Species

The Ohio Department of Natural Resources (ODNR) was contacted for information available concerning the presence of state-listed endangered, threatened, and proposed species or their habitat for the assessment area. A request was made to provide information through a full Environmental Review (ER), as this review may be needed for waterway permitting purposes. ODNR provided the ER response on April 1, 2022. The Natural Heritage Database (NHD) review identified the following records of rare or endangered species within a one-mile radius of the assessment area:

- Spotted coral-root (*Corallorhiza maculata*) – State Potentially Threatened
- Large-leaved mountain-rice (*Oryzopsis asperifolia*) – State Threatened
- Virginia meadow-beauty (*Rhexis virginica*) – State Potentially Threatened
- Least bittern (*Ixobrychus exilis*) – State Threatened
- Golden-winged warbler (*Vermivora chrysoptera*) – State Special Interest
- Smooth greensnake (*Opheodrys vernalis*) – State Endangered
- Queensnake (*Regina septemvittata*) – State Species of Concern
- Great Lakes crayfish (*Orconectes propinquus*) – State Species of Concern

Additionally, in the ER letter, the Ohio Division of Wildlife (DOW) identified the following species whose range overlaps the assessment area:

- Least Bittern (*Ixobrychus exilis*) – State Threatened
- American bittern (*Botaurus lentiginosus*) – State Endangered
- Black-crowned night-heron (*Nycticorax nycticorax*) – State Threatened
- King rail (*Rallus elegans*) – State Endangered
- Sandhill crane (*Grus canadensis*) – State Threatened
- Trumpeter swan (*Cygnus buccinators*) – State Threatened
- Upland sandpiper (*Bartramia longicauda*) – State Endangered
- Smooth greensnake (*Opheodrys vernalis*) – State Endangered
- Spotted turtle (*Clemmys guttata*) – State Threatened
- Blanding's turtle (*Emydoidea blandingii*) – State Threatened
- Lake sturgeon (*Acipenser fulvescens*) – State Endangered
- Channel darter (*Percina copelandi*) – State Threatened
- Bigmouth shiner (*Notropis dorsalis*) – State Threatened
- Indiana bat (*Myotis sodalis*) – State Endangered
- Northern long-eared bat (*Myotis septentrionalis*) – State Endangered
- Little brown bat (*Myotis lucifugus*) – State Endangered
- Tricolored bat (*Perimyotis subflavus*) – State Endangered

Furthermore, the ODNR stated they have records of the following managed areas within a one-mile radius of the assessment area:

- Cuyahoga Valley National Park – National Park Service
- Brecksville Reservation – Cleveland Metroparks

The assessment area was evaluated for the presence of these species by assessing the habitats located in the assessment area. No state-listed species were observed within or adjacent to the assessment area. This evaluation for state-listed species would not constitute species-specific surveys. Those habitats identified within the assessment area that may be suitable for these species are marginal, most of these species are mobile and can move out of the way of construction activities, and impacts to these species as a result of this project are unlikely. Avoiding construction during their respective nesting and spawning periods would further reduce the likelihood of impacting these species.

Spotted coral-root: This plant typically grows in extensive colonies in moist, shady upland forests and occasionally in dry upland forests. Upland and floodplain forest habitat was observed within the assessment area; however, this habitat was marginal.

Large-leaved Mountain-rice: This grass grows in both deciduous and coniferous woods, generally on open, rocky ground. It is able to grow in manmade or disturbed areas, woods, fields, and meadows. Much of the assessment area constitutes suitable habitat. This species was not observed during the field investigation.

Virginia Meadow-beauty: This flowering plant grows in wetlands, wet meadows, bogs, seepage slopes, and open sandy locations and blooms July through September. Although much of the assessment area consists of forest or scrub/shrub areas, some open areas that would provide suitable habitat for the Virginia meadow-beauty do exist within the assessment area. These areas are mostly scattered throughout the western portion of the site south of Vaughn Road.

Least Bittern: These birds live in freshwater and brackish marshes with tall, dense stands of vegetation standing in water. The water may be fairly deep, because the bird mostly climbs in reeds rather than wading. Least bitterns are sometimes found in salt marsh or in mangroves. They create nests by bending down marsh vegetation, adding sticks and grass on top, and conceal them in the tall marsh growth. No suitable habitat was observed within the assessment area.

Golden-winged Warbler: This bird nests in forested landscapes interspersed with ample early successional habitats. Due to the presence of expansive forested landscapes in the surrounding parkland area, the assessment area would be considered suitable habitat for this species, especially the thick forest edges observed on the eastern side of the assessment area.

Smooth Greensnake: This snake prefers moist, grassy habitats, particularly those associated with remnant prairie habitats. However, the snakes have been found in a variety of places, including upland forest, blackberry bushes, grapevines, shrubs, roadside ditches, open grassy meadows, and marshy grass. From June to September, females lay eggs in burrows under logs, rocks, or vegetation. The snakes hibernate through the winter in abandoned rodent burrows, inside anthills, or under rocks and logs. The assessment area consists largely of paved roadway and maintained right-of-way. The preferred remnant prairie habitat of the smooth green snake is not present within the assessment area. The more general environments the snake is known to inhabit, including forest, shrubs, bushes, and ditches, are present within the assessment area.

Queensnake: This snake is a semi-aquatic reptile that prefers slow moving or shallow, rocky streams and is commonly found under large flat stones, boards, or debris. This species feeds primarily on soft-shelled crayfish and are occasionally found in lakes or other aquatic habitats. They often do not venture far from the aquatic habitat they inhabit. Stream 2 and the Cuyahoga River have rocky substrate and provide marginal suitable habitat for the queensnake.

Great Lakes crayfish: This crayfish is a habitat generalist which can be found in small streams, large rivers, ponds and lakes. The species prefers rocky riffle habitat in streams and coarse habitat in lakes that can provide more cover from predators. Stream 1 is a small, intermittent stream with a drainage area of about 0.1 square miles and would likely not support the crayfish. Stream 2 is a small, perennial stream with a severe gradient and coarse substrate. Stream 2 and the Cuyahoga River constitute marginal suitable habitat for this species.

American bittern: Nesting bitterns are very secretive and prefer large undisturbed wetlands that have scattered small pools amongst the dense vegetation. They occasionally occupy bogs, large wet meadows, and dense, shrubby swamps. Based on the site investigation there is limited suitable foraging habitat along the banks of the Cuyahoga River and surrounding floodplain. The wetland within the study area is likely not large or dense enough for breeding populations of this species, which are typically restricted to wetlands greater than 20 acres in size.

Black-crowned night-heron: This species prefers aquatic habitat for foraging and terrestrial vegetation for cover. They are largely nocturnal and are often found roosting in thick vegetation along streams, lakes, and wetlands. Black-Crowned night-herons nest in colonies in trees or tall vegetation, and prefer sites on an island or over water away from predators. Often a single tree can contain several nests. There is potential suitable foraging and roosting habitat for this species within the assessment area directly adjacent to the Cuyahoga River on the eastern end of the assessment area however, it is not likely that there are nesting colonies of Black-Crowned night-heron within the assessment area.

King rail: Per USFWS, the king rail uses a variety of wetland habitats throughout its range including freshwater marshes (tidal and non-tidal), brackish marshes, shrub swamps, and rice fields. Typical habitat includes dense, emergent vegetation and shallow water. Micro-topography is also important with sites usually containing an interspersed of hummocks, swales, and dry patches. The king rail nests in clumps of grass or sedges. The wetland identified within the assessment area includes very little microtopography and does not constitute suitable habitat for the king rail. No other areas of suitable habitat were observed within the assessment area.

Sandhill crane: This bird's nests are typically located in isolated, undisturbed bogs and large wet meadows. These nests are surrounded by water that varies from a few inches to 2–3 feet deep and emergent vegetation that includes sedges, bulrushes, cattails, and various grasses. Their breeding territories usually encompass an average of 132–210 acres, depending upon habitat suitability. These territories may include a variety of wetland and upland habitats, although most foraging occurs in wet meadows, upland pastures, cultivated fields, and occasionally in open woodlands. No suitable habitat was observed within the assessment area.

Trumpeter swan: These birds are year-round residents and prefer large marshes and lakes ranging in size from 40 to 150 acres. They like shallow wetlands one to three feet deep with a diverse mix of emergent and submergent vegetation and open water. Swans often build a nest on top of muskrat lodges or in stands of emergent vegetation, such as bulrushes, cattails or sedges where the water is one to three feet deep. No suitable habitat was observed within the assessment area.

Upland sandpiper: This bird requires large open grasslands for their habitat. Typical breeding grounds include grasslands, pastures, unkempt agricultural lands, and the grassy expanses of airports. The birds are adaptable to human landscapes, especially during migration. Sandpipers prefer to nest in native grasslands with a mixture of tall grass and broad-leafed weeds. No suitable habitat was observed within the assessment area.

Spotted turtle: Habitat for this turtle includes slow, shallow waters in ditches, small streams, marshes, bogs, and the edges of ponds. It prefers abundant vegetation and can also occasionally be found in wet woods and meadows. This species prefers to nest in upland habitats, but it will only feed underwater. The breeding season extends from March to May. At the end of breeding season, females leave the breeding pools in search of an open site, such as a meadow, field, or the edge of a road, as a nesting area. There are areas of slow shallow water with abundant vegetative cover within the assessment area along Streams 1 and 2, however these areas provide only marginal habitat for this species.

Blanding's turtle: This species inhabits the marshy shorelines, inland streams, and wet meadows of the Lake Erie region. This large aquatic turtle is very timid, and sometimes forages on land.

Blanding's turtle uses a variety of wetland habitats, with a preference for shallow, clear, standing water with abundant aquatic vegetation, but it can be found in almost any water body in their area. This species also requires upland habitat, relying on open sandy areas covered in grasses or shrubs for nesting. Due to their high mobility, Blanding's turtles occupy large areas. Blanding's turtles often traverse inhabited or disturbed areas, including farm fields, gardens, under power lines, and the edges of dirt roads. The preferred shallow, standing water wetland with aquatic vegetation was not observed within the assessment area nor was any suitable nesting habitat. However, inland streams are present within the study area and constitute general habitat for this species.

Lake sturgeon: This species is a large, long-lived, freshwater fish species characterized by multiple reproductive cycles over the course of their lifetime. Preferred habitats are large shallow lakes, rivers and near-shore areas. Sturgeons in general are highly vulnerable to habitat alteration and over-fishing because of their specialized habitat requirements, the long time it takes them to reach breeding maturity, and their episodic reproductive success. The Cuyahoga River constitutes suitable habitat for the lake sturgeon.

Channel darter: This fish inhabits large creeks and rivers in areas with sand and gravel/rubble substrates. They have also been found over sandy and gravelly shoals off the beaches of lakes. They prefer clear water and silt-free substrates. Stream 1 is a small intermittent stream with predominantly silty substrate and would likely not support the channel darter. However, Stream 2 and the Cuyahoga River are perennial streams with gravel substrate and constitute suitable habitat for this species.

Bigmouth shiner: These small, silver fish are found in streams with a sandy substrate. They gather in pools where they swim in schools just above the substrate. Their diet consists of various aquatic invertebrates and terrestrial insects that fall in the water. Little is known about their reproductive habits, but they spawn in June or July. They are most abundant in perennial streams and can adapt to changing water levels, turbidity and pollutants, but need a sand substrate not covered with silt. Two (2) perennial streams (Stream 2 and the Cuyahoga River) were observed in the assessment area. Stream 2 did not have sandy substrate however the Cuyahoga River constitutes suitable habitat for the bigmouth shiner. The DOW recommends no in-water work in perennial streams from March 15 through June 30 to reduce impacts to indigenous aquatic species and their habitat.

Indiana bat, Northern long-eared bat, little brown bat, and tricolored bat: As mentioned previously, suitable habitat for bat species includes a wide variety of forested habitats where bats may roost, forage, and travel. Habitat observations and investigation results for the Indiana bat and Northern long-eared bat mentioned in the previous section apply to the little brown bat and the tricolored bat species as well.

A copy of the ODNR Environmental Review Request response is provided in Appendix A. Further coordination with ODNR is recommended to determine if species specific surveys for State Endangered organisms are necessary.

Mussels

All native mussels are protected in Ohio per Ohio Revised Code Section 1533.324. Any streams that contain mussels or potential mussel habitat must be surveyed and coordinated with the Ohio Department of Natural Resources (ODNR) prior to any proposed stream disturbance in accordance

with the Ohio Mussel Survey Protocol (OMSP) (April 2022). Streams 1 and 2 have a drainage area less than five (5) square miles and therefore do not require mussel reconnaissance surveys. However, the Cuyahoga River is listed as a “Group 3” mussel stream in the OMSP, i.e., a large river where federally listed species are expected. As such, a mussel survey must be conducted prior to conducting any work within the Cuyahoga River. Further coordination with ODNR is recommended.

