

SURFACE WATER DELINEATION REPORT

EVERPOWER WIND HOLDINGS, INC

**FOR THE:
BUCKEYE WIND POWER FACILITY
CHAMPAIGN COUNTY, OHIO**

**PROPOSED RELOCATION OF COLLECTION LINES,
STAGING AREAS AND SUBSTATION**

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1.0 SUMMARY

A delineation of wetlands and other surface waters was completed for the proposed relocation of electrical collection lines, three staging areas and a substation for the proposed Buckeye Wind Power electric generation Facility in west central Ohio. The Facility will be located in Champaign County within the townships of Salem, Wayne, Rush, Urbana, Union, and Goshen.

The delineation identified a total of 21 wetlands, all or a portion of which were within 100 feet of the Facility; fifteen Ohio Category 1 wetlands, one Ohio Category 1/2 gray zone wetland assumed to be Modified Category 2, four Ohio Modified Category 2 wetlands and one Ohio Category 2 wetland (see Table 1 for a summary of delineated wetlands). The wetlands were evaluated and placed in the appropriate Ohio Antidegradation Category using the Ohio Rapid Assessment Method for Wetlands Final Version 5.0 (ORAM).

The delineation identified a total of 35 streams, all or a portion of which were within 100 feet of the Facility; several streams were delineated at more than one location, resulting in a total of 43 stream segments within 100 feet of the Facility; eleven Modified Class I Primary Headwater Habitat (PHWH) streams, sixteen Modified Class II PHWH streams, two Class II PHWH streams, one Modified Warm Water Habitat stream, two Warm Water Habitat (WWH) streams, two Exceptional Warm Water Habitat (EWH) streams, eight Cold Water Habitat (CWH) streams and one stream that is both EWH and CWH were identified within the Facility (see Table 2 for a summary of evaluated streams). The streams were evaluated using Ohio evaluation techniques appropriate to stream type and assigned to an existing use, or assigned an aquatic life use designation based on their listing in Ohio water quality standards (OAC 3745-1).

Based on US Army Corps of Engineers (USACE) guidance in effect at the time of this report, Hull has determined that of the 19 wetlands delineated, twelve are non-isolated and under the Clean Water Act jurisdiction of federal and state government. Seven wetlands were found to be isolated and under the sole jurisdiction of the Ohio Isolated Wetland Permitting Program. Isolation status was determined based on the December 2008 post-Rapanos guidance issued by the USACE and US Environmental Protection Agency. Hull has determined that with the exception of Stream GG, all of the streams evaluated within the Facility are under federal jurisdiction and therefore subject to Clean Water Act regulations through the USACE and the

Ohio Environmental Protection Agency (Ohio EPA). Stream GG is an isolated stream and is not under federal jurisdiction.

Photographs taken during the delineation are located in Appendix A; wetland delineation data sheets are located in Appendix B; and Appendix C contains the ORAM data sheets. The Headwater Habitat Evaluation Index (HHEI) data sheets, the Headwater Macroinvertebrate Field Evaluation Index (HMFEL) data sheets, the Visual Encounter Survey sheets and the Ohio Qualitative Habitat Evaluation Index (QHEI) data sheets are located in Appendix D.

2.0 INTRODUCTION

2.1 Project Background

EverPower Wind Holdings, Inc. (EverPower) is planning development of a wind-powered electric generation Facility (Facility) in west central Ohio. The Facility will be located in Champaign County within the townships of Salem, Wayne, Rush, Urbana, Union, and Goshen. An application for a Certificate of Environmental Compatibility and Public Need (Certificate) for the Facility was awarded by the Ohio Power Siting Board in March 2010. The Facility will consist of 52 wind turbine generators, each with a nameplate capacity of 1.8 to 2.5 megawatts (MW), access roads, collection lines, associated substations and all other associated equipment (Facility features).

This surface water delineation was initiated in support of an amendment to the Certificate to relocate electrical interconnects from aerial to buried lines, and to relocate three staging areas and a substation. Throughout this delineation report, references to the Facility refer only to the portions of the Facility being relocated under the proposed amendment.

Note that this surface water delineation did not cover the entire geographical extent of the Facility, but instead concentrated on surface waters located within 100 feet of the relocated portions of the Facility that could potentially be impacted by construction.

2.2 Delineation Overview

Hull & Associates, Inc. (Hull) conducted the surface water delineation in May, June, and November 2008, in August 2009, June, October, and December 2011 and in March 2013. At the time of surface water evaluation activities conducted in 2008, the Interim Midwest Regional Supplement to the 1987 Wetland Delineation Manual had not yet been implemented. Wetland delineation work conducted in August 2009 and June 2011 for this report used the Midwest Supplement, which was implemented in Interim form on November 25, 2008 and in final form in November 2009. Use of the Midwest Supplement resulted in small changes in field procedures and delineation criteria, as well as the use of new delineation data forms.

The purpose of the delineation was to determine the extent and quality of wetlands and other surface waters located within or near the Facility that may be subject to regulation under Sections 404 and 401 of the Clean Water Act (1987, as amended) or the Ohio Isolated Wetland

Permit Program. This report contains a description of investigations conducted to delineate wetlands and streams, and to assess the value of surface waters found within the Facility. The report includes: a summary of findings; a description of wetland and stream delineation criteria; a summary of resource materials used to plan and conduct field activities; and descriptions of the wetlands and streams delineated within the Facility.

A surface water delineation report is a necessary component of determining whether an entity must submit permit applications to the USACE and/or the Ohio Environmental Protection Agency (Ohio EPA) for planned project activities. The USACE issues Clean Water Act (CWA) Section 404 permits, which are required for anyone who plans to discharge dredged or fill material into waters of the U.S., including non-isolated wetlands. The Ohio EPA issues CWA Section 401 water quality certifications, which must be obtained before a Section 404 permit can be granted. In the case of isolated wetlands, Ohio EPA has sole jurisdiction under its Isolated Wetlands Permit Program. In addition, Ohio EPA must verify all wetland and stream evaluations.

3.0 DELINEATION CRITERIA

Federal regulations define a jurisdictional wetland as an area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. According to current wetland criteria, a wetland has: (1) hydric (i.e., wetland) soils, (2) evidence of inundated or saturated conditions (wetland hydrology), and (3) a predominance of wetland vegetation. When all three of these criteria are met, a wetland is present and is subject to Federal and/or State regulations and permitting.

In wetland delineation, data are collected concerning the vegetation, soils, and hydrology present in various plant communities to determine if the criteria for a jurisdictional wetland are met, and the wetland/non-wetland boundaries are flagged. The wetland/non-wetland boundaries and the sample locations are then surveyed and placed on a Site map. From the wetland map, the acreage of each wetland can be calculated. A preliminary determination is also made as to whether each wetland is isolated and thus under the jurisdiction of the State of Ohio Isolated Wetland Permit Program, or non-isolated, and thus under federal Clean Water Act jurisdiction.

In stream delineation, the location and length of streams is determined from existing mapping information and/or via surveying streams in the field. Note that some streams too small to be included on U.S. Geological Survey (USGS) topographic maps may nevertheless be under CWA jurisdiction. Jurisdictional streams generally have a defined channel, an Ordinary High Water Mark and discernible bed and bank features, and may have other morphological features typical of streams including riffles and pools, meanders, and a floodplain.

Currently the USACE has sole authority to verify delineations of surface waters and to determine whether wetlands or other water bodies are isolated or non-isolated. Verification occurs after review of a delineation report, which typically includes a field visit by USACE staff. Delineations are typically valid for a period of five years from the date of the USACE delineation verification letter.

4.0 INVESTIGATION METHODS

4.1 General

Prior to visiting the Facility, Hull compiled the following existing information about the Facility. This information was compiled on a series of Figures (see Figures 1 through 19). Please note that figures may not be consecutively numbered.