2.5 Cultural Resources

As part of this ecological assessment, EMH&T reviewed the State Historic Preservation Office (SHPO) GIS website to determine if there were any known cultural resources in or adjacent to the proposed assessment area (Exhibit 6). Below is a summary of the findings:

- Based on a review of the records found at SHPO, there were no previously identified Ohio Genealogical Society (OGS) cemeteries, Determination of Eligibility (DOE) properties or National Historic Landmarks (NHL) properties located within the assessment area.
- Based on the SHPO GIS review, an archaeological survey for a portion of the Vaughn Site (33-CU-65) was conducted near the project’s western terminus (Zalesky 1986).
- The NRHP Jaite Mill District Historic District overlaps with portions of the assessment area. The Jaite Mill Historic District includes the Jaite Depot and Jaite Company Town (CUY-[443-450]-20) located just east of the Vaughn Road-Riverview Road intersection.
- The NRHP Ohio and Erie Canal Historic District includes Canal Lock #34, which is located within the assessment area near the eastern project terminus north of Vaughn Road and east of the Cuyahoga River.
- The NRHP Valley Railway Historic District is located within the assessment area near the western terminus. This historic district is limited to the Valley Railway railroad tracks that bisect Vaughn Road.
- The NRHP Vaughn Village Site (33-CU-65) is also located near the western project terminus on the north side of Vaughn Road. This prehistoric era village site is known to have extensive prehistoric remains.
- The Riverview Village Site (33-CU-64) is located south of Vaughn Road adjacent to the project corridor. This prehistoric era village site contains extensive prehistoric remains.

The project involves the investigation of approximately 11 acres along either side of Vaughn Road and the Vaughn Road Bridge over the Cuyahoga River. The goal of the project is to reduce the likelihood of large flood events. It is very unlikely this project will affect the setting of any known historic buildings or structures in the area, although there are several listed on the NRHP including the Jaite Mill Historic District, the Ohio and Erie Canal District and the Valley Railway Historic District. The significant portions of these districts located in or adjacent to the assessment area including Lock #34, the Jaite Depot and Company Town buildings, and the Valley Railway railroad tracks should be avoided.

There are two significant archaeological sites located within or adjacent to the assessment area. The NRHP Vaughn Village Site (33-CU-65) is a large, Late Prehistoric era village that is located on the north side of Vaughn Road just east of the railroad tracks. The Riverview Village Site (33-CU-64) is also an extensive Late Prehistoric era village site. This site is located south of Vaughn Road extending west from the banks of the Cuyahoga River. The portions of the project confined to the river and previously disturbed road right-of-way have a low probability of encountering

undisturbed archaeological sites. Portions of the project outside of previously disturbed right-of-way have the potential to encounter portions of these archaeological sites, or other currently undiscovered archaeological sites.

2.6 Riparian and Wetland Setbacks

Summit County requires riparian setback for projects within County limits as adopted in Chapter 937 of the Summit County Codified Ordinances (American Legal Publishing Corporation, 2002). These required setbacks are listed in Table 2. Where the 100-year floodplain exceeds these setbacks, the setbacks must be extended to the outer edge of the 100-year floodplain. Setback requirements also increase for areas with steeper stream channels.

TABLE 2
Summit County Riparian Setbacks

Watershed Area (square miles)	Minimum Stream Buffer (feet on either side of watercourse)
<0.05	30
0.05-0.5	50
0.5-20	75
20-300	100
300+	300

The onsite portion of Stream 2 is located within Summit County and has a watershed area of 0.54 mi², requiring a 75-foot riparian setback. Stream 2 is not located within the FEMA mapped 100-year floodplain of the Cuyahoga River and therefore will not need any setback extensions. Additionally, the average percent slope of Stream 2 is not high enough within the assessment area to require any further extension of the buffer area. The onsite portions of the Cuyahoga River located within Summit County qualify for a riparian setback of 300 feet.

3.0 INVESTIGATION RESULTS

EMH&T conducted a field investigation of the assessment area on May 5, 2022 to determine the location, extent, and quality of potential Waters of the United States, including wetlands. The investigative methodology employed is summarized in Appendix B. As shown on Exhibit 7, one (1) potentially jurisdictional wetland and three (3) jurisdictional streams were located within the assessment area. Photographs of the features are included in the Photographs section.

Wetland A was observed in a depression located within the western portion of the assessment area south of Vaughn Road. The wetland did not contain any trees and the sapling/shrub layer consisted mainly of gray dogwood (*Cornus racemosa*). The herbaceous layer consisted primarily of sedges (*Carex* spp.). The hydric soil indicator was a depleted matrix. Much of the wetland exhibited saturation at the surface at the time of the site investigation.

Three (3) potentially jurisdictional streams were observed in the assessment area. Stream 1 is an intermittent stream flowing south to north across the west-central portion of the assessment area and draining into the Cuyahoga River. Approximately 173 linear feet of Stream 1 is located within the assessment area, 40 linear feet of which is culverted under Vaughn Road. Stream 2 is a perennial stream flowing east to west for through the eastern portion of the assessment area before flowing

directly into the Cuyahoga River. Approximately 218 linear feet of Stream 2 is located within the assessment area, 46 linear feet of which is culverted. The Cuyahoga River flows through the assessment area at two points for a total of 440 linear feet and constitutes 0.85 acre of open channel. The first portion includes just the left bank and channel on the south-central boundary of the assessment area. After a wide meander to the southeast, the Cuyahoga River flows directly through the assessment area from south to north on the assessment area's eastern end.

Table 3 summarizes the extent and size of the potentially jurisdictional waters identified during the investigation. The USACE wetland and upland dataforms are included as Appendix C.

TABLE 3
Extent of Onsite Surface Water Features

Feature ID	Classification	Stream Length (lf)	Area (acres)
Wetland A	Potentially Jurisdictional	-	0.14
Stream 1	Potentially Jurisdictional	173	0.017
Stream 2	Potentially Jurisdictional	218	0.038
Cuyahoga River	Jurisdictional	440	0.85
Total		831	1.045

Federal jurisdiction over various classes of water resources under the Clean Water Act is currently described in regulations (40 CFR 230.3) and USACE guidance (USEPA & USACE, 2008) following the U.S. Supreme Court Decision *Rapanos v. United States*. Among the classes of water resources subject to federal jurisdiction are traditional navigable waters (TNWs); wetlands adjacent to TNWs; non-navigable tributaries of TNWs that are relatively permanent (i.e., typically flow year-round or have continuous flow at least seasonally); and wetlands that directly abut such relatively permanent tributaries.

Further, federal jurisdiction also covers non-relatively permanent waters (non-navigable tributaries that do not typically flow year round or have continuous flow at least seasonally [3 months]), wetlands adjacent to non-relatively permanent waters and wetlands adjacent to but not directly abutting relatively permanent waters when a fact-specific analysis determines these waters have a "significant nexus" with a traditional navigable water. A significant nexus determination must be done in order to prove a non-relatively permanent water has more than an insubstantial or speculative effect on the chemical, physical and/or biological integrity of a downstream traditional navigable water.

Based on this understanding, Streams 1 and 2 identified within the study area are potentially jurisdictional. The Cuyahoga River is a jurisdictional water. The other surface water feature identified within the study area, Wetland A, is also a potentially jurisdictional water. Wetland A lies adjacent to Stream 1, a potentially jurisdictional stream. However, the definition of Waters of the United States is subject to change, pending ongoing litigation and rule making. Table 4 summarizes the jurisdictional classification of each surface water feature.

TABLE 4
Jurisdictional Classification of Onsite Surface Water Features

Feature ID	Streams			Wetlands			
	TNW	RPW	Non-RPW	(A)	(B)	(C)	(D)
Wetland A	--	--	--	--	--	X	--
Stream 1	--	X	--	--	--	--	--
Stream 2	--	X	--	--	--	--	--
Cuyahoga River	X	--	--	--	--	--	--

TNW: Traditional Navigable Water

RPW: Relatively Permanent Waters (non-navigable tributaries that flow year-round or at least seasonally [3 months])

Non-RPW: Non-Relatively Permanent Waters (non-navigable tributaries without at least seasonal flow [3 months])

Wetlands:

- (A) Abutting or adjacent to a TNW
- (B) Abutting a RPW
- (C) Located adjacent to a RPW or Non-RPW
- (D) Isolated

3.1 Wetland Habitat Assessment

Wetland A is characterized as an emergent wetland and received an Ohio Rapid Assessment Method (ORAM) score of 35, indicating that it is a Modified Category 2 wetland. The ORAM dataform for Wetland A is located in Appendix D.

3.2 Stream Habitat Assessment

Streams 1 and 2 within the assessment area are undesignated per OAC 3745-1 and qualify as primary headwater (PHW) habitat, having watersheds less than one (1) square mile and natural pools less than 40 cm in depth. Based on their watershed size and pool depths, the Headwater Habitat Evaluation Index (HHEI) was completed for Streams 1 and 2. The HHEI dataforms are provided in Appendix E.

The Cuyahoga River has an assigned Aquatic Life Use designation by the Ohio EPA of Warmwater Habitat (WWH). Therefore, no Quantitative Habitat Evaluation Index (QHEI) was completed for the Cuyahoga River. The Cuyahoga River is subject to ODNR's in-water work restriction period for streams with a WWH designation. No work should occur in the Cuyahoga River from March 15th to June 30th, unless an instream work restriction waiver is obtained from ODNR. A summary of the assessments of all three streams is provided in Table 5.

TABLE 5
Stream Habitat Assessment Summary

Feature ID	Type	Bankfull Width (ft)	Bankfull Depth (ft)	Extent in Assessment Area		HHEI Score	Narrative Rating / PHWH Class
				Length (lf)	Area (ac)		
Stream 1	Intermittent	8.5	0.49	173	0.017	61	Modified Class II
Stream 2	Perennial	9.2	0.65	218	0.038	67	Modified Class II
Cuyahoga River	Perennial	106	-	440	0.85	-	WWH

4.0 REGULATORY JURISDICTION

Impacts to Waters of the United States are regulated by the USACE and the U.S. Environmental Protection Agency (EPA) through Section 404 of the Clean Water Act (33 U.S.C. 1344). Prior to federal authorization for impacts to waters or wetlands, certification must be obtained from the Ohio EPA as defined in Section 401 of the Clean Water Act (33 U.S.C. 1341). In addition, the Ohio EPA regulates discharges of fill to isolated wetlands in the State of Ohio as provided in Sections 6111.021 through 6111.029 of the Ohio Revised Code. Accordingly, no filling may occur in the wetlands, streams and other potential waters described in this document without appropriate permits and authorization.

Per a review of the Ohio EPA 401 Water Quality Certification for Nationwide Permit Eligibility, the assessment area is located in an *ineligible* (“purple”) area.

5.0 REFERENCES

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PHOTOGRAPHS



Engineers, Surveyors, Planners, Scientists



Photograph No. 1 – View of Wetland A, facing north (EMH&T 5/5/2022).



Photograph No. 2 – View of Wetland A, facing east (EMH&T 5/5/2022).



Engineers, Surveyors, Planners, Scientists



Photograph No. 3 – View of Wetland A, facing south (EMH&T 5/5/2022).



Photograph No. 4 – View of Wetland A, facing west (EMH&T 5/5/2022).



Engineers, Surveyors, Planners, Scientists



Photograph No. 5 – Upstream view of Stream 1, facing south (EMH&T 5/5/2022).



Photograph No. 6 – Downstream view of Stream 1, facing north (EMH&T 5/5/2022).



Engineers, Surveyors, Planners, Scientists



Photograph No. 7 – View of Stream 1 substrate (EMH&T 5/5/2022).



Photograph No. 8 – View of the culvert conveying Stream 1 under Vaughn Road (EMH&T 5/5/2022).



Engineers, Surveyors, Planners, Scientists



Photograph No. 9 – Upstream view of Stream 2, facing east (EMH&T 5/5/2022).



Photograph No. 10 – Downstream view of Stream 2, facing west (EMH&T 5/5/2022).



Engineers, Surveyors, Planners, Scientists



Photograph No. 11 – View of Stream 2 substrate (EMH&T 5/5/2022).



Photograph No. 12 – View of the culvert conveying Stream 2 under a roadway, facing east (EMH&T 5/5/2022).



Engineers, Surveyors, Planners, Scientists



Photograph No. 13 – Upstream view of the Cuyahoga River along the eastern end of the assessment area, facing north (EMH&T 5/5/2022).



Photograph No. 14 – Downstream view of the Cuyahoga River along the eastern end of the assessment area, facing south (EMH&T 5/5/2022).



Engineers, Surveyors, Planners, Scientists



Photograph No. 15 – View of the Cuyahoga River's substrate along the eastern end of the assessment area (EMH&T 5/5/2022).



Photograph No. 16 – Upstream view of the Cuyahoga River along the south-central border of the assessment area, facing east (EMH&T 5/5/2022).



Photograph No. 17 – Downstream view of the Cuyahoga River along the south-central border of the assessment area, facing west (EMH&T 5/5/2022).



Photograph No. 18 – View of the Cuyahoga River's substrate along the south-central border of the assessment area (EMH&T 5/5/2022).



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Photograph No. 19 – Representative view of a typical bat roost tree within the forested floodplain on the eastern end of the assessment area (EMH&T 5/5/2022).



Photograph No. 20 – Representative view of a typical bat roost tree within the forested area in the central portion of the assessment area (EMH&T 5/5/2022).



Photograph No. 21 – Representative view of suitable bat roosting areas underneath the bridge carrying Vaughn Road over the Cuyahoga River (EMH&T 5/5/2022).



Photograph No. 22 – Overview of the eastern end of the assessment area dominated by forested floodplain vegetation (EMH&T 5/5/2022).



Photograph No. 23 – Overview of the western end of the assessment area dominated by scrub/shrub vegetation (EMH&T 5/5/2022).



Photograph No. 24 – Overview of the maintained utility corridor within the western part of the assessment area (EMH&T 5/5/2022).



Engineers, Surveyors, Planners, Scientists



Photograph No. 25 – Overview of the historic park offices within the western part of the assessment area (EMH&T 5/5/2022).

EXHIBITS

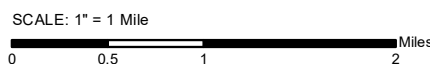


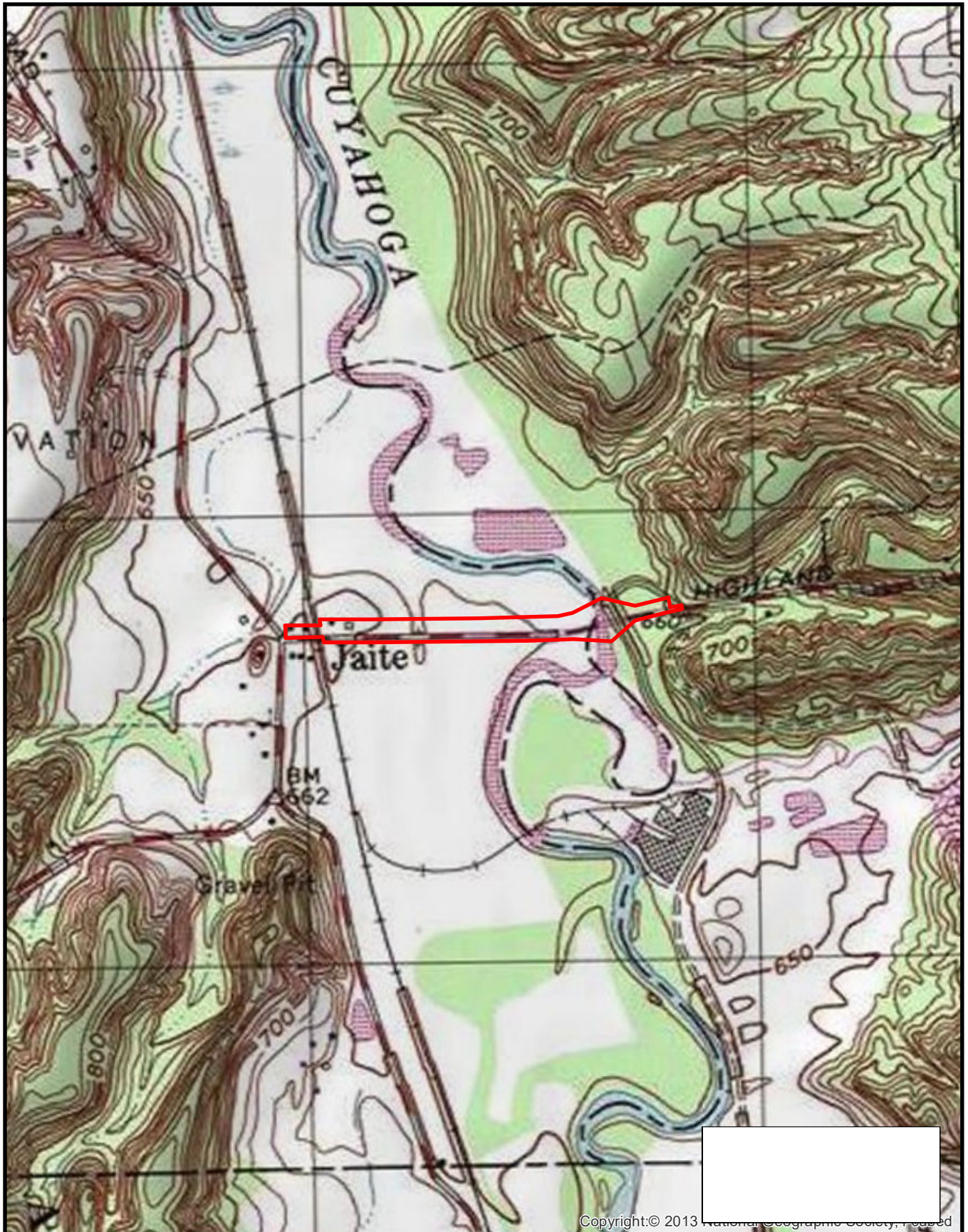
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

EMH&T
 Engineers • Surveyors • Planners • Scientists
 5500 New Albany Road, Columbus, OH 43054
 Phone: 614.775.4500 Toll Free: 888.775.3648
 emht.com

URBAN & SAGAMORE HILLS TOWNSHIPS, CUYAHOGA & SUMMIT COUNTIES, OHIO

**1641 - Vaughn Road Flood Mitigation
 Location Map
 Exhibit 1**





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1641 - Vaughn Road Flood Mitigation
USGS Topographic Map
Exhibit 2

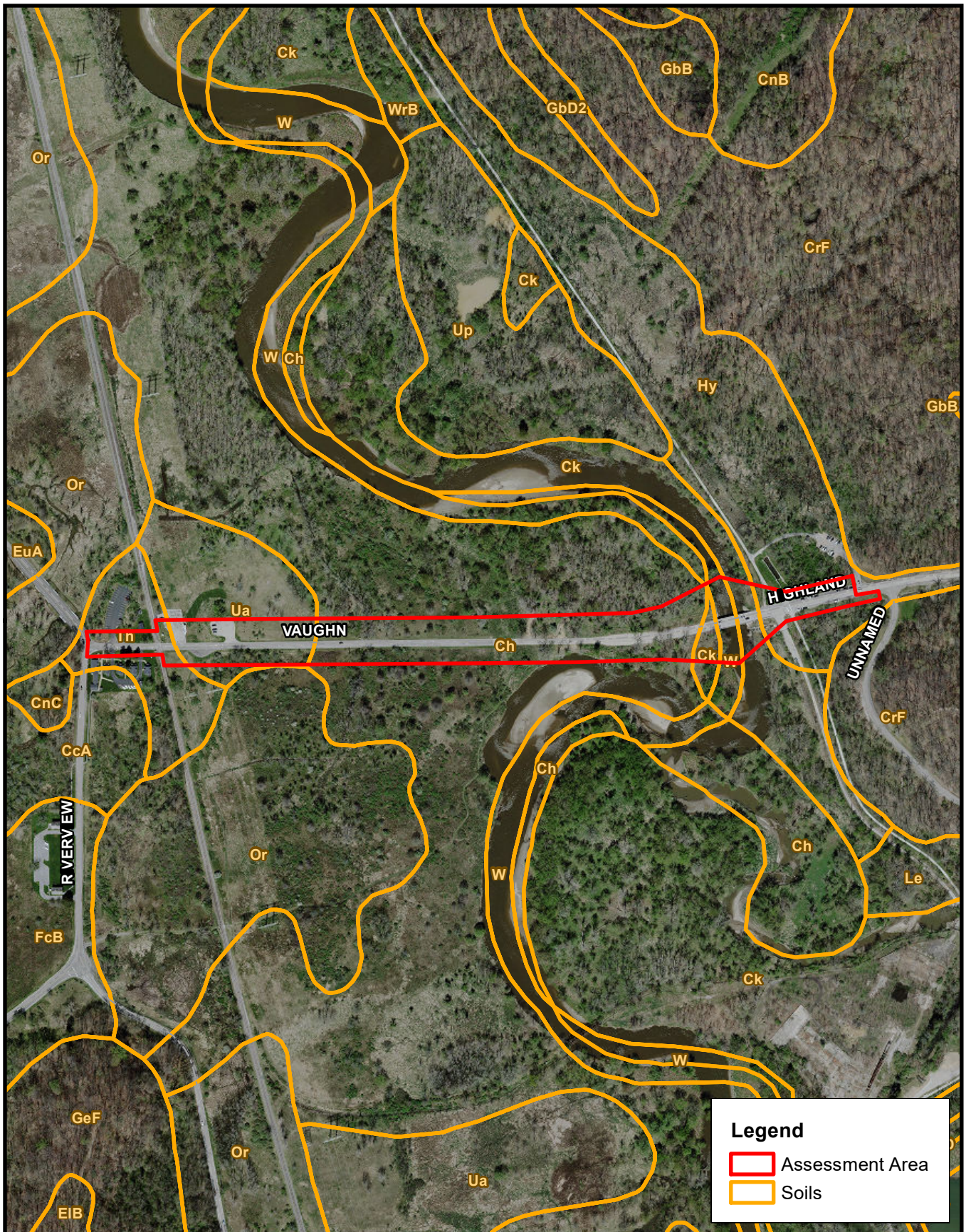
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0 500 1,000 2,000 Feet

Source: USGS - Northfield (Pub. 1980)



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Legend

- Assessment Area
- Soils



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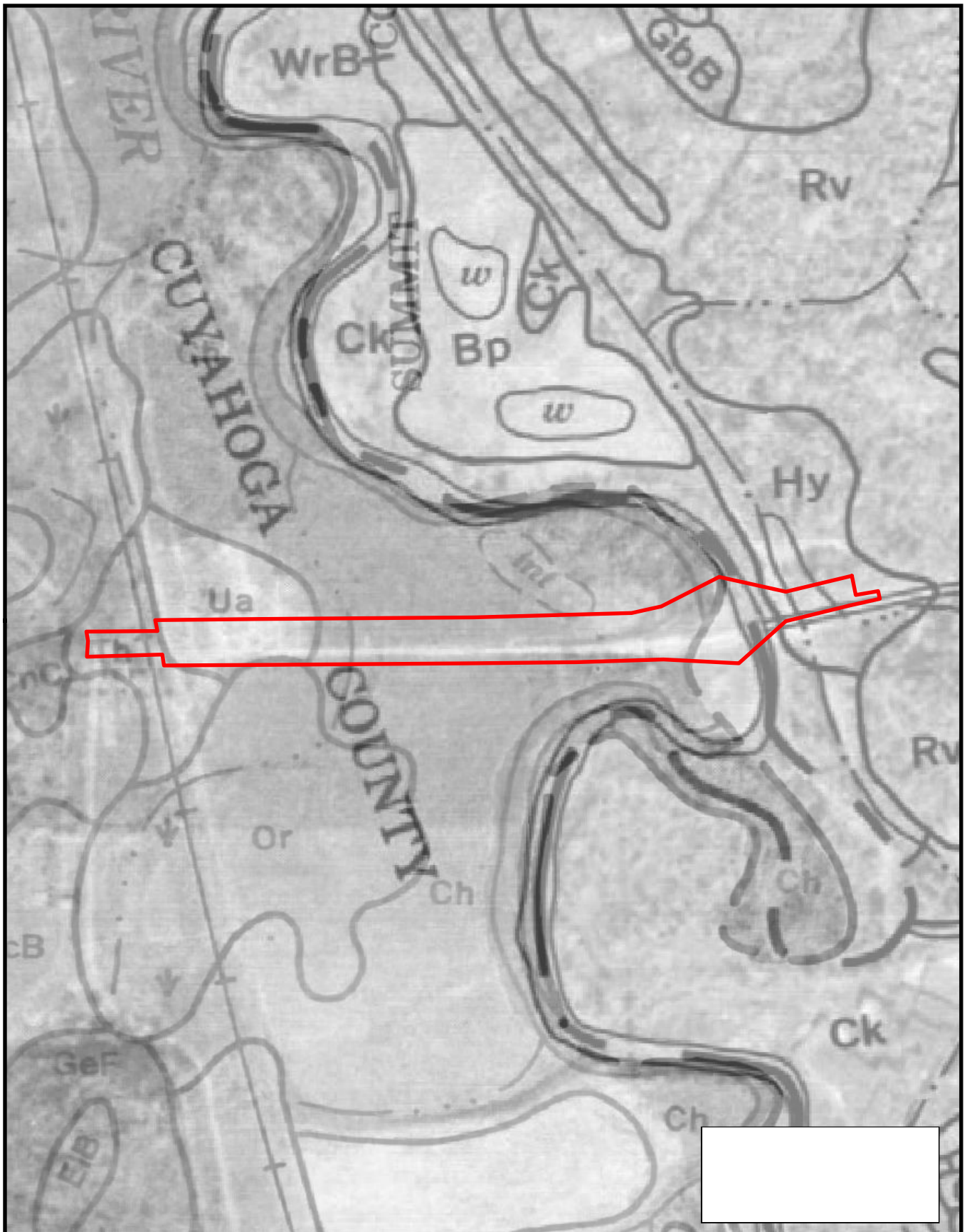
1641 - Vaughn Road Flood Mitigation Soils Map Exhibit 3A