- **Natural Resources Conservation Service (NRCS) Soil Survey of Champaign County, Ohio** – The soil survey identifies soil mapping units within the Facility, including hydric soil mapping units, non-hydric soil mapping units that may contain inclusions of hydric soil units, and non-hydric soil mapping units (see Soils Figures 1-19). Descriptions for each unit are available from the above mentioned reference.
- **County Listings of Hydric Soils and Non-hydric Soils with Hydric Inclusions** – Hydric or non-hydric status for each soil unit was determined using the Natural Resources Conservation Service Web Soil Survey 2.0.
- **United States Department of Interior National Wetlands Inventory (NWI) Maps** – These data provide an indication of the presence of wetland and open-water areas across the Facility, as defined by the U.S. Fish and Wildlife Service (USFWS) classification system (Cowardin et al., 1979). The notation of a wetland on a NWI Map indicates that wetlands may occur or have occurred in the area. Often, those wetlands depicted on NWI maps are the wettest spots in a given area. NWI map information is used to supplement knowledge about a site and cannot take the place of field observations due to minimal ground truthing, map age, map scale, and wetland criteria that differ from USACE wetlands criteria. See Figures 2-18 for NWI mapped areas within the Facility.

Hull used this preliminary information to perform screening of the Facility to plan and focus on-site investigations. All areas of the Facility were examined using confirmatory soil sampling and wetland and stream data collection.

4.2 Wetland Delineation Methods

As previously indicated, field delineation activities performed during 2008 were conducted according to methods outlined in the 1987 US Army Corps of Engineer's wetlands delineation manual (Manual; Environmental Laboratory, 1987), while field activities performed during 2009 and 2011 were conducted according to the 1987 Manual plus the methods outlined in the 2008 Midwest Supplement. Hull located the wetland edges in the field using these procedures, subsequent USACE memoranda and regulatory guidance, and basic principles of plant community ecology. Plant communities within the Facility were characterized using the three-

criterion wetland delineation approach. The wetland indicator status of plant species was determined using Reed (1988). After characterizing the vegetation, hydrology, and soils of a plant stand type, and becoming familiar with the soil, vegetation, and/or hydrologic cues that indicate wetland edge, Hull flagged the wetland edges with collection of additional soil or hydrologic data where needed to refine the edge. Wetland delineation data sheets appear in Appendix B.

4.3 Hydrologic Indicators Observed within the Facility

Primary hydrologic indicators observed within wetlands during field activities included soil saturation within the upper 12 inches, water marks, water-stained leaves, sediment deposits, drift deposits and inundation. Secondary hydrologic indicators observed within some of the wetlands during field activities included the FAC-neutral test, geomorphic position, crayfish burrows, surface soil cracks, saturation visible on aerial imagery, drainage patterns, and local soil survey data.

4.4 Wetland Evaluation Methods

Hull performed an evaluation of wetlands using Ohio's Rapid Assessment Method for Wetlands (Mack, 2001), Final Version 5.0 (ORAM). The ORAM value assessment is based on review of resource materials, data obtained in the field, and the acreage as determined by delineation and mapping. The wetland value information is provided to the Ohio EPA for the purpose of placing wetlands into the appropriate wetland Category described in Ohio's Wetland Water Quality Standards (Sections 3745-1-05 and Sections 3745-1-50 through 3745-1-54). The ORAM wetland value information is included in Appendix C.

There are three possible Ohio Wetland Antidegradation tiers to which wetlands may be assigned:

- Category 1 – **Lowest value category.** Generally limited to small, low-diversity wetlands and wetlands with a predominance of non-native invasive species.
- Category 2 – **Middle value category.** Wetlands in this category are of moderate diversity but do not contain rare, threatened, or endangered species. They are generally degraded, but are capable of attaining higher value. Most wetlands in Ohio are expected to fall into this category.

- Category 3 – **Highest value category.** Wetlands in this category may be large, diverse, represent rare plant community types, contain rare, threatened or endangered species, or any combination of these and several other factors.

4.5 Stream Delineation Methods

Streams identified on US Geological Survey (USGS) topographic maps are generally found to be under the Clean Water Act jurisdiction of the USACE. Additional streams may be identified in the field by the presence of a defined bed and bank, and Ordinary High Water Mark (OHWM) and other stream morphological features. Suspected stream channels are examined upstream to identify the source of water and downstream to determine if the channel ends in a wetland, a confluence with another stream, a culvert inlet, or another fate.

4.6 Stream Evaluation Methods

Hull evaluated streams within the Facility using the Ohio Qualitative Habitat Evaluation Index (QHEI) scoring method, or the Ohio Headwater Habitat Evaluation Index (HHEI) as applicable. Both methods yield a numerical score for the stream reach evaluated, which is then used to estimate the probable existing aquatic life use of each stream. The HHEI and the Ohio Headwater Macroinvertebrate Field Evaluation Index (HMFEL) are used on primary headwater habitat (PHWH) streams with drainage area less than one square mile and with maximum pool depths less than 40 centimeters. Headwater streams are small first-order swales, creeks, and streams that are the origin of most rivers. These small streams join together to form larger streams and rivers, or run directly into larger streams and lakes. Ohio EPA defines a headwater stream as a stream with a watershed less than or equal to 20 square miles. Many streams and drainage ways have a watershed of less than one square mile; these are referred to as primary headwater streams (Ohio EPA, 2002). There are three possible categories to which PHWH streams may be assigned:

- Class I – **Lowest value category.** These streams are limited to intermittent or ephemeral streams with warm water conditions. They may contain ephemeral warm water communities, but are often dry for long periods of time.
- Class II – **Middle value category.** These streams are perennial or intermittent with warm water conditions. They generally contain species of animals that are adapted to warm water streams, including certain amphibians and pioneering fish species, along with invertebrates such as odonate larvae.

- **Class III – Highest value category.** These streams are perennial with cold water conditions, and are usually groundwater fed. They contain species of animals adapted to the year-round presence of cool water, including certain amphibians or fish species, along with insect larvae such as mayflies, stoneflies, and caddisflies.

In addition to natural channels, different classes of headwater streams can also have modified channels. Many primary headwater streams are being modified through channelization and/or riparian removal, as part of activities related to agricultural activities and urban/suburban development. Such modification is the primary origin of habitat degradation in smaller streams and a leading source of impairment to the water quality of larger streams into which they flow (Ohio EPA, 2002).

The QHEI is used for streams with drainage areas greater than one square mile and/or with pool depths greater than 40 centimeters. This index was designed to provide a measure of habitat quality that corresponds to physical factors that affect communities of fish and aquatic invertebrates, and is based on six main metrics: substrate, instream cover, channel morphology, channel and bank condition, pool and riffle quality, and gradient (Rankin, 1989). These larger and deeper streams have sufficient amounts of water throughout the year to support year-round fish communities. Scores from the QHEI are used to assign each stream to one or more of the following aquatic life use designations, as defined by Ohio Water Quality Standards Water Use Designations (OAC 3745-1-07):

- **Warmwater Habitat (WWH)** – Capable of supporting and maintaining a balanced community of warmwater aquatic organisms. This is the most widely applied use designation assigned to rivers and streams in Ohio.
- **Limited Warmwater Habitat (LWWH)** – Temporary aquatic life habitat use designation created in the 1978 Ohio Water Quality Standards for streams not meeting specific warmwater habitat criteria. This aquatic life use designation is being phased out
- **Exceptional Warmwater Habitat (EWH)** – Capable of supporting and maintaining an exceptional or unusual community of warmwater aquatic organisms with the general characteristics of being highly intolerant of adverse water quality conditions and/or being rare, threatened, endangered, or of special status.
- **Modified Warmwater Habitat (MWH)** – Incapable of supporting and maintaining a balanced community of warmwater aquatic organisms because of extensive and irretrievable modifications to the physical habitat

- **Seasonal Salmonid Habitat (SSH)** – Capable of supporting the passage of salmonids from October to May, and large enough to support recreational fishing.
- **Coldwater Habitat (CWH)** – Capable of supporting populations of coldwater aquatic organisms on an annual basis and/or put-and-take salmonid fishing. These water bodies are not necessarily capable of supporting the successful reproduction of salmonids and may be periodically stocked.
- **Limited Resource Water (LRW)** – Incapable of supporting and maintaining a balanced community of aquatic organisms because of natural background conditions or irretrievable human-induced conditions.

4.7 Surveying and Mapping Methods

The boundaries of all wetland areas and sample points were captured in the field using Trimble GeoXT mapping-level portable Global Positioning System (GPS) receivers. Differentially corrected GPS data were determined to be accurate within 0.5 to 2.0 feet. The wetland areas and sample points were placed in a GIS database and assembled with other available geographically referenced information using ARC-GIS v.9.0 software.

4.8 Isolated Surface Waters

As a consequence of the 2001 Supreme Court decision in *SWANCC vs. US Army*, isolated wetlands and other isolated water bodies are no longer under USACE jurisdiction. Currently, the USACE has sole authority to determine the isolation status of wetlands and other surface waters, which is determined on a case-by-case basis in the field.

The June 2006 US Supreme Court decision in *Rapanos/Carabell vs. US* resulted in additional limitations on the extent of federal jurisdiction over wetlands and streams that are not immediately adjacent to navigable-in-fact surface waters (e.g., larger streams and rivers). The US Environmental Protection Agency (USEPA) and the USACE issued technical guidance for interpreting the Rapanos/Carabell decision in December 2008. Hull formed its opinion of isolation status of the wetlands and streams within the Facility based on our interpretation of the December 2008 Rapanos guidance. An April 2011 revision of this memorandum is under review at this time but it is not yet final.

5.0 DELINEATION RESULTS

The results of the surface water delineation appear in Table 1 (wetlands) and Table 2 (streams). These Tables reference maps organized within a map grid. A map grid index sheet appears as Figure 1. Wetlands and streams are depicted graphically on Figures 2 through 18 and a map key appears as Figure 19. Wetland delineation data sheets appear in Appendix B, and wetland assessment data sheets (ORAMs) appear in Appendix C. Stream assessment data sheets (HHEIs and QHEIs) appear in Appendix D.

5.1 Wetlands

The wetlands summarized in Table 1 are described below. Please note some wetlands delineated are more than 100 feet away from Facility features and there is no potential for project-related impacts. These wetlands are located along routes that had been proposed during Facility planning, and later removed during plan refinement to minimize impacts to environmental resources or for other design reasons. In an effort to maintain a clear and concise Surface Water Delineation Report, many resources that will not be in proximity to construction activities for the final Facility configuration have been removed from this report.

5.1.1 Wetland A

Wetland A is an emergent isolated wetland with a small shrub component, and is dominated by black willow (*Salix nigra*; FACW+) and beggar's ticks (*Bidens frondosa*; FACW). Wetland A is located in an area mapped as Celina silt loam 2-6% slopes, a non-hydric unit that may contain inclusions of the hydric Brookston unit in depressions. Samples were taken in the central portion of the wetland (SP1); soils were saturated within the upper 12 inches. Hydrology for the wetland is provided by direct precipitation.

Wetland A is a Modified Ohio Category 2 wetland. The ORAM score was strongly influenced by its small size, hydrology, and limited habitat development.

5.1.2 Wetland B

Wetland B is a non-isolated emergent/scrub-shrub wetland dominated by sand bar willow (*Salix exigua*; OBL), gray dogwood (*Cornus racemosa*; FAC-), and broad leaved cattail (*Typha latifolia*; OBL). Wetland B is located in an area mapped as Brookston silty clay loam 0-2%

slopes, a hydric soil unit. Samples were taken in the eastern portion of the wetland (SP3). Hydrology for the wetland is provided by direct precipitation.

Wetland B is a Modified Ohio Category 2 wetland. The ORAM score was strongly influenced by its small size and limited habitat development.

5.1.3 Wetland H

Wetland H is a non-isolated, emergent wetland dominated by fox sedge (*Carex vulpinoidea*; OBL) and is located in an area mapped as Brookston silty clay loam, 0-2% slopes, a hydric soil unit, and Miami silt loam, 6-12% slopes, moderately eroded, a non-hydric soil unit. Samples were taken in the central portion of the wetland (SP10); soils were saturated to the surface. Hydrology for the wetland is provided by direct precipitation and intermittent surface water.

Wetland H is an Ohio Modified Category 2 wetland. The ORAM score was strongly influenced by wide buffers, intensity of surrounding land use, and relative lack of habitat disturbance.

5.1.4 Wetland I

Wetland I is a ponded, non-isolated wetland that was created by damming a stream located to the west. It is dominated by duck weed (*Lemna minor*, OBL) and is in an area mapped as Miami silt loam, 2-6% slopes, Miami silt loam, 6-12% slopes, and Celina silt loam, 2-6% slopes. All three of these soil units are non-hydric, but may contain inclusions of the hydric Brookston silty clay loam unit in depressions. Soil analysis was not performed in the field, because the area was dominated by FACW and OBL vegetation and the wetland/upland boundary was abrupt (p. 62 of the 1987 Delineation Manual). The surface was inundated with approximately 24-48 inches of water; hydrology for the wetland is provided by direct precipitation and intermittent surface water.

Wetland I is an Ohio Modified Category 2 wetland. The ORAM score was strongly influenced by hydrology and relative lack of habitat disturbance.

5.1.5 Wetland J

Wetland J is an isolated emergent wetland dominated by reed canary grass and is in an area mapped as Algiers silt loam, a non-hydric soil unit that may contain inclusions of the Sloan hydric soil unit in depressions and oxbows. Samples were taken in the northern portion of the

wetland (SP4a); the surface was inundated with approximately 1 inch of water at the time of evaluation. Hydrology for the wetland is provided by direct precipitation.

Wetland J is an Ohio Category 1 wetland. The ORAM score was strongly influenced by lack of buffers, intensity of surrounding land use, and dominance by invasive species.

5.1.6 Wetland K

Wetland K is a nonisolated emergent wetland dominated by reed canary grass and an unidentified aster (*Aster* sp.; assumed FACW). Wetland K is located in an area mapped as Miami silt loam, 2 to 6 percent slopes, moderately eroded, and Miami silt loam, 6 to 12 percent slopes, moderately eroded. Both soil units are non-hydric, but may contain inclusions of the hydric Brookston silty clay loam soil unit in depressions. Samples were taken in the southern portion of the wetland (SP5); the surface was inundated with approximately 1 inch of water at the time of evaluation. Hydrology for the wetland is provided by direct precipitation and intermittent surface water runoff from State Route 36 located directly north of the wetland.

Wetland K is an Ohio Category 1 wetland. The ORAM score was strongly influenced by lack of buffers, intensity of surrounding land use, and the presence of invasive species.

5.1.7 Wetland L

Wetland L is a non-isolated emergent wetland dominated by broad leaved cattail (*Typha latifolia*; OBL), calico aster (*Aster lateriflorus*; FACW-), and reed canary grass (*Phalaris arundinacea*; FACW+). Wetland L is located in an area mapped as Algiers silt loam, a nonhydric soil that may contain inclusions of the Sloan hydric soil unit in depressions and oxbows. Samples were taken in the central portion of the wetland (SP29); soils were saturated to the surface. Hydrology for the wetland is provided by direct precipitation and intermittent surface water.

Wetland L is in the Ohio Category 1/2 gray zone. The ORAM score was strongly influenced by wide buffers and intensity of surrounding land use.

5.1.8 Wetland M

Wetland M is an isolated emergent wetland dominated by reed canary grass (*Phalaris arundinacea*; FACW+). Wetland M is located in an area mapped as Brookston silty clay loam,

0-2% slopes, a hydric soil unit. Samples were taken in the western portion of the wetland (SP32); the soils of this wetland had a depleted matrix while the surface of the wetland showed primary signs of hydrology with water-stained leaves present. Hydrology for the wetland is provided by direct precipitation.

Wetland M is an Ohio Category 1 wetland. The ORAM score was strongly influenced by the intensity of surrounding land use and the dominance of invasive species coupled with isolation.

5.1.9 Wetland N

Wetland N is a non-isolated emergent wetland dominated by rough barnyard grass (*Echinochloa muricata*; FACW+). Wetland N is located in an area mapped as Brookston silty clay loam, 0-2% slopes, a hydric soil unit. Samples were taken in the northwestern portion of the wetland (SP33); the surface was dry at the time of evaluation, however, primary and secondary signs of hydrology were observed. The soils for this wetland were recently disturbed or mixed during tile installation and swale configuration; this wetland accepts field drain tiles from the surrounding row crop agriculture fields. Hydrology for the wetland is provided by direct precipitation and field drainage tiles.