SCALE: 1" = 500'

0 250 500 1,000 Feet

Source: Soils - NRCS, 2017; Aerial - OSIP, 2017





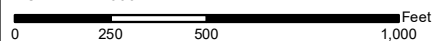
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**1641 - Vaughn Road Flood Mitigation
Historical Soil Survey Map
Exhibit 3B**

SCALE: 1" = 600'



Source: Historic Soils - USDA 1980



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Legend

-  Assessment Area
-  Floodway
-  Zone X (Unshaded). Areas Outside the 500 Year Floodplain
-  100-Year Floodplain with Base Flood Elevations Determined
-  500-Year Floodplain



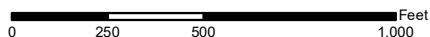
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1641 - Vaughn Road Flood Mitigation Flood Insurance Rate Map Exhibit 4

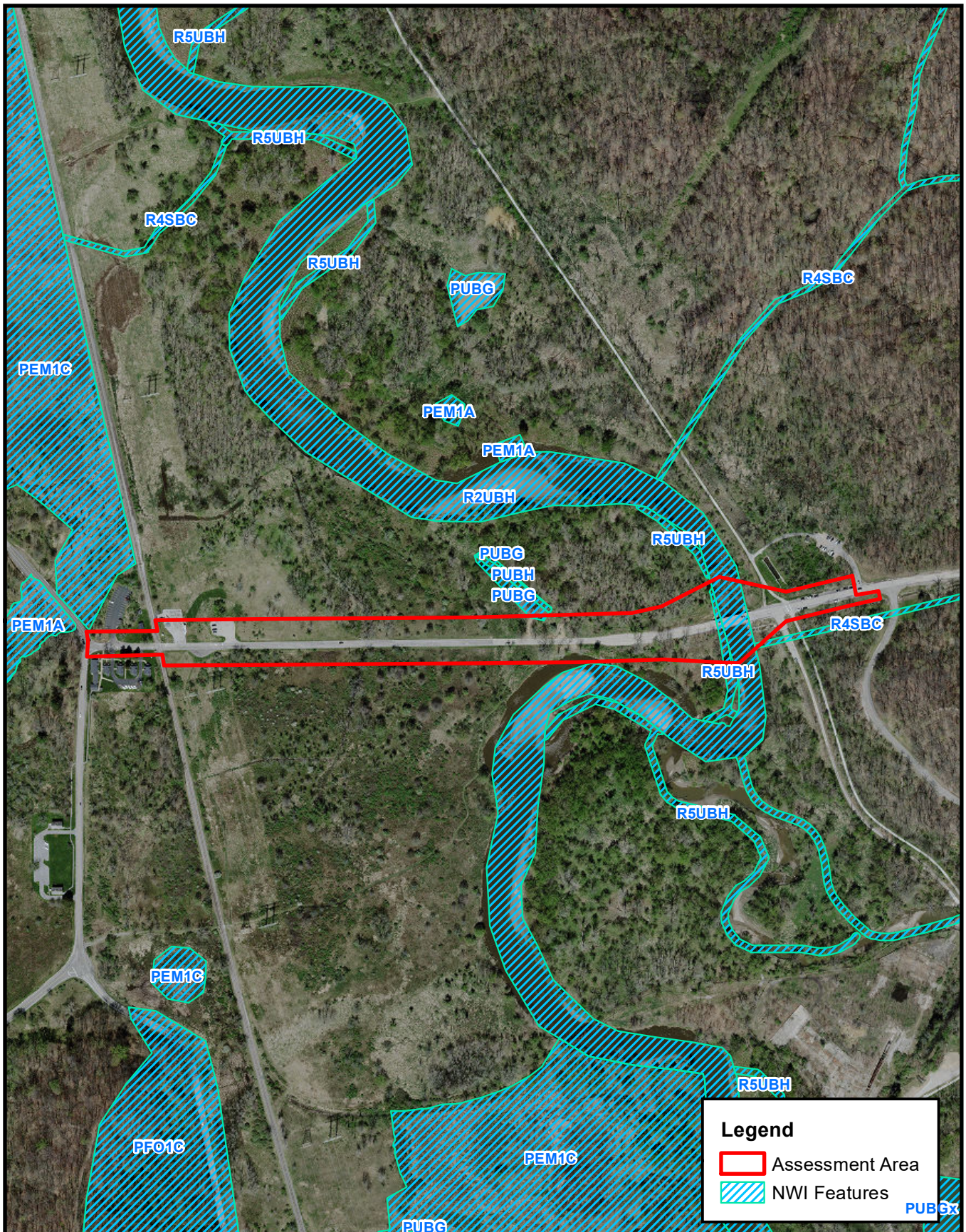
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Source: Floodplain - FEMA, 2010 & 2016; Aerial - OSIP 2017



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Legend

- Assessment Area
- NWI Features



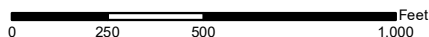
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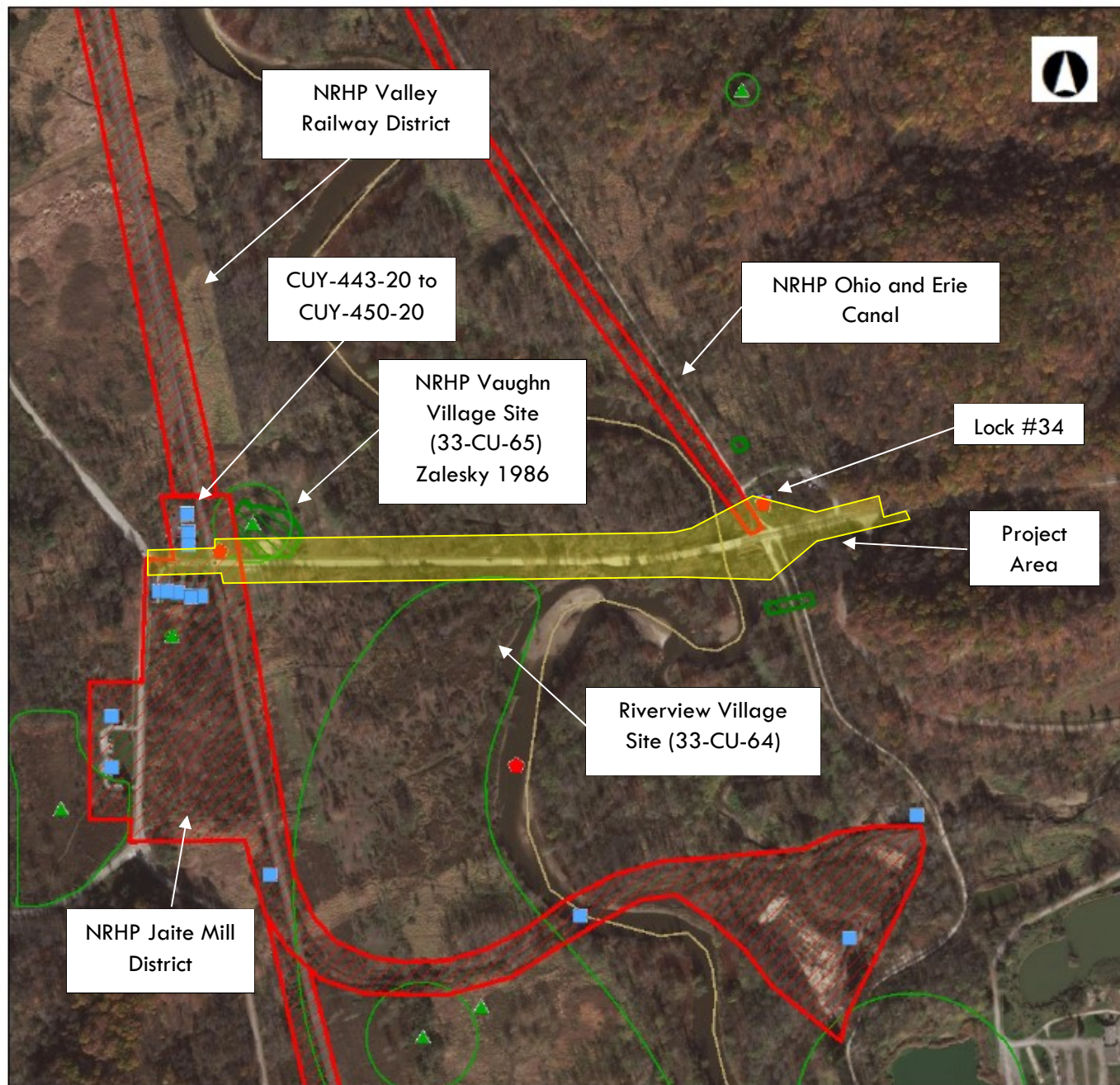
1641 - Vaughn Road Flood Mitigation National Wetland Inventory Map Exhibit 5

SCALE: 1" = 500'



Source: NWI Features - USFWS, 2019; Aerial - OSIP 2017





State Historic
Preservation Office

Legend

NR Listings

- Listed
- National Historic Landmark
- Delisted

Determinations of Eligibility

- DOE
- Demolished
- Archaeological Sites
- Historic Structures
- Historic Bridges
- Historic Tax Credit Projects
- Local Designations

OGS Cemeteries

- Confident
- Not Confident

Historic Markers

- Dams
- UTM Zone Split

0 0.12 0.24 Miles

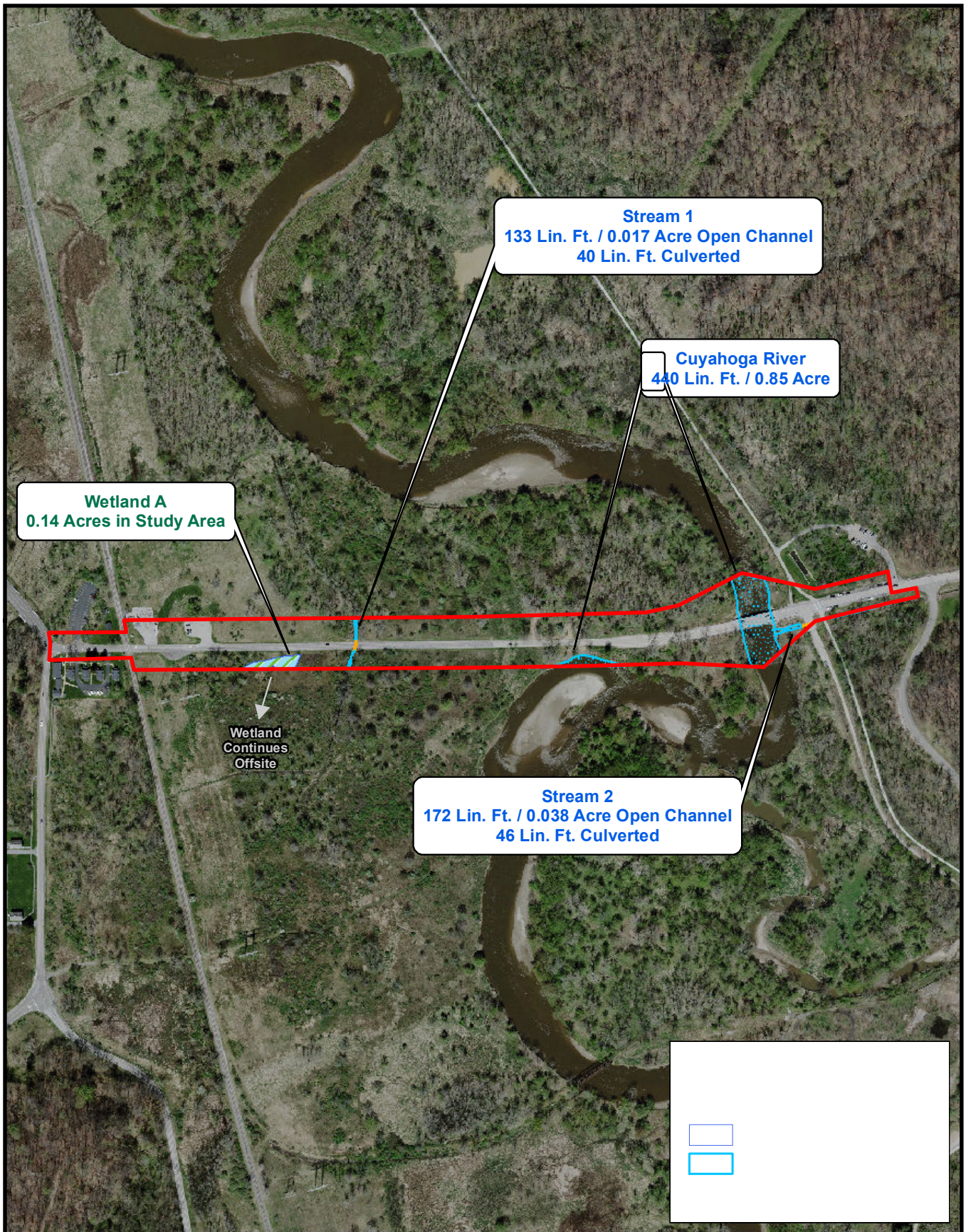
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Projection: WGS_1984_Web_Mercator_Auxiliary_Sphere





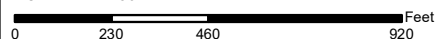
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**1641 - Vaughn Road Flood Mitigation
Delineation Map
Exhibit 7**

SCALE: 1" = 450'



Source: Aerial - OSIP, 2017



APPENDIX A:
ODNR Environmental Review



Ohio Department of Natural Resources

MIKE DeWINE, GOVERNOR

MARY MERTZ, DIRECTOR

Office of Real Estate

John Kessler, Chief

2045 Morse Road – Bldg. E-2

Columbus, OH 43229

Phone: (614) 265-6621

Fax: (614) 267-4764

April 1, 2022

Dana Dosen
EMH&T
5500 New Albany Road
Columbus, OH 43054

Re: 22-0226; Vaughn Road Flood Mitigation Project

Project: The proposed project includes replacing a small culvert, rehabilitating the bridge across the Cuyahoga River, and raising roadway along Vaughn Road that is currently susceptible to flooding.