Wetland N is an Ohio Category 1 wetland. The ORAM score was strongly influenced by lack of buffers, intensity of surrounding land use, and recent disturbances to vegetation (mowing) and soils.

5.1.10 Wetland Q

Wetland Q is a non-isolated emergent wetland dominated by yellow nut-sedge (*Cyperus esculentus*; FACW) and calico aster (*Aster lateriflorus*; FACW). Wetland Q is located in an area mapped as Miami Silt Loam 12-18% slopes, a non-hydric soil that may contain inclusions of the Brookston hydric soil unit in drainageways. Samples were taken in the south central portion of the wetland (SP39). Hydrology for the wetland is provided by direct precipitation and surface runoff from surrounding upland areas.

Wetland Q is an Ohio Category 1 wetland. The ORAM score was strongly influenced by having poor habitat and recent disturbances.

5.1.11 Wetland T

Wetland T is an isolated emergent wetland dominated by broad-leafed cattail (*Typha latifolia*; OBL). Wetland T is located in an area mapped as Brookston silty clay loam 0-2% slopes, a hydric soil. Samples were taken in the southwest portion of the wetland (SP43). Hydrology for the wetland is provided by direct precipitation and a seep from a probable broken field drain tile.

Wetland T is an Ohio Category 1 wetland. The ORAM score was strongly influenced by lack of buffers, having a high intensity of surrounding land use, and recent habitat and substrate disturbances from farming activities.

5.1.12 Wetland U

Wetland U is an isolated emergent wetland dominated broad-leaved cattail (*Typha latifolia*; OBL) and purple-leaved willow-herb (*Epilobium coloratum*). Wetland U is located in an area mapped as Brookston silty clay loam 0-2% slopes hydric soil. Samples were taken in the southern portion of the wetland (SP44). Hydrology for the wetland is provided by direct precipitation.

Wetland U is an Ohio Category 1 wetland. The ORAM score was strongly influenced by having small size, narrow buffers and a high intensity of surrounding land use from farming activities.

5.1.13 Wetland V

Wetland V is an isolated emergent wetland dominated by broad-leaved cattail (*Typha latifolia*; OBL) and rough barnyard grass (*Echinochloa muricata*; FACW+). Wetland V is located in an area mapped as Wea silt loam 0-3% slopes, a non-hydric soil. Samples were taken in the central portion of the wetland (SP45); the surface was inundated with approximately 12 inches of water at the time of evaluation. This wetland is spring-fed which provides its hydrology as well as direct precipitation.

Wetland V is an Ohio Category 1 wetland. The ORAM score was strongly influenced by having very narrow buffers, recent disturbances and high intensity of surrounding land use because this wetland was located within an open cow pasture.

5.1.14 Wetland W

Wetland W is an emergent isolated wetland dominated by stick tight (*Bidens cernua*; OBL), barnyard grass (*Echinochloa crus-galli*; FACU), blunt spike-rush (*Eleocharis obtusa*; OBL), and mild water-pepper (*Polygonum hydropiperoides*; OBL). Wetland W is located in an area mapped as Brookston silty clay loam 0-2% slopes (BsA), a hydric soil unit. Samples were taken in the central portion of the wetland (SP46). Hydric soils were confirmed by the presence of a thick dark surface (Indicator A12). Surface inundation and soil saturation were lacking at the time of evaluation. However, the presence of wetland hydrology was confirmed by saturation observed on aerial imagery, geomorphic position and a positive FAC neutral test. The combination of these three secondary indicators confirms the presence of wetland hydrology. Hydrology for the wetland is provided by direct precipitation.

Wetland W is an Ohio Category 1 wetland. The ORAM score was strongly influenced by its small size, hydrology, lack of buffers, surrounding land use, limited habitat development and predominance of invasive plant species.

5.1.15 Wetland FF

Wetland FF is a non-isolated emergent/scrub-shrub wetland dominated by reed canary grass (*Phalaris arundinacea*; FACW) and cottonwood (*Populus deltoids*; FACW). Wetland FF is located in an area mapped as Brookston silty clay loam, 0-2% slopes (BsA), Crosby silt loam, 2-6% slopes (CsB), and Miami silt loam, 6-12% slopes (MIC2). Brookston silty clay loam is a hydric soil unit. The Crosby silt loam and Miami silt loam units are non-hydric; however, they may contain inclusions of the hydric Brookston unit in depressions and drainage ways. Samples were taken in the eastern portion of the wetland (SP57). Hydric soils were confirmed by the presence of a depleted matrix (Indicator F3). Hydrology for the wetland is provided by direct precipitation. Surface inundation and soil saturation were lacking at the time of evaluation. However, the presence of wetland hydrology was confirmed by the presence of drainage patterns and a positive FAC neutral test.

Wetland FF is an Ohio Category 1 wetland. The ORAM score was strongly influenced by narrow buffers, the intensity of surrounding land use, hydrology, lack of habitat development and the predominance of invasive species.

5.1.16 Wetland GG

Wetland GG is a non-isolated emergent/scrub-shrub wetland dominated by reed canary grass (*Phalaris arundinacea*; FACW), sandbar willow (*Salix exigua*; OBL) and black willow (*Salix nigra*, FACW). Wetland GG is located in an area mapped as Miami silt loam 2-6% slopes, a non-hydric soil that may contain inclusions of the Brookston Silty clay loam hydric soil unit in drainageways. Samples were taken in the eastern portion of the wetland (SP58). Hydrology for the wetland is provided by direct precipitation and soil was saturated to the surface at the time of evaluation.

Wetland GG is an Ohio Category 1 wetland. The ORAM score was strongly influenced by having fairly narrow buffers and a high percent coverage of invasive plants.

5.1.17 Wetland JJ

Wetland JJ is a non-isolated emergent wetland dominated by calico aster (*Aster lateriflorus*; FACW), and sandbar willow (*Salix exigua*; OBL). Wetland JJ is located in an area mapped as Miami silt loam 2-6% slopes, a non-hydric soil that may contain inclusions of the Brookston hydric soil unit in drainageways. Samples were taken in the northwest portion of the wetland (SP62). Hydrology for the wetland is provided by direct precipitation, soil was saturated to the surface and there was surface water up to 3 inches at the time of evaluation.

Wetland JJ is an Ohio Category 1 wetland. The ORAM score was strongly influenced by being small in size, having very narrow buffers and a moderately high intensity of surrounding land use.

5.1.18 Wetland KK

Wetland KK is a non-isolated forested wetland dominated by creeping bentgrass (*Agrostis stolonifera*; FACW) and green ash (*Fraxinus pennsylvanica*; FACW). Wetland KK is located in an area mapped as Brookston silty clay loam 0-2% slopes, a hydric soil unit. Samples were taken in the southwest portion of the wetland (SP63). Hydrology for the wetland is provided by direct precipitation, soil was saturated and there were pockets of surface water at the time of evaluation.

Wetland KK is an Ohio Category 2 wetland. The ORAM score was strongly influenced by having good habitat development and habitat that has recovered from past alteration.

5.1.19 Wetland NN

Wetland NN is a non-isolated emergent wetland with a forested component dominated by broadleaf cattail (*Typha latifolia*; OBL) and black willow (*Salix nigra*; FACW+). Wetland NN is located in an area mapped as Miami silt loam 2-6% slopes, a non-hydric soil that may contain inclusions of the Brookston Silty clay loam hydric soil unit in drainageways. Samples were taken in the southwest portion of the wetland (SP66). Hydrology for the wetland is provided by direct precipitation, soil was saturated to the surface and there was up to 3 inches of surface water at the time of evaluation.

Wetland NN is an Ohio Category 1 wetland. The ORAM score was strongly influenced by having high to moderately high surrounding land use, narrow buffers and moderate amounts of invasive plant cover.

5.1.20 Wetland KA

Wetland KA is an isolated emergent/scrub-shrub wetland dominated by narrowleaf cattail (*Typha angustifolia*; OBL) and black willow (*Salix nigra*; FACW). Wetland KA is located in an area mapped as Crosby silt loam 2-6% slopes, a non-hydric soil. A soil sample was taken in the southwest portion of the wetland (WET-KA). Hydrology for the wetland is provided by direct precipitation, soil was saturated to the surface and there was up to 1 inch of surface water at the time of evaluation.

Wetland KA is an Ohio Category 1 wetland. The ORAM score was strongly negatively influenced by having high surrounding land use, very narrow buffers and moderate amounts of invasive plant cover.

5.1.21 Wetland KB

Wetland KB is a non-isolated emergent/scrub-shrub wetland dominated by narrowleaf cattail (*Typha latifolia*; OBL) and black willow (*Salix nigra*; FACW). Wetland KB is located in an area mapped as Crosby silt loam 2-6% slopes, a non-hydric soil. A soil sample was taken in the southwest portion of the wetland (WET-KB). Hydrology for the wetland is provided by direct

precipitation, soil was saturated to the surface and there was up to 2 inches of surface water at the time of evaluation.

Wetland KB is an Ohio Category 1 wetland. The ORAM score was strongly negatively influenced by having high surrounding land use, narrow buffers and moderate amounts of invasive plant cover.

5.2 Streams

The streams summarized in Table 2 are described below. All 43 stream segments within the Facility were preliminarily determined to be under federal jurisdiction, with the exception of Stream GG.

5.2.1 Stream B

Stream B is an unnamed primary headwaters stream. Stream B has a watershed area of 0.46 square miles and a maximum pool depth of 25.4 cm, and was therefore evaluated using the HHEI. Stream B does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. While the HHEI score for Stream B identifies it as a potential Modified Class III PHWH stream, the HMFEI score (11) indicates that Stream B is appropriately classified as a Modified Class II intermittent PHWH stream. The lower existing use may be due to organic enrichment from runoff from adjacent agricultural fields. Substrates within the assessed reach consisted primarily of gravel and sand.

5.2.2 Stream B-2

Stream B-2 is an unnamed primary headwaters stream located south of Urbana Woodstock Pike. Stream B-2 has a watershed area of 0.32 square miles and a maximum pool depth of 4 cm, and was therefore evaluated using the HHEI. Stream B-2 does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 50 for Stream B-2 identifies it as a Modified Class II PHWH stream. Substrates within the assessed reach consisted primarily of gravel and muck.

5.2.3 Stream D-2

Stream D-2 is an unnamed primary headwaters stream. Stream D-2 has a watershed area of 0.55 square miles and was therefore evaluated using the HHEI. Stream D does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life

and chemical parameters. The HHEI score for Stream D-2 (49) identifies it as a Modified Class II PHWH ephemeral stream. Substrates within the assessed reach consisted primarily of clay hardpan with lesser amounts of gravel sand and silt.

5.2.4 Stream E

Stream E is a named intermittent stream (Dugan Run). Although Stream E has a watershed area of 2.73 square miles, it was dry during an earlier assessment and was initially evaluated using the HHEI. The stream had water and was flowing during the June 2011 field reconnaissance and was therefore also evaluated with the QHEI. In 2005, the Ohio EPA recommended that Dugan Run be given a Cold Water Habitat aquatic life use designation but this has not yet been promulgated in rule. The sampled reach of Stream E lacks the features necessary for a Cold Water Habitat designation (i.e. substrate types of bedrock, boulder, boulder slabs, and cobble comprising >20% of the substrate and presence of a natural channel), and the HHEI score is less than 70 and the QHEI score was 44. The HHEI score for Stream E identifies it as a Modified Class II PHWH intermittent stream and the QHEI score indicates a Modified Warmwater Habitat, which likely constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of gravel and sand.

5.2.5 Stream F

Stream F is an unnamed primary headwaters stream. Stream F has a watershed area of 0.24 square miles and a maximum pool depth of 20 cm, and therefore was evaluated using the HHEI. Stream F does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. While the HHEI score for Stream F identifies it as a potential Modified Class III perennial PHWH stream, the HMFEL score (14), and a lack of amphibians observed during the VES indicate that Stream F is a Modified Class II perennial PHWH stream. The lower existing use may be due to organic enrichment from runoff from adjacent agricultural fields. Substrates within the assessed reach consisted primarily of gravel and sand.

5.2.6 Stream J

Stream J is a named stream (Dugan Run). Stream J has a watershed area of 1.05 square miles and was dry during the assessment, and was therefore evaluated using the HHEI. Stream J does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream J identifies it as a

Modified Class II PHWH intermittent stream, which constitutes the stream's existing use. The assessed reach contained substrate consisting primarily of silt, gravel, and sand.

5.2.7 Stream J-2

Stream J-2 is an unnamed intermittent stream. Stream J-2 has a watershed area of 0.65 square miles and a maximum pool depth of 80 cm, and was therefore evaluated using the QHEI. Stream J-2 does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The QHEI score of 72 for Stream J-2 identifies it as a Warmwater Habitat stream. Substrates within the assessed reach consisted primarily of cobble and gravel.

5.2.8 Stream K

Stream K is an unnamed primary headwaters stream. Stream K has a watershed area of 0.24 square miles and was dry during the assessment, and was therefore evaluated using the HHEI. Stream K does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream K identifies it as a Modified Class I PHWH ephemeral stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of clay hardpan.

5.2.9 Stream L

Stream L is a named primary headwaters stream (Little Darby Creek). Stream L has a watershed area of 1.95 square miles and was dry during the assessment, and was therefore evaluated using both the HHEI and QHEI. Stream L has assigned Aquatic Life Use designations of Exceptional Warm Water Habitat and Cold Water Habitat based on evaluation by Ohio EPA in 2004. The HHEI score for Stream L identifies it as a Class II PHWH intermittent stream and the QHEI score indicates a Warmwater Habitat resource, but this assessment is overridden by the promulgated rule. Interstitial perennial flow is assumed to be present. Substrates within the assessed reach consisted primarily of silt, sand, and gravel.

5.2.10 Stream O

Stream O is a named perennial stream (East Fork Buck Creek). Stream O has a watershed area of 4.11 square miles and a maximum pool depth greater than 40 cm; therefore was evaluated using the QHEI. Stream O has an assigned Aquatic Life Use designation of Cold Water Habitat which was verified based on field data collected by the Ohio EPA in 2005. The

QHEI score of 46.5 for Stream O places it in the “fair” narrative range and suggests that the stream habitat in this reach is not capable of supporting cold-water aquatic communities; however this assessment is overridden by the promulgated rule.

5.2.11 Stream O-2

Stream O-2 is a named perennial stream (East Fork Buck Creek). Stream O-2 has a watershed area of 3.98 square miles and a maximum pool depth of 33 cm; therefore it was evaluated using the QHEI. Stream O-2 has an assigned Aquatic Life Use designation of Cold Water Habitat which was verified based on field data collected by the Ohio EPA in 2005. The QHEI score of 39 for Stream O-2 places it in the “poor” narrative range and suggests that the stream habitat in this reach is not capable of supporting cold-water aquatic communities; however this assessment is overridden by the promulgated rule. Substrate within the assessed reach consisted primarily of gravel.

5.2.12 Stream P

Stream P is a named intermittent stream (Dugan Ditch). At the point of assessment, Stream P has a watershed area of 0.07 square miles and a maximum pool depth of 3 cm; therefore it was evaluated using the HHEI. Stream P has an assigned Aquatic Life Use Designation of Coldwater Habitat, although this use is not apparently attainable this far up in the watershed. The HHEI score for Stream P identifies it as a Modified Class I ephemeral PWH stream, and suggests that the stream habitat in this reach is not capable of supporting cold-water aquatic communities; however this assessment is overridden by the promulgated rule. Substrates within the assessed reach consisted primarily of silt and leaf pack.

5.2.13 Stream Q

Stream Q is an unnamed primary headwaters stream. Stream Q has a watershed area of 0.07 square miles and a maximum pool depth of less than 40 cm (stream dry at time of evaluation), therefore was evaluated using the HHEI. Stream Q does not have an assigned aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream Q identifies it as a Modified Class II intermittent PWH stream, which constitutes the stream’s existing use. Substrates within the assessed reach consisted entirely of silt.

5.2.14 Stream R

Stream R is an unnamed primary headwaters stream. Stream R has a watershed area of 0.12 square miles and a maximum pool depth of less than 40 cm (stream dry at time of evaluation), therefore was evaluated using the HHEI. Stream R does not have an assigned aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream R identifies it as a Class II intermittent PWH stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of gravel and sand.