Location: The proposed project is located in the City of Brecksville, Cuyahoga County, Ohio.

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

Natural Heritage Database: The Natural Heritage Database has the following data at or within one mile of the project area:

Spotted Coral-root (*Corallorhiza maculata*), P
Large-leaved Mountain-rice (*Oryzopsis asperifolia*), T
Virginia Meadow-beauty (*Rhexia virginica*), P
Least Bittern (*Ixobrychus exilis*), T
Smooth Greensnake (*Opheodrys vernalis*), E
Queensnake (*Regina septemvittata*), SC
Golden-winged Warbler (*Vermivora chrysoptera*), SI
Great Lakes Crayfish (*Orconectes propinquus*), SC

The review was performed on the project area specified in the request as well as an additional one-mile radius. Records searched date from 1980. Conservation status abbreviations are as follows: E = state endangered; T = state threatened; P = state potentially threatened; SC = state species of concern; SI = state special interest; U = state status under review; X = presumed extirpated in Ohio; FE = federally endangered, and FT = federally threatened.

Please note that Ohio has not been completely surveyed and we rely on receiving information from many sources. Therefore, a lack of records for an area is not a statement that rare species or unique features are absent from that area.

A search for unique ecological sites, scenic rivers, state nature preserves, wildlife areas, national wildlife refuges, parks, forests, and other protected natural areas indicates that the following sites occur within or adjacent to the project area:

Cuyahoga Valley National Park -- National Park Service

Brecksville Reservation -- Cleveland Metroparks

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

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

The entire state of Ohio is within the range of the Indiana bat (*Myotis sodalis*), a state endangered and federally endangered species, the northern long-eared bat (*Myotis septentrionalis*), a state endangered and federally threatened species, the little brown bat (*Myotis lucifugus*), a state endangered species, and the tricolored bat (*Perimyotis subflavus*), a state endangered species. During the spring and summer (April 1 through September 30), these species of bats predominately roost in trees behind loose, exfoliating bark, in crevices and cavities, or in the leaves. However, these species are also dependent on the forest structure surrounding roost trees. If trees are present within the project area, and trees must be cut, the DOW recommends cutting only occur from October 1 through March 31, conserving trees with loose, shaggy bark and/or crevices, holes, or cavities, as well as trees with DBH ≥ 20 if possible. If trees are present within the project area, and trees must be cut during the summer months, the DOW recommends a mist net survey or acoustic survey be conducted from June 1 through August 15, prior to any cutting. Mist net and acoustic surveys should be conducted in accordance with the most recent version of the “OHIO DIVISION OF WILDLIFE GUIDANCE FOR BAT SURVEYS AND TREE CLEARING”. If state listed bats are documented, DOW recommends cutting only occur from October 1 through March 31. However, limited summer tree cutting may be acceptable after consultation with the DOW (contact Erin Hazelton at Erin.hazelton@dnr.ohio.gov).

The DOW also recommends that a desktop habitat assessment is conducted, followed by a field assessment if needed, to determine if a potential hibernaculum is present within the project area. Direction on how to conduct habitat assessments can be found in the current USFWS “Range-wide Indiana Bat Survey Guidelines.” If a habitat assessment finds that a potential hibernaculum is present within 0.25 miles of the project area, please send this information to Erin Hazelton for project recommendations. If a potential or known hibernaculum is found, the DOW recommends a 0.25-mile tree cutting and subsurface disturbance buffer around the hibernaculum entrance, however, limited summer or winter tree cutting may be acceptable after consultation with the DOW. If no tree cutting or subsurface impacts to a hibernaculum are proposed, this project is not likely to impact these species.

This project must not have an impact on freshwater native mussels at the project site. This applies to both listed and non-listed species. Per the Ohio Mussel Survey Protocol (2020), all Group 2, 3, and 4 streams (Appendix A) require a mussel survey. Per the Ohio Mussel Survey Protocol, Group 1 streams (Appendix A) and unlisted streams with a watershed of 5 square miles or larger above the point of impact should be assessed using the Reconnaissance Survey for Unionid

Mussels (Appendix B) to determine if mussels are present. Mussel surveys may be recommended for these streams as well. This is further explained within the Ohio Mussel Survey Protocol. Therefore, if in-water work is planned in any stream that meets any of the above criteria, the DOW recommends the applicant provide information to indicate no mussel impacts will occur. If this is not possible, the DOW recommends a professional malacologist conduct a mussel survey in the project area. If mussels that cannot be avoided are found in the project area, as a last resort, the DOW recommends a professional malacologist collect and relocate the mussels to suitable and similar habitat upstream of the project site. Mussel surveys and any subsequent mussel relocation should be done in accordance with the Ohio Mussel Survey Protocol. The Ohio Mussel Survey Protocol (2020) can be found at:
<https://ohiodnr.gov/static/documents/wildlife/permits/dow-protocol-ohio-mussel-survey.pdf>

The project is within the range of the lake sturgeon (*Acipenser fulvescens*), a state endangered fish and a federal species of concern, the channel darter (*Percina copelandi*), a state threatened fish, and the bigmouth shiner (*Notropis dorsalis*), a state threatened fish. The DOW recommends no in-water work in perennial streams from March 15 through June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed in a perennial stream, this project is not likely to impact these or other aquatic species.

Records exist adjacent to the project area for the smooth greensnake (*Opheodrys vernalis*), a state endangered species. This species is primarily a prairie inhabitant, but also found in marshy meadows and roadside ditches. The DOW recommends that an approved herpetologist conducts a habitat suitability survey to determine if suitable habitat is present within the project area. If suitable habitat is determined to be present; the DOW recommends that a presence/absence survey be conducted, or an avoidance/minimization plan be developed and implemented by the approved herpetologist.

The project is within the range of the spotted turtle (*Clemmys guttata*), a state threatened species. This species prefers fens, bogs and marshes, but also is known to inhabit wet prairies, meadows, pond edges, wet woods, and the shallow sluggish waters of small streams and ditches. Due to the location, the type of habitat within the project area, and the type of work proposed, this project is not likely to impact this species.

The project is within the range of the Blanding's turtle (*Emydoidea blandingii*), a state threatened species. This species inhabits marshes, ponds, lakes, streams, wet meadows, and swampy forests. Although essentially aquatic, the Blanding's turtle will travel over land as it moves from one wetland to the next. Due to the location, the type of habitat within the project area, and the type of work proposed, this project is not likely to impact this species.

The project is within the range of the American bittern (*Botaurus lentiginosus*), a state endangered bird. Nesting bitterns prefer large undisturbed wetlands that have scattered small pools amongst dense vegetation. They occasionally occupy bogs, large wet meadows, and dense shrubby swamps. If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of May 1 through July 31. If this type of habitat will not be impacted, the project is not likely to impact this species.

The project is within the range of the black-crowned night-heron (*Nycticorax nycticorax*), a state-threatened bird. Night-herons are so named because they are nocturnal, conducting most of their foraging in the evening hours or at night, and roost in trees near wetlands and waterbodies during the day. Night herons are migratory and are typically found in Ohio from April 1 through December 1 but can be found in more urbanized areas with reliable food sources year-round.

Black-crowned night-herons primarily forage in wetlands and other shallow aquatic habitats, and roost in trees nearby. These night-herons nest in small trees, saplings, shrubs, or sometimes on the ground, near bodies of water and wetlands. If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of May 1 through July 31. If this type of habitat will not be impacted, this project is not likely to impact this species.

The project is within the range of the king rail (*Rallus elegans*), a state endangered bird. Nests for this species are deep bowls constructed out of grass and usually hidden very well in marsh vegetation. If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of May 1 through July 31. If no wetland habitat will be impacted, the project is not likely to impact this species.

The project is within the range of the least bittern (*Ixobrychus exilis*), a state threatened bird. This secretive marsh species prefers dense emergent wetlands with thick stands of cattails, sedges, sawgrass or other semiaquatic vegetation interspersed with woody vegetation and open water. If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of May 1 through July 31. If this type of habitat will not be impacted, this project is not likely to impact this species.

The project is within the range of the sandhill crane (*Grus canadensis*), a state threatened species. Sandhill cranes are primarily a wetland-dependent species. On their wintering grounds, they will utilize agricultural fields; however, they roost in shallow, standing water or moist bottomlands. On breeding grounds they require a rather large tract of wet meadow, shallow marsh, or bog for nesting. If grassland, prairie, or wetland habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of April 1 through August 31. If this habitat will not be impacted, this project is not likely to have an impact on this species.

The project is within the range of the trumpeter swan (*Cygnus buccinator*), a state threatened bird. Trumpeter swans prefer large marshes and lakes ranging in size from 40 to 150 acres. They like shallow wetlands one to three feet deep with a diverse mix of plenty of emergent and submergent vegetation and open water. If this type of habitat will be impacted, construction should be avoided in this habitat during the species' nesting period of April 15 through June 15. If this habitat will not be impacted, this project is not likely to have an impact on this species.

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

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

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

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

http://water.ohiodnr.gov/portals/soilwater/pdf/floodplain/Floodplain%20Manager%20Community%20Contact%20List_8_16.pdf

ODNR appreciates the opportunity to provide these comments. Please contact Mike Pettegrew at mike.pettegrew@dnr.ohio.gov if you have questions about these comments or need additional information.

Mike Pettegrew
Environmental Services Administrator

APPENDIX B:

Investigative Methodology

INVESTIGATIVE METHODOLOGY

Wetlands

According to the Federal Register (1980; 1982), wetlands are defined as *Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.* Potential wetlands located on non-agricultural lands are identified using the 1987 Wetland Delineation Manual (Environmental Laboratory, 1987) for confirmation by the U.S. Army Corps of Engineers (USACE).

Under normal site conditions, all three (3) indicators of jurisdictional wetlands including the presence of hydrophytic macrophytes, hydric soils and certain hydrologic indicators must be identified to meet the criteria for a jurisdictional wetland (Environmental Laboratory, 1987). As such, identification of potential wetlands requires characterization of plant community types, identification of hydric soils, and hydrologic indicators for each community type.

For all potential wetland areas, dominant species in the tree, sapling, shrub, woody vine, and herb layers are determined, in accordance with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0* (USACE 2012). Recorded vegetative data consists of herbs with the greatest percentage of aerial cover within 5' of the plot center. Within a 15' radius of the plot center, saplings and shrubs with the greatest height are recorded. Within a 30' radius of the plot center, trees with the largest relative basal area and woody vines with the greatest number of stems are recorded. Species within each of these layers are listed on data forms in order of dominance.

Dominance is determined for each stratum individually. Dominant species include those that comprise 50 percent of the total dominance measure for a stratum, plus any additional species comprising 20 percent or more of the total dominance measure of a stratum. Hydrophytic vegetation is determined to be present when more than 50 percent of the dominants in a sample area are listed as facultative (FAC), facultative wetland (FACW) or obligate wetland (OBL) plants according to Lichvar (2016).

Where possible, soil data are collected by digging a test pit to a maximum depth of 20" to determine the presence of hydric soil. Soil matrix and mottle colors are identified using a Munsell Soil Color Chart (Macbeth, Revised 1994). Evidence of any hydric soil characteristics and evidence of the presence of wetland hydrology are also recorded. Due to restrictions on digging within the parks system, visual observations of the soil surface along with previously collected soil sample data will be utilized to determine the presence or absence of hydric soil.

The boundaries of areas that meet all three (3) wetland criteria are identified and measured in the field. Points at which dominant vegetation species changes from wetland to upland, where soils change from hydric to non-hydric, or where indicators of wetland hydrology are no longer observed are noted. The characteristics of each community type are recorded on dataforms and sample points are chosen to represent both an identified potential wetland and its surrounding upland community. All potential wetlands delineated in the field are marked with flagging and mapped

using a Trimble GeoXH GPS unit. The dominant vegetation, soils, and indicators of wetland hydrology are described on delineation forms. Wetland communities are classified according to the classification scheme of Cowardin et al. (1979).

Wetlands are classified using the Ohio Rapid Assessment Method (ORAM) Version 5 (Ohio EPA, 2001). The ORAM seeks to determine whether wetlands are rated as Category 1, 2, or 3 based on the State of Ohio Wetland Water Quality Standards. Category 1 wetlands exhibit limited quality, function, or value. Category 2 wetlands exhibit moderate quality, function, or value; this includes wetlands that have been degraded but have reasonable potential for restoration (Modified Category 2). Category 3 wetlands are wetlands of superior quality, function, or value.

Streams

The centerline of the streams are mapped for their entire length found on-site using a Trimble® GPS unit. Ordinary High Water Marks (OHWM), which define the outermost regulatory boundaries of streams and open waters, are flagged and mapped using the GPS unit.

Streams are classified as ephemeral, intermittent, or perennial based on site observations, and are assigned a regulatory classification according to the most recent USACE guidance. Streams are also assessed using the Ohio EPA's Qualitative Habitat Evaluation Index (QHEI) and/or Headwater Habitat Evaluation Metric (HHEI). Assessment locations are placed in representative reaches of the streams within the assessment area.

The QHEI is used for streams with drainage areas greater than one square mile and pools with maximum water depths greater than 15.75 in (40 cm) (Ohio EPA, 2006). QHEI scoring is based on substrate types, in-stream cover, channel morphology, riparian quality and bank erosion, pool/glide and riffle/run quality, and gradient. These metrics reflect stream habitat features that are correlated with the potential to attain the aquatic life use designation for Ohio streams.

Streams that do not meet these requirements are assessed using the HHEI (Ohio EPA, 2020). HHEI scoring is based on three (3) parameters that are associated with habitat quality in small primary headwater streams: substrate type, maximum pool depth and bankfull width. Using the HHEI scoring system, streams may be categorized as Class I, Class II or Class III Primary Headwater (PHW) Streams.

Open Water Habitat

The boundaries of open water systems (deep water aquatic habitats, such as ponds and lakes) are delineated either using recent aerial photography or by flagging boundaries in the field and locating them using a GPS unit. Based on the 1987 Wetland Delineation Manual (Environmental Laboratory, 1987), deepwater aquatic habitats are areas that are permanently inundated at mean annual water depths >6.6 ft or permanently inundated areas <6.6 ft in depth that do not support rooted-emergent or woody plant species.

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APPENDIX C:
USACE Wetland and Upland Dataforms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Vaughn Road Flood Mitigation City/County: Brecksville / Cuyahoga Sampling Date: 5/5/2022
 Applicant/Owner: NEORSD State: OH Sampling Point: WA-5
 Investigator(s): Eric Nagy Section, Township, Range: T5N R11W
 Landform (hillside, terrace, etc.): Depressional Local relief (concave, convex, none): Concave Slope %: 0.5
 Subregion (LRR or MLRA): LRR R Lat: 41.288428° Long: -81.570823° Datum: OH State Plane N
 Soil Map Unit Name: Chagrin silt loam, occasionally flooded (Ch) / Udorthents, loamy (Ua) NWI classification: N/A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u> Hydric Soil Present? Yes <u>X</u> No <u> </u> Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u> If yes, optional Wetland Site ID: <u> </u>
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <u> </u> Surface Water (A1) <u> </u> Water-Stained Leaves (B9) <u>X</u> High Water Table (A2) <u> </u> Aquatic Fauna (B13) <u>X</u> Saturation (A3) <u> </u> Marl Deposits (B15) <u> </u> Water Marks (B1) <u> </u> Hydrogen Sulfide Odor (C1) <u> </u> Sediment Deposits (B2) <u> </u> Oxidized Rhizospheres on Living Roots (C3) <u> </u> Drift Deposits (B3) <u> </u> Presence of Reduced Iron (C4) <u> </u> Algal Mat or Crust (B4) <u> </u> Recent Iron Reduction in Tilled Soils (C6) <u> </u> Iron Deposits (B5) <u> </u> Thin Muck Surface (C7) <u> </u> Inundation Visible on Aerial Imagery (B7) <u> </u> Other (Explain in Remarks) <u> </u> Sparsely Vegetated Concave Surface (B8)	<u>Secondary Indicators (minimum of two required)</u> <u> </u> Surface Soil Cracks (B6) <u> </u> Drainage Patterns (B10) <u> </u> Moss Trim Lines (B16) <u> </u> Dry-Season Water Table (C2) <u> </u> Crayfish Burrows (C8) <u> </u> Saturation Visible on Aerial Imagery (C9) <u>X</u> Stunted or Stressed Plants (D1) <u>X</u> Geomorphic Position (D2) <u> </u> Shallow Aquitard (D3) <u> </u> Microtopographic Relief (D4) <u>X</u> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION – Use scientific names of plants.

 Sampling Point: WA-5

Tree Stratum (Plot size: <u>50'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66.7%</u> (A/B)																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
=Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th style="width: 50%;">Total % Cover of:</th> <th style="width: 50%;">Multiply by:</th> </tr> <tr> <td>OBL species <u>10</u></td> <td>x 1 = <u>10</u></td> </tr> <tr> <td>FACW species <u>60</u></td> <td>x 2 = <u>120</u></td> </tr> <tr> <td>FAC species <u>55</u></td> <td>x 3 = <u>165</u></td> </tr> <tr> <td>FACU species <u>15</u></td> <td>x 4 = <u>60</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>140</u> (A)</td> <td><u>355</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = <u>2.54</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>10</u>	x 1 = <u>10</u>	FACW species <u>60</u>	x 2 = <u>120</u>	FAC species <u>55</u>	x 3 = <u>165</u>	FACU species <u>15</u>	x 4 = <u>60</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>140</u> (A)	<u>355</u> (B)	Prevalence Index = B/A = <u>2.54</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>10</u>	x 1 = <u>10</u>																			
FACW species <u>60</u>	x 2 = <u>120</u>																			
FAC species <u>55</u>	x 3 = <u>165</u>																			
FACU species <u>15</u>	x 4 = <u>60</u>																			
UPL species <u>0</u>	x 5 = <u>0</u>																			
Column Totals: <u>140</u> (A)	<u>355</u> (B)																			
Prevalence Index = B/A = <u>2.54</u>																				
=Total Cover																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. <u>Cornus racemosa</u>	<u>40</u>	<u>Yes</u>	<u>FAC</u>																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
=Total Cover																				
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Carex spp.</u>	<u>50</u>	<u>Yes</u>	<u>FACW</u>																	
2. <u>Lonicera tatarica</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>																	
3. <u>Phalaris arundinacea</u>	<u>10</u>	<u>No</u>	<u>FACW</u>																	
4. <u>Juncus effusus</u>	<u>10</u>	<u>No</u>	<u>OBL</u>																	
5. <u>Viburnum dentatum</u>	<u>10</u>	<u>No</u>	<u>FAC</u>																	
6. <u>Apocynum cannabinum</u>	<u>5</u>	<u>No</u>	<u>FAC</u>																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
12. _____	_____	_____	_____																	
=Total Cover																				
Woody Vine Stratum (Plot size: <u>50'</u>)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
=Total Cover																				

Hydrophytic Vegetation Indicators:
1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

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

SOIL

Sampling Point WA-5

[illegible]

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Vaughn Road Flood Mitigation City/County: Brecksville / Cuyahoga Sampling Date: 5/5/2022
 Applicant/Owner: NEORSD State: OH Sampling Point: WA-UP
 Investigator(s): Eric Nagy Section, Township, Range: T5N R11W
 Landform (hillside, terrace, etc.): Depressional Local relief (concave, convex, none): Concave Slope %: 0
 Subregion (LRR or MLRA): LRR R Lat: 41.288427° Long: -81.570537° Datum: OH State Plane N
 Soil Map Unit Name: Chagrin silt loam, occasionally flooded (Ch) NWI classification: N/A

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

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u> Hydric Soil Present? Yes <u> </u> No <u>X</u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u> If yes, optional Wetland Site ID: <u> </u>
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <u> </u> Surface Water (A1) <u> </u> Water-Stained Leaves (B9) <u> </u> High Water Table (A2) <u> </u> Aquatic Fauna (B13) <u> </u> Saturation (A3) <u> </u> Marl Deposits (B15) <u> </u> Water Marks (B1) <u> </u> Hydrogen Sulfide Odor (C1) <u> </u> Sediment Deposits (B2) <u> </u> Oxidized Rhizospheres on Living Roots (C3) <u> </u> Drift Deposits (B3) <u> </u> Presence of Reduced Iron (C4) <u> </u> Algal Mat or Crust (B4) <u> </u> Recent Iron Reduction in Tilled Soils (C6) <u> </u> Iron Deposits (B5) <u> </u> Thin Muck Surface (C7) <u> </u> Inundation Visible on Aerial Imagery (B7) <u> </u> Other (Explain in Remarks) <u> </u> Sparsely Vegetated Concave Surface (B8)	<u>Secondary Indicators (minimum of two required)</u> <u> </u> Surface Soil Cracks (B6) <u> </u> Drainage Patterns (B10) <u> </u> Moss Trim Lines (B16) <u> </u> Dry-Season Water Table (C2) <u> </u> Crayfish Burrows (C8) <u> </u> Saturation Visible on Aerial Imagery (C9) <u> </u> Stunted or Stressed Plants (D1) <u> </u> Geomorphic Position (D2) <u> </u> Shallow Aquitard (D3) <u> </u> Microtopographic Relief (D4) <u> </u> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: None observed	

VEGETATION – Use scientific names of plants.

Sampling Point: WA-UP

Tree Stratum (Plot size: 50')	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
	=Total Cover			
Sapling/Shrub Stratum (Plot size: 15')				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
	=Total Cover			
Herb Stratum (Plot size: 5')				
1. <i>Solidago canadensis</i>	80	Yes	FACU	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
	80	=Total Cover		
Woody Vine Stratum (Plot size: 50')				
1. <i>Vitis labrusca</i>	5	Yes	FACU	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
	5	=Total Cover		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 0	x 1 = 0
FACW species 0	x 2 = 0
FAC species 0	x 3 = 0
FACU species 85	x 4 = 340
UPL species 0	x 5 = 0
Column Totals: 85 (A)	340 (B)
Prevalence Index = B/A = 4.00	

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

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

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

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

SOIL

Sampling Point	WA-UP
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[illegible]

APPENDIX D:
ORAM Dataforms

Version 5.0	Ohio Rapid Assessment Method for Wetlands 10 Page Form for Wetland Categorization	
	Background Information Scoring Boundary Worksheet Narrative Rating Field Form Quantitative Rating ORAM Summary Worksheet Wetland Categorization Worksheet	Ohio EPA, Division of Surface Water Final: February 1, 2001

Instructions

The investigator is *STRONGLY URGED* to read the Manual for Using the Ohio Rapid Assessment Method for Wetlands for further elaboration and discussion of the questions below prior to using the rating forms.

The Narrative Rating is designed to categorize a wetland or to provide alerts to the Rater based on the presence or possible presence of threatened or endangered species. The presence or proximity of such species is often an indicator of the quality and lack of disturbance of the wetland being evaluated. In addition, it is designed to categorize certain wetlands as very low quality (Category 1) or very high quality (Category 3) regardless of the wetland's score on the Quantitative Rating. In addition, the Narrative Rating also alerts the investigator that a particular wetland *may* be a Category 3 wetland, again, regardless of the wetland's score on the Quantitative Rating.