5.2.15 Stream S

Stream S is an unnamed primary headwaters stream. Stream S has a watershed area of 0.08 square miles and a maximum pool depth of 6 cm, therefore was evaluated using the HHEI. Stream S does not have an assigned aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream S identifies it as a Modified Class I ephemeral PWH stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted entirely of silt.

5.2.16 Stream V

Stream V is an unnamed primary headwaters stream. Stream V has a watershed area of 0.12 square miles and a maximum pool depth of 10 cm, therefore was evaluated using the HHEI. Stream V does not have an assigned aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream V identifies it as a Modified Class II perennial PWH stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of sand and silt.

5.2.17 Stream W

Stream W an unnamed primary headwaters stream. Stream W has a watershed area of 0.15 square miles and a maximum pool depth of 24 cm, therefore was evaluated using the HHEI. Stream W does not have an assigned aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream W identifies it as a Modified Class II perennial PWH stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of sand and silt.

5.2.18 Stream Y

Stream Y is a named intermittent stream (Buck Creek). Stream Y has a watershed area of 5.56 square miles and a maximum pool depth greater than 40 cm (stream dry at time of evaluation), therefore was evaluated using the QHEI. Stream Y has an assigned Aquatic Life Use designation of Cold Water Habitat (CWH) which was verified based on field data collected by the Ohio EPA in 2005. The QHEI score for Stream Y places it in the fair narrative range and suggests that the stream habitat in this reach is not capable of supporting cold-water aquatic communities; however this assessment is overridden by the promulgated use designation in rule.

5.2.19 Stream Y-2

Stream Y-2 is a named intermittent stream (Buck Creek). Stream Y-2 has a watershed area of 3.51 square miles and was therefore evaluated using the QHEI. Stream Y-2 has an assigned Aquatic Life Use designation of Cold Water Habitat (CWH) which was verified based on field data collected by the Ohio EPA in 2005. The combination of the stream being a dry channel at the time of evaluation along with a QHEI score of 27.4 for Stream Y-2 places it in the “very poor” narrative range and suggests the stream habitat in this reach is not capable of supporting cold-water aquatic communities; however this assessment is overridden by the promulgated use designation in rule. Substrate within the assessed reach consisted primarily of silt.

5.2.20 Stream Y-3

Stream Y-3 is a named intermittent stream (Buck Creek). Stream Y-3 has a watershed area of 3.51 square miles and was therefore evaluated using the QHEI. Stream Y-3 has an assigned Aquatic Life Use designation of Cold Water Habitat which was verified based on field data collected by the Ohio EPA in 2005. The combination of the stream being a dry channel at the time of evaluation along with a QHEI score of 22 for Stream Y-3 places it in the “very poor” narrative range and suggests the stream habitat in this reach is not capable of supporting cold-water aquatic communities; however this assessment is overridden by the promulgated use designation in rule. Substrate within the assessed reach consisted primarily of silt.

5.2.21 Stream Y-4

Stream Y-4 is a named stream (Buck Creek). Stream Y-4 has a watershed area of 1.85 square miles therefore was evaluated using the QHEI. Stream Y-4 has an assigned Aquatic Life Use designation of Cold Water Habitat which was verified based on field data collected by the Ohio EPA in 2005. The QHEI score of 33 for Stream Y-4 identifies it as a Modified Warm Water

Habitat stream; however, this assessment is overridden by the promulgated use designation in rule. Substrates within the assessed reach consisted primarily of clay hardpan and gravel with lesser amounts of cobble, sand and silt.

5.2.22 Stream AA

Stream AA is a named primary headwaters stream (Buck Creek) located east of Mutual Union Road. Stream AA has a watershed area of 0.26 square miles and a maximum pool depth of 7 cm, therefore was evaluated using the HHEI. Stream AA has an assigned Aquatic Life Use designation of Cold Water Habitat which was verified based on field data collected by the Ohio EPA in 2005. The HHEI score for Stream AA identifies it as a Modified Class II intermittent PHWH stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of clay hardpan and silt. Note: during field investigations conducted during the beginning of this project, this stream was identified as an upland drainage ditch through agriculture fields with no discernable bed and bank and was dominated by upland species of herbaceous vegetation. Recently, the drainage ditch was cleaned out and excavated to a deeper depth for agricultural drainage purposes and now has a defined bed and bank and was flowing during the June 2011 field season.

5.2.23 Stream BB

Stream BB is a named intermittent stream (Treacle Creek) located west of Yocum Road. Stream BB has a watershed area of 1.11 square miles and was flowing during the assessment. Due to the perceived small drainage area and borderline pool depths measured during the June 2011 field reconnaissance; this stream was evaluated with both the QHEI and HHEI. Stream BB has an assigned Aquatic Life Use designation of Exceptional Warm Water Habitat based on evaluations by Ohio EPA in 2004. The HHEI score for Stream BB identifies it as a Modified Class II PHWH intermittent stream and the QHEI score indicates it is likely a Modified Warmwater Habitat; however, these assessments are overridden by the promulgated rule. Substrates within the assessed reach consisted primarily of cobble, sand, clay hardpan, and gravel.

5.2.24 Stream BB-3

Stream BB-3 is a named ephemeral stream (Treacle Creek). Stream BB-3 has a watershed area of 0.15 square miles and was flowing during the assessment. Due to the small drainage area this stream was evaluated with the HHEI. Stream BB-3 has an assigned Aquatic Life Use

designation of Exceptional Warm Water Habitat based on evaluations by Ohio EPA in 2005. The HHEI score of 61 indicates it is likely Modified Class II PHWH stream, however, this assessment is overridden by the promulgated use designation in rule. Substrates within the assessed reach consisted primarily of gravel and sand with lesser amounts of cobble, leaf pack/woody debris, boulder and silt.

5.2.25 Stream CC

Stream CC is an unnamed primary headwaters stream (unnamed tributary to Buck Creek) located north of State Route 29. Stream CC has a watershed area of 0.63 square miles but was dry during the site visit; therefore this stream was evaluated using the HHEI. Stream CC does not have an assigned aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream CC identifies it as a Modified Class I ephemeral PHWH stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of cobble and clay hardpan.

5.2.26 Stream DD

Stream DD is an unnamed primary headwaters stream (unnamed tributary to Little Darby Creek). Stream DD has a watershed area of 0.068 square miles with a dry stream channel, and was therefore evaluated using the HHEI. Stream DD does not have an assigned aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream DD identifies it as a Modified Class I ephemeral PHWH stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of cobble and clay hardpan. Note: Stream DD drains to Stream L (Little Darby Creek) which was also dry during this investigation.

5.2.27 Stream EE

Stream EE is an unnamed primary headwaters stream (unnamed tributary to East Fork Buck Creek). Stream EE has a watershed area of 0.31 square miles with a dry stream channel, and was therefore evaluated using the HHEI. Stream EE does not have an assigned aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream EE identifies it as a Modified Class II ephemeral PHWH stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of gravel and silt.

5.2.28 Stream GG

Stream GG is an isolated unnamed primary headwaters stream. Stream GG has a watershed area of 0.19 square miles and was therefore evaluated using the HHEI. Stream GG flows into an excavated pond with no outlet. Stream GG does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. Stream GG is classified as an isolated Modified Class II ephemeral PHWH stream due to an HHEI score of 45. Substrates within the assessed reach consisted primarily of cobble and gravel. Since Stream GG is an isolated stream, it is not under federal jurisdiction.

5.2.29 Stream HH

Stream HH is an unnamed primary headwaters stream. Stream HH has a watershed area of 0.25 square miles, therefore was evaluated using the HHEI. Stream HH does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. Stream HH scored a 22 on the HHEI and is therefore classified as a Modified Class I intermittent PHWH stream. Substrates within the assessed reach consisted primarily of cobble and silt.

5.2.30 Stream II

Stream II is an unnamed primary headwaters stream. Stream II was a dry channel at the time of evaluation and has a watershed area of 0.04 square miles and was therefore evaluated using the HHEI. Stream II does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. Stream II is classified as a Modified Class I intermittent PHWH stream with an HHEI score of 25. Substrate within the assessed reach consisted primarily of silt.