It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the ORAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to Scoring Boundary worksheet and the User's Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories. The most recent version of this document is posted on Ohio EPA's Division of Surface Water web page at: <http://www.epa.ohio.gov/dsw/wetlands/WetlandEcologySection.aspx>

Background Information

Name: Eric Nagy	
Date: 5/5/2022	
Affiliation: EMH&T	
Address: 5500 New Albany Road Columbus, OH 43054	
Phone Number: (614) 775-4518	
e-mail address: enagy@emht.com	
Name of Wetland: Wetland A	
Vegetation Communit(ies): Emergent/Shrub	
HGM Class(es): Depressional	
Location of Wetland: include map, address, north arrow, landmarks, distances, roads, etc. See attached Delineation Map	
Lat/Long or UTM Coordinate	41.288428/-81.570823
USGS Quad Name	Northfield, OH
County	Cuyahoga
Township	Urban (City of Brecksville)
Section and Subsection	T5N R11W
Hydrologic Unit Code	041100020505
Site Visit	5/5/2022
National Wetland Inventory Map	USFWS, 2019
Ohio Wetland Inventory Map	--
Soil Survey	NRCS, 2017 (Ch)
Delineation report/map	EMH&T, 2022

Name of Wetland: Wetland A	
Wetland Size (acres, hectares):	0.14 acre
Sketch: Include north arrow, relationship with other surface waters, vegetation zones, etc. See attached Delineation Map	
Comments, Narrative Discussion, Justification of Category Changes: 0.14 acre of Wetland A is contained in the project study area and it continues offsite to the southwest	
Final score : 35	Category: Modified Category 2

Scoring Boundary Worksheet

INSTRUCTIONS. The initial step in completing the ORAM is to identify the “scoring boundaries” of the wetland being rated. In many instances this determination will be relatively easy and the scoring boundaries will coincide with the “jurisdictional boundaries.” For example, the scoring boundary of an isolated cattail marsh located in the middle of a farm field will likely be the same as that wetland’s jurisdictional boundaries. In other instances, however, the scoring boundary will not be as easily determined. Wetlands that are small or isolated from other surface waters often form large contiguous areas or heterogeneous complexes of wetland and upland. In separating wetlands for scoring purposes, the hydrologic regime of the wetland is the main criterion that should be used. Boundaries between contiguous or connected wetlands should be established where the volume, flow, or velocity of water moving through the wetland changes significantly. *Areas with a high degree of hydrologic interaction should be scored as a single wetland.* In determining a wetland’s scoring boundaries, use the guidelines in the ORAM Manual Section 5.0. In certain instances, it may be difficult to establish the scoring boundary for the wetland being rated. These problem situations include wetlands that form a patchwork on the landscape, wetlands divided by artificial boundaries like property fences, roads, or railroad embankments, wetlands that are contiguous with streams, lakes, or rivers, and estuarine or coastal wetlands. These situations are discussed below, however, it is recommended that Rater contact Ohio EPA, Division of Surface Water, 401/Wetlands Section if there are additional questions or a need for further clarification of the appropriate scoring boundaries of a particular wetland.

#	Steps in properly establishing scoring boundaries	done?	not applicable
Step 1	Identify the wetland area of interest. This may be the site of a proposed impact, a reference site, conservation site, etc.	X	
Step 2	Identify the locations where there is physical evidence that hydrology changes rapidly. Such evidence includes both natural and human-induced changes including, constrictions caused by berms or dikes, points where the water velocity changes rapidly at rapids or falls, points where significant inflows occur at the confluence of rivers, or other factors that may restrict hydrologic interaction between the wetlands or parts of a single wetland.	X	
Step 3	Delineate the boundary of the wetland to be rated such that all areas of interest that are contiguous to and within the areas where the hydrology does not change significantly, i.e. areas that have a high degree of hydrologic interaction are included within the scoring boundary.	X	
Step 4	Determine if artificial boundaries, such as property lines, state lines, roads, railroad embankments, etc., are present. These should not be used to establish scoring boundaries unless they coincide with areas where the hydrologic regime changes.	X	
Step 5	In all instances, the Rater may enlarge the minimum scoring boundaries discussed here to score together wetlands that could be scored separately.		X
Step 6	Consult ORAM Manual Section 5.0 for how to establish scoring boundaries for wetlands that form a patchwork on the landscape, divided by artificial boundaries, contiguous to streams, lakes or rivers, or for dual classifications.		X

End of Scoring Boundary Determination. Begin Narrative Rating on next page.

Narrative Rating

INSTRUCTIONS. Answer each of the following questions. Questions 1, 2, 3 and 4 should be answered based on information obtained from the site visit or the literature *and* by submitting a Data Services Request to the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Natural Heritage Data Services, 1889 Fountain Square Court, Building F-1, Columbus, Ohio 43224, 614-265-6453 (phone), 614-265-3096 (fax), <http://www.dnr.state.oh.us/dnap>. The remaining questions are designed to be answered primarily by the results of the site visit. Refer to the User's Manual for descriptions of these wetland types. Note: "Critical habitat" is legally defined in the Endangered Species Act and is the geographic area containing physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection. The Rater should contact the Region 3 Headquarters or the Columbus Ecological Services Office for updates as to whether critical habitat has been designated for other federally listed threatened or endangered species. "Documented" means the wetland is listed in the appropriate State of Ohio database.

#	Question	Circle one	
1	Critical Habitat. Is the wetland in a township, section, or subsection of a United States Geological Survey 7.5 minute Quadrangle that has been designated by the U.S. Fish and Wildlife Service as "critical habitat" for any threatened or endangered plant or animal species? Note: as of January 1, 2001, of the federally listed endangered or threatened species which can be found in Ohio, the Indiana Bat has had critical habitat designated (50 CFR 17.95(a)) and the piping plover has had critical habitat proposed (65 FR 41812 July 6, 2000).	YES Wetland should be evaluated for possible Category 3 status Go to Question 2	☒ NO Go to Question 2
2	Threatened or Endangered Species. Is the wetland known to contain an individual of, or documented occurrences of federal or state-listed threatened or endangered plant or animal species?	YES Wetland is a Category 3 wetland. Go to Question 3	☒ NO Go to Question 3
3	Documented High Quality Wetland. Is the wetland on record in Natural Heritage Database as a high quality wetland?	YES Wetland is a Category 3 wetland Go to Question 4	☒ NO Go to Question 4
4	Significant Breeding or Concentration Area. Does the wetland contain documented regionally significant breeding or nonbreeding waterfowl, neotropical songbird, or shorebird concentration areas?	YES Wetland is a Category 3 wetland Go to Question 5	☒ NO Go to Question 5
5	Category 1 Wetlands. Is the wetland less than 0.5 hectares (1 acre) in size and hydrologically isolated and either 1) comprised of vegetation that is dominated (greater than eighty per cent areal cover) by <i>Phalaris arundinacea</i> , <i>Lythrum salicaria</i> , or <i>Phragmites australis</i> , or 2) an acidic pond created or excavated on mined lands that has little or no vegetation?	YES Wetland is a Category 1 wetland Go to Question 6	☒ NO Go to Question 6
6	Bogs. Is the wetland a peat-accumulating wetland that 1) has no significant inflows or outflows, 2) supports acidophilic mosses, particularly <i>Sphagnum</i> spp., 3) the acidophilic mosses have >30% cover, 4) at least one species from Table 1 is present, and 5) the cover of invasive species (see Table 1) is <25%?	YES Wetland is a Category 3 wetland Go to Question 7	☒ NO Go to Question 7
7	Fens. Is the wetland a carbon accumulating (peat, muck) wetland that is saturated during most of the year, primarily by a discharge of free flowing, mineral rich, ground water with a circumneutral ph (5.5-9.0) and with one or more plant species listed in Table 1 and the cover of invasive species listed in Table 1 is <25%?	YES Wetland is a Category 3 wetland Go to Question 8a	☒ NO Go to Question 8a
8a	"Old Growth Forest." Is the wetland a forested wetland and is the forest characterized by, but not limited to, the following characteristics: overstory canopy trees of great age (exceeding at least 50% of a projected maximum attainable age for a species); little or no evidence of human-caused understory disturbance during the past 80 to 100 years; an all-aged structure and multilayered canopies; aggregations of canopy trees interspersed with canopy gaps; and significant numbers of standing dead snags and downed logs?	YES Wetland is a Category 3 wetland. Go to Question 8b	☒ NO Go to Question 8b

8b	Mature forested wetlands. Is the wetland a forested wetland with 50% or more of the cover of upper forest canopy consisting of deciduous trees with large diameters at breast height (dbh), generally diameters greater than 45cm (17.7in) dbh?	YES Wetland should be evaluated for possible Category 3 status. Go to Question 9a	NO Go to Question 9a
9a	Lake Erie coastal and tributary wetlands. Is the wetland located at an elevation less than 575 feet on the USGS map, adjacent to this elevation, or along a tributary to Lake Erie that is accessible to fish?	YES Go to Question 9b	NO Go to Question 10
9b	Does the wetland's hydrology result from measures designed to prevent erosion and the loss of aquatic plants, i.e. the wetland is partially hydrologically restricted from Lake Erie due to lakeward or landward dikes or other hydrological controls?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	NO Go to Question 9c
9c	Are Lake Erie water levels the wetland's primary hydrological influence, i.e. the wetland is hydrologically unrestricted (no lakeward or upland border alterations), or the wetland can be characterized as an "estuarine" wetland with lake and river influenced hydrology. These include sandbar deposition wetlands, estuarine wetlands, river mouth wetlands, or those dominated by submersed aquatic vegetation.	YES Go to Question 9d	NO Go to Question 10
9d	Does the wetland have a predominance of native species within its vegetation communities, although non-native or disturbance tolerant native species can also be present?	YES Wetland is a Category 3 wetland Go to Question 10	NO Go to Question 9e
9e	Does the wetland have a predominance of non-native or disturbance tolerant native plant species within its vegetation communities?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	NO Go to Question 10
10	Lake Plain Sand Prairies (Oak Openings) Is the wetland located in Lucas, Fulton, Henry, or Wood Counties and can the wetland be characterized by the following description: the wetland has a sandy substrate with interspersed organic matter, a water table often within several inches of the surface, and often with a dominance of the gramineous vegetation listed in Table 1 (woody species may also be present). The Ohio Department of Natural Resources Division of Natural Areas and Preserves can provide assistance in confirming this type of wetland and its quality.	YES Wetland is a Category 3 wetland. Go to Question 11	NO Go to Question 11
11	Relict Wet Prairies. Is the wetland a relict wet prairie community dominated by some or all of the species in Table 1. Extensive prairies were formerly located in the Darby Plains (Madison and Union Counties), Sandusky Plains (Wyandot, Crawford, and Marion Counties), northwest Ohio (e.g. Erie, Huron, Lucas, Wood Counties), and portions of western Ohio Counties (e.g. Darke, Mercer, Miami, Montgomery, Van Wert etc.).	YES Wetland should be evaluated for possible Category 3 status Complete Quantitative Rating	NO Complete Quantitative Rating

Table 1. Characteristic plant species.

invasive/exotic spp	fen species	bog species	Oak Opening species	wet prairie species
<i>Lythrum salicaria</i>	<i>Zygadenus elegans</i> var. <i>glaucus</i>	<i>Calla palustris</i>	<i>Carex cryptolepis</i>	<i>Calamagrostis canadensis</i>
<i>Myriophyllum spicatum</i>	<i>Cacalia plantaginea</i>	<i>Carex atlantica</i> var. <i>capillacea</i>	<i>Carex lasiocarpa</i>	<i>Calamagrostis stricta</i>
<i>Najas minor</i>	<i>Carex flava</i>	<i>Carex echinata</i>	<i>Carex stricta</i>	<i>Carex atherodes</i>
<i>Phalaris arundinacea</i>	<i>Carex sterilis</i>	<i>Carex oligosperma</i>	<i>Cladium mariscoides</i>	<i>Carex buxbaumii</i>
<i>Phragmites australis</i>	<i>Carex stricta</i>	<i>Carex trisperma</i>	<i>Calamagrostis stricta</i>	<i>Carex pellita</i>
<i>Potamogeton crispus</i>	<i>Deschampsia caespitosa</i>	<i>Chamaedaphne calyculata</i>	<i>Calamagrostis canadensis</i>	<i>Carex sartwellii</i>
<i>Ranunculus ficaria</i>	<i>Eleocharis rostellata</i>	<i>Decodon verticillatus</i>	<i>Quercus palustris</i>	<i>Gentiana andrewsii</i>
<i>Rhamnus frangula</i>	<i>Eriophorum viridicarinarum</i>	<i>Eriophorum virginicum</i>		<i>Helianthus grosseserratus</i>
<i>Typha angustifolia</i>	<i>Gentianopsis</i> spp.	<i>Larix laricina</i>		<i>Liatris spicata</i>
<i>Typha xglauca</i>	<i>Lobelia kalmii</i>	<i>Nemopanthus mucronatus</i>		<i>Lysimachia quadriflora</i>
	<i>Parnassia glauca</i>	<i>Scheuchzeria palustris</i>		<i>Lythrum alatum</i>
	<i>Potentilla fruticosa</i>	<i>Sphagnum</i> spp.		<i>Pycnanthemum virginianum</i>
	<i>Rhamnus alnifolia</i>	<i>Vaccinium macrocarpon</i>		<i>Silphium terebinthinaceum</i>
	<i>Rhynchospora capillacea</i>	<i>Vaccinium corymbosum</i>		<i>Sorghastrum nutans</i>
	<i>Salix candida</i>	<i>Vaccinium oxycoccos</i>		<i>Spartina pectinata</i>
	<i>Salix myricoides</i>	<i>Woodwardia virginica</i>		<i>Solidago riddellii</i>
	<i>Salix serissima</i>	<i>Xyris difformis</i>		
	<i>Solidago ohioensis</i>			
	<i>Tofieldia glutinosa</i>			
	<i>Triglochin maritimum</i>			
	<i>Triglochin palustre</i>			

End of Narrative Rating. Begin Quantitative Rating on next page.

Site: Vaughn Road Flood Mitigation**Rater(s):** Eric Nagy**Date:** 5/5/2022

1

1

Metric 1. Wetland Area (size).

max 6 pts.

subtotal

Select one size class and assign score.

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

12

13

Metric 2. Upland buffers and surrounding land use.

max 14 pts.

subtotal

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

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

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

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

6

19

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)

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

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

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

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

3b. Connectivity. Score all that apply.

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

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

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

Check all disturbances observed

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

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

12

31

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
☐ toxic pollutants

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

31

subtotal this page

Site: Vaughn Road Flood Mitigation	Rater(s): Eric Nagy	Date: 5/5/2022
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31

subtotal first page

0

31

max 10 pts.

subtotal

Metric 5. Special Wetlands.

Check all that apply and score as indicated.

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

4

35

max 20 pts.

subtotal

Metric 6. Plant communities, interspersions, microtopography.

6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

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

6b. horizontal (plan view) Interspersions.

Select only one.

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

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

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

6d. Microtopography.

Score all present using 0 to 3 scale.

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

Vegetation Community Cover Scale

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

Narrative Description of Vegetation Quality

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

Mudflat and Open Water Class Quality

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

Microtopography Cover Scale

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

35

Modified Category 2

End of Quantitative Rating. Complete Categorization Worksheets.

Wetland Categorization Worksheet

Choices	Circle one	NO	Evaluation of Categorization Result of ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 2, 3, 4, 6, 7, 8a, 9d, 10	YES Wetland is categorized as a Category 3 wetland	☒	Is quantitative rating score <i>less</i> than the Category 2 scoring threshold (<i>excluding</i> gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been over-categorized by the ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 1, 8b, 9b, 9e, 11	YES Wetland should be evaluated for possible Category 3 status	☒	Evaluate the wetland using the 1) narrative criteria in OAC Rule 3745-1-54(C) and 2) the quantitative rating score. If the wetland is determined to be a Category 3 wetland using either of these, it should be categorized as a Category 3 wetland. Detailed biological and/or functional assessments may also be used to determine the wetland's category.
Did you answer "Yes" to Narrative Rating No. 5	YES Wetland is categorized as a Category 1 wetland	☒	Is quantitative rating score <i>greater</i> than the Category 2 scoring threshold (<i>including</i> any gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been under-categorized by the ORAM
Does the quantitative score fall within the scoring range of a Category 1, 2, or 3 wetland?	☒ YES Wetland is assigned to the appropriate category based on the scoring range	☐ NO	If the score of the wetland is located within the scoring range for a particular category, the wetland should be assigned to that category. In all instances however, the narrative criteria described in OAC Rule 3745-1-54(C) can be used to clarify or change a categorization based on a quantitative score.
Does the quantitative score fall with the "gray zone" for Category 1 or 2 or Category 2 or 3 wetlands?	YES Wetland is assigned to the higher of the two categories or assigned to a category based on detailed assessments and the narrative criteria	☒ NO	Rater has the option of assigning the wetland to the higher of the two categories or to assign a category based on the results of a nonrapid wetland assessment method, e.g. functional assessment, biological assessment, etc, and a consideration of the narrative criteria in OAC rule 3745-1-54(C).
Does the wetland otherwise exhibit <i>moderate</i> OR <i>superior</i> hydrologic OR habitat, OR recreational functions AND the wetland was <i>not</i> categorized as a Category 2 wetland (in the case of moderate functions) or a Category 3 wetland (in the case of superior functions) by this method?	YES Wetland was undercategorized by this method. A written justification for recategorization should be provided on Background Information Form	☒ NO Wetland is assigned to category as determined by the ORAM.	A wetland may be undercategorized using this method, but still exhibit one or more superior functions, e.g. a wetland's biotic communities may be degraded by human activities, but the wetland may still exhibit superior hydrologic functions because of its type, landscape position, size, local or regional significance, etc. In this circumstance, the narrative criteria in OAC Rule 3745-1-54(C)(2) and (3) are controlling, and the under-categorization should be corrected. A written justification with supporting reasons or information for this determination should be provided.

Final Category			
Choose one	Category 1	☒ Category 2	Category 3

End of Ohio Rapid Assessment Method for Wetlands.

APPENDIX E:
HHEI Dataforms



Primary Headwater Habitat Field Evaluation Form

HHEI Score (sum of metrics 1+2+3)

61

SITE NAME/LOCATION Vaughn Rd. - Stream 1
SITE NUMBER _____ RIVER BASIN _____ RIVER CODE _____ DRAINAGE AREA (mi²) 0.1
LENGTH OF STREAM REACH (ft) 200 LAT 41.288753° LONG -81.569918° RIVER MILE --
DATE 5/5/2022 SCORER E. Nagy 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

1. SUBSTRATE (Estimate percent of every type 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				HHEI Metric Points Substrate Max = 40 16 A + B																												
<table border="1"> <thead> <tr> <th>TYPE</th> <th>PERCENT</th> </tr> </thead> <tbody> <tr><td>☐ BLDR SLABS [16 pts]</td><td></td></tr> <tr><td>☐ BOULDER (>256 mm) [16 pts]</td><td></td></tr> <tr><td>☐ BEDROCK [16 pts]</td><td></td></tr> <tr><td>☐ COBBLE (65-256 mm) [12 pts]</td><td></td></tr> <tr><td>☒ GRAVEL (2-64 mm) [9 pts]</td><td>10</td></tr> <tr><td>☐ SAND (<2 mm) [6 pts]</td><td>5</td></tr> </tbody> </table>	TYPE	PERCENT	☐ BLDR SLABS [16 pts]			☐ BOULDER (>256 mm) [16 pts]		☐ BEDROCK [16 pts]		☐ COBBLE (65-256 mm) [12 pts]		☒ GRAVEL (2-64 mm) [9 pts]	10	☐ SAND (<2 mm) [6 pts]	5	<table border="1"> <thead> <tr> <th>TYPE</th> <th>PERCENT</th> </tr> </thead> <tbody> <tr><td>☒ SILT [3 pt]</td><td>80</td></tr> <tr><td>☐ LEAF PACK/WOODY DEBRIS [3 pts]</td><td>5</td></tr> <tr><td>☐ FINE DETRITUS [3 pts]</td><td></td></tr> <tr><td>☐ CLAY or HARDPAN [0 pt]</td><td></td></tr> <tr><td>☐ MUCK [0 pts]</td><td></td></tr> <tr><td>☐ ARTIFICIAL [3 pts]</td><td></td></tr> </tbody> </table>	TYPE	PERCENT	☒ SILT [3 pt]	80	☐ LEAF PACK/WOODY DEBRIS [3 pts]	5	☐ FINE DETRITUS [3 pts]		☐ CLAY or HARDPAN [0 pt]		☐ MUCK [0 pts]		☐ ARTIFICIAL [3 pts]			
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Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock <u>0</u> (A)		(B)																														
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12		TOTAL NUMBER OF SUBSTRATE TYPES: 4																														
2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 feet) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):				Pool Depth Max = 30 25																												
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COMMENTS _____ AVERAGE BANKFULL WIDTH (meters) 2.6																																

This information must also be completed

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

RIPARIAN WIDTH (Per Bank)		FLOODPLAIN QUALITY (Most Predominant per Bank)	
L	R	L	R
☒	☒	☐	☐
☐	☐	☒	☒
☐	☐	☐	☐
☐	☐	☐	☐

COMMENTS _____

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

☒ Stream Flowing	☐ Moist Channel, isolated pools, no flow (intermittent)
☐ Subsurface flow with isolated pools (interstitial)	☐ 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 #/100 #)
 ☐ Flat to Moderate
 ☐ Moderate (2 #/100 #)
 ☐ Moderate to Severe
 ☐ Severe (10 #/100 #)

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: Cuyahoga River Distance from Evaluated Stream 625 ft
☐ 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: Northfield, OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order: _____
County: Cuyahoga County Township/City: City of Brecksville

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 5/4/2022 Quantity: 0.34"

Photo-documentation Notes: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 0

Were samples collected for water chemistry? (Y/N): N Lab Sample # or ID (attach results): _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream (Y/N) N If not, explain: _____

Additional comments/description of pollution impacts: _____

BIOLOGICAL OBSERVATIONS

(Record all observations below)

Fish Observed? (Y/N) N Species observed (if known): _____

Frogs or Tadpoles Observed? (Y/N) N Species observed (if known): _____

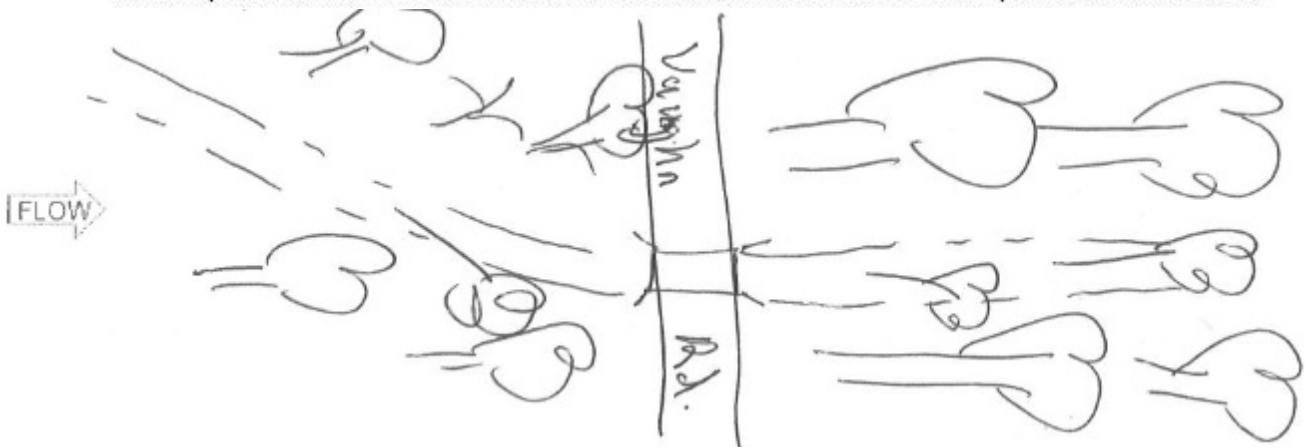
Salamanders Observed? (Y/N) N Species observed (if known): _____

Aquatic Macroinvertebrates Observed? (Y/N) N Species observed (if known): _____

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 Field Evaluation Form

HHEI Score (sum of metrics 1+2+3)

67

SITE NAME/LOCATION Vaughn Rd. - Stream 2

SITE NUMBER _____ RIVER BASIN _____ RIVER CODE _____ DRAINAGE AREA (mi²) 0.54

LENGTH OF STREAM REACH (ft) 200 LAT 41.288707° LONG -81.564549° RIVER MILE --

DATE 5/5/2022 SCORER E. Nagy COMMENTS channelization

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 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				HHEI Metric Points Substrate Max = 40 22 A + B																												
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COMMENTS _____ AVERAGE BANKFULL WIDTH (meters) 2.8																																

This information must also be completed

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

RIPARIAN WIDTH (Per Bank)		FLOODPLAIN QUALITY (Most Predominant per Bank)	
L	R	L	R
☒	☐ Wide >10m	☐	☐ Mature Forest, Wetland
☐	☐ Moderate 5-10m	☒	☐ Immature Forest, Shrub or Old Field
☐	☒ Narrow <5m	☐	☐ Residential, Park, New Field
☐	☐ None	☐	☐ Fenced Pasture
☐	☐	☐	☐ 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	☐ Moist Channel, isolated pools, no flow (intermittent)
☐ Subsurface flow with isolated pools (interstitial)	☐ 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 #/100 #)	☐ Flat to Moderate	☐ Moderate (2 #/100 #)	☐ Moderate to Severe	☒ Severe (10 #/100 #)
---	---	---	---	---

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: Cuyahoga River Distance from Evaluated Stream 0 ft
☐ 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: Northfield, OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order: _____
County: Summit County Township/City: Sagamore Hills Township

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 5/4/2022 Quantity: 0.34"

Photo-documentation Notes: _____

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

Were samples collected for water chemistry? (Y/N): N Lab Sample # or ID (attach results): _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream (Y/N) N If not, explain: _____

Additional comments/description of pollution impacts: _____

BIOLOGICAL OBSERVATIONS

(Record all observations below)

Fish Observed? (Y/N) Y Species observed (if known): _____

Frogs or Tadpoles Observed? (Y/N) Y Species observed (if known): _____

Salamanders Observed? (Y/N) N Species observed (if known): _____

Aquatic Macroinvertebrates Observed? (Y/N) N Species observed (if known): _____

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