5.2.31 Stream JJ

Stream JJ is an unnamed stream. Stream JJ has a watershed area of 1.08 square miles and was therefore evaluated using the QHEI. Stream JJ does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The QHEI score of 36.5 for Stream JJ identifies it as a Modified WWH stream. Substrates within the assessed reach consisted primarily of cobble and gravel.

5.2.32 Stream LL

Stream LL is an unnamed primary headwaters stream. Stream LL has a watershed area of 0.05 square miles and was therefore evaluated using the HHEI. Stream LL does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 32 for Stream LL identifies it as a Class I PHWH stream. Substrates within the assessed reach consisted primarily of clay hardpan and cobble.

5.2.33 Stream MM

Stream MM is an unnamed primary headwaters stream. Stream MM was a dry channel at the time of evaluation and has a watershed area of 0.13 square miles therefore was evaluated using the HHEI. Stream MM does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 29 for Stream MM identifies it as a Modified Class I PHWH stream. Substrate within the assessed reach consisted primarily of silt.

5.2.34 Stream NN

Stream NN is an unnamed stream. Stream NN was a dry channel at the time of evaluation and has a watershed area of 0.51 square miles and a maximum pool depth of 25.4 cm, therefore it was evaluated using the HHEI. Stream NN does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 46 for Stream NN identifies it as a Modified Class II PHWH stream. Substrates within the assessed reach consisted primarily of gravel and cobble.

5.2.35 Stream OO

Stream OO is an unnamed primary headwaters stream. Stream OO was a dry channel at the time of evaluation and has a watershed area of 0.69 square miles therefore it was evaluated using the HHEI. Stream OO does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 36 for Stream OO identifies it as a Modified Class II PHWH stream. Substrates within the assessed reach consisted primarily of gravel and silt.

5.2.36 Stream PP

Stream PP is an unnamed ephemeral stream (UT to Little Darby Creek). Stream PP has a watershed area of less than 0.10 square mile and was dry during this assessment; thus Stream PP was evaluated using the HHEI. Stream PP does not have an assigned Aquatic Life Use

designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 15 for Stream PP identifies it as a Modified Class I PHWH ephemeral stream, which likely constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of silt with minor amounts of cobble, clay hardpan, and boulder.

5.2.37 Stream QQ

Stream QQ is an unnamed ephemeral stream (UT to Treacle Creek) located west of Yocum Road. Stream QQ has a watershed area of 0.20 square mile and was dry during this assessment; thus Stream QQ was evaluated using the HHEI. Stream QQ does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 15 for Stream QQ identifies it as a Modified Class I PHWH ephemeral stream, which likely constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of silt with minor amounts of clay hardpan, cobble, and gravel.

5.2.38 Stream WW

Stream WW is an unnamed primary headwaters stream. Stream WW was a dry channel at the time of evaluation and has a watershed area of 0.42 square miles therefore it was evaluated using the HHEI. Stream WW does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 42 for Stream WW identifies it as a Modified Class II PHWH stream. Substrates within the assessed reach consisted primarily of gravel.

5.2.39 Stream XX

Stream XX is an unnamed primary headwaters stream. Stream XX was a dry channel at the time of evaluation and has a watershed area of 0.01 square miles therefore it was evaluated using the HHEI. Stream XX does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 38 for Stream XX identifies it as a Modified Class II PHWH stream. Substrates within the assessed reach consisted primarily of gravel with lesser amounts of silt and clay hardpan.

5.2.40 Stream YY

Stream YY is an unnamed primary headwaters stream (UT to Little Darby Creek). Stream YY has a watershed area of 0.02 square miles and was dry at time of assessment therefore was evaluated using the HHEI. Stream YY does not have an assigned aquatic Life Use designation

and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 8 for Stream YY identifies it as a Modified Class I intermittent PHWH stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted primarily of clay hardpan with lesser amounts of cobble and gravel.

5.2.41 Stream ZZ

Stream ZZ is an unnamed primary headwaters stream (UT to Buck Creek). Stream ZZ has a watershed area of 0.24 square miles and the stream bed was dry at time of evaluation so was therefore evaluated using the HHEI. Stream ZZ does not have an assigned aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score for Stream ZZ identifies it as a Modified Class II PHWH stream. Substrates within the assessed reach consisted primarily of gravel with lesser amounts of cobble sand and boulder.

5.2.42 Stream ZZ-2

Stream ZZ-2 is an unnamed primary headwaters stream (UT to Buck Creek). Stream ZZ-2 has a watershed area of 0.10 square miles and had a dry channel at the time of assessment therefore was evaluated using the HHEI. Stream ZZ-2 does not have an assigned aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 29 for Stream ZZ-2 identifies it as a Modified Class I ephemeral PHWH stream, which constitutes the stream's existing use. Substrates within the assessed reach consisted almost entirely of silt with lesser amounts of leaf pack/woody debris.

5.2.43 Stream AAA

Stream AAA is an unnamed primary headwaters stream to Buck Creek located just west of State Route 56 in between Wetlands FF and GG. Stream AAA has a watershed area of 0.05 square miles therefore it was evaluated using the HHEI. Stream AAA does not have an assigned Aquatic Life Use designation and has not been monitored by Ohio EPA for aquatic life and chemical parameters. The HHEI score of 34 for Stream AAA identifies it as a potential Modified Class II PHWH stream. Substrates within the assessed reach consisted primarily of clay hardpan and silt with lesser amounts of boulder, gravel, sand and cobble.

6.0 REPORT LIMITATIONS

The conclusions presented herein are based on the level of effort and investigative techniques defined under the Scope of Work. Hull & Associates, Inc. has conducted this investigation in a manner consistent with published guidance, sound ecological practices and best professional judgment. No other warranty or guarantee, expressed or implied, is made. This report does not attempt to evaluate past or present compliance with Federal, State and Local environmental or land use laws and regulations. Furthermore, Hull & Associates, Inc. makes no guarantees regarding the completeness or accuracy of any information obtained in review of public or private files or previous investigations at the Facility not conducted by Hull & Associates, Inc. The results of the surface water delineation and the surface water evaluation are subject to verification by the USACE and Ohio EPA, respectively.

7.0 REFERENCES

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TABLES

BUCKEYE WIND POWER PROJECT
SURFACE WATER DELINEATION

TABLE 1

SUMMARY OF WETLAND DATA

Wetland ID	Sample Point	Map Grid No.	Figure No.	Mapped hydric soil	Cowardin Classification	NWI Mapped As	Hydric Soils Present?	Hydrology Present?	Hydrophytic Plant Community Present?	Wetland Present?	Wetland Size (ac)§	Size method	ORAM score [†]	Ohio Category [†]	Isolation status [§]	Photo No.
A	SP1	C3	10	no	PEM/PSS	PUBFh	yes	yes	yes	yes	0.39	GPS/GIS	42	Modified 2	Isolated	81, 82
B	SP3	C3	10	yes	PEM/PSS	PEMCd	yes	yes	yes	yes	2.90	GPS/GIS	41.5	Modified 2	Nonisolated	83
H	SP10	C3	10	yes	PEM	n/a	yes	yes	yes	yes	0.02	GPS/GIS	37.5	Modified 2	Nonisolated	n/a
I	SP26	C3	10	no	POW	PUBGh	yes	yes	yes	yes	0.66	GPS/GIS	37	Modified 2	Nonisolated	84
J	SP4a	C4	11	no	PEM	PEMA	yes	yes	yes	yes	0.74	GPS/GIS	7.5	1	Isolated	85
K	SP5	C4	11	no	PEM	PEMC	yes	yes	yes	yes	1.44	GPS/GIS	17.5	1	Nonisolated	86
L	SP30	C3	10	yes	PEM	n/a	yes	yes	yes	yes	0.01	GPS/GIS	31	1/2 Gray Zone; assumed Modified 2	Nonisolated	87
M	SP32	C4	11	yes	PEM	n/a	yes	yes	yes	yes	0.19	GPS/GIS	11	1	Isolated	88
N	SP33	B4	6	yes	PEM	n/a	yes	yes	yes	yes	0.02	GPS/GIS	14	1	Nonisolated	89
Q	SP39	B2	4	no	PEM	n/a	yes	yes	yes	yes	0.04	GPS/GIS	29	1	Nonisolated	90
T	SP43	C4	11	yes	PEM	PEM1C	yes	yes	yes	yes	0.20	GPS/GIS	14	1	Isolated	91
U	SP44	D4	17	yes	PEM	n/a	yes	yes	yes	yes	0.07	GPS/GIS	20	1	Isolated	92
V	SP45	D4	17	no	PEM	PEM1A	yes	yes	yes	yes	~0.20**	GPS/GIS	25	1	Isolated	93
W	SP46	B4	6	yes	PEM	PEM1C	yes	yes	yes	yes	0.19	GPS/GIS	10	1	Isolated	94
FF	SP57	D4	17	yes	PEM	n/a	yes	yes	yes	yes	0.39	GPS/GIS	16.5	1	Non-isolated	95
GG	SP58	D3	16	yes	PEM/PSS	n/a	yes	yes	yes	yes	~0.30-3**	GPS/GIS	25	1	Nonisolated	96
JJ	SP62	B4	6	no	PEM	PEM1A	yes	yes	yes	yes	0.19	GPS/GIS	27	1	Nonisolated	97
KK	SP63	B5	7	yes	PFO/PSS	PFO1A/PS S1C	yes	yes	yes	yes	~0.30-3**	GPS/GIS	45	2	Nonisolated	98
NN	SP66	C4	11	yes	PSS/PUB	PSS1C/PU BGh	yes	yes	yes	yes	~0.30-3**	GPS/GIS	28	1	Nonisolated	99
KA	WET-KA	B4	6	no	PEM/PSS	n/a	yes	yes	yes	yes	0.05	GPS/GIS	14	1	Isolated	100
KB	WET-KB	B4	6	no	PEM/PSS	n/a	yes	yes	yes	yes	0.38	GPS/GIS	20	1	Nonisolated	101

NWI = National Wetlands Inventory

ORAM = Ohio Rapid Assessment Method for Wetlands v. 5.0

§ Subject to verification by US Army Corps of Engineers.

† Subject to verification by Ohio EPA.

n/a = Not applicable.

GPS = Global Positioning System

GIS = Global Information System

** = Wetland size estimated, extended out of delineation area

BUCKEYE WIND POWER PROJECT
SURFACE WATER DELINEATION

TABLE 2

SUMMARY OF STREAM DATA

Stream ID	Map	Figure No.	Watershed Size (mi ²)	HHEI Score [†]	HMFEI Score [†]	QHEI Score [†]	Named Stream	Existing Beneficial Use [†]	Flow Regime [§]	Photo No.	Existing Crossing?
B	B2	4	0.46	74	11	n/a	No	Modified Class II PHWH	Intermittent	1, 2	Yes
B-2	B3	5	0.32	50	ND	n/a	No	Modified Class II PHWH	Ephemeral	3, 4	No
D-2	B4	6	0.55	49	ND	n/a	No	Modified Class II PHWH	Ephemeral	5, 6	No
E	B2	4	2.73	37	ND	44	Dugan Run	Listed WWH; Measured Modified Class II PHWH ²	Intermittent	7, 8	No
F	B5	7	0.24	74	14	n/a	No	Modified Class II PHWH	Perennial	9, 10	No
J	C2	9	1.05	32	ND	n/a	No	Modified Class II PHWH	Intermittent	12, 13	Yes
J-2	C3	10	0.65	n/a	ND	72	No	WWH	Intermittent	14, 15	No
K	C2	9	0.24	16	ND	n/a	No	Modified Class I PHWH	Ephemeral	16, 17	No
L	C5	12	1.95	46	ND	51.5	Little Darby Creek	EWI and CWH	Intermittent	18	No
O	D3, D4	15, 16	4.11	n/a	ND	46.5	East Fork Buck Creek	CWH ¹	Perennial	19, 20	No
O-2	D3	16	3.98	n/a	ND	39	East Fork Buck Creek	CWH ¹	Perennial	21, 22	No
P	C3	10	0.07	19	ND	n/a	Dugan Ditch	Listed CWH; Measured Modified Class I PHWH	Intermittent	23	No
Q	D3	15	0.07	37	ND	n/a	No	Modified Class II PHWH	Intermittent	24	No
R	C3	10	0.12	43	ND	n/a	No	Class II PHWH	Intermittent	25, 26	No
S	B4	6	0.08	27	ND	n/a	No	Modified Class I PHWH	Ephemeral	27, 28	Yes
V	C2	9	0.12	51	ND	n/a	No	Modified Class II PHWH	Intermittent	29	Yes
W	C2	9	0.15	66	ND	n/a	No	Modified Class II PHWH	Intermittent	30, 31, 32	Yes
Y	D3	15	5.56	n/a	ND	47.5	Buck Creek	CWH ¹	Intermittent	33, 34	No
Y-2	C3	10	3.51	n/a	ND	25.5	Buck Creek	CWH ¹	Intermittent	35, 36	No
Y-3	C3	10	1.87	n/a	ND	22	Buck Creek	CWH ¹	Intermittent	37, 38	No
Y-4	C3	10	1.85	n/a	ND	33	Buck Creek	CWH ²	Intermittent	39, 40	No
AA	C3	10	0.26	54	ND	n/a	Buck Creek	CWH ²	Intermittent	41, 42	No
BB	B4	6	1.11	69	ND	44	Treacle Creek	EWI	Intermittent	43	No
BB-3	B4	6	0.15	61	ND	n/a	Treacle Creek	EWI ¹	Intermittent	44, 45	No
CC	D3	15	0.63	21	ND	n/a	No	Modified Class I PHWH	Ephemeral	46	No
DD	C5	12	0.068	22	ND	n/a	No	Modified Class I PHWH	Ephemeral	47	No
EE	D4	16	0.31	34	ND	n/a	No	Modified Class II PHWH	Ephemeral	48	No
GG ³	C3	10	0.19	45	ND	n/a	No	Modified Class II PHWH	Ephemeral	49, 50	No
HH	C3	10	0.25	22	ND	n/a	No	Modified Class I PHWH	Ephemeral	51, 52	No
II	C3	10	0.04	25	ND	n/a	No	Modified Class I PHWH	Ephemeral	53, 54	No
JJ	C3	10	1.08	n/a	ND	36.5	No	Modified WWH	Intermittent	55, 56	Yes
LL	B2	4	0.05	32	ND	n/a	No	Class II PHWH	Ephemeral	57, 58	Yes
MM	B5	7	0.13	29	ND	n/a	No	Modified Class I PHWH	Ephemeral	59, 60	No
NN	D4	17	0.51	46	ND	n/a	No	Modified Class II PHWH	Ephemeral	61, 62	No
OO	D3	16	0.69	36	ND	n/a	No	Modified Class II PHWH	Ephemeral	63, 64	No
PP	C4	11	0.05	15	ND	n/a	No	Modified Class I PHWH	Ephemeral	65, 66	Yes
QQ	B4	6	0.2	15	ND	n/a	No	Modified Class I PHWH	Ephemeral	67, 68	No
WW	D5	18	0.42	42	ND	n/a	No	Modified Class II PHWH	Ephemeral	69, 70	No
XX	D5	18	0.01	38	ND	n/a	No	Modified Class II PHWH	Ephemeral	71, 72	No
YY	D5	18	0.27	8	ND	n/a	No	Modified Class I PHWH	Ephemeral	73, 74	No
ZZ	C4	11	0.24	43	ND	n/a	No	Modified Class II PHWH	Ephemeral	75, 76	No
ZZ-2	C4	11	0.1	29	ND	n/a	No	Modified Class I PHWH	Ephemeral	77, 78	No
AAA	D3	16	0.05	34	ND	n/a	No	Modified Class II PHWH	Ephemeral	79, 80	Yes

HHEI = Headwater Habitat Evaluation Index
HMFEI = Headwater Macroinvertebrate Field Evaluation Index
QHEI = Qualitative Habitat Evaluation Index
PHWH = Primary Headwater Habitat
CWH = Coldwater Habitat
EWI = Exceptional Warmwater Habitat
WWH = Warmwater Habitat
n/a = Not applicable.
ND = no data obtained.
¹Verified by the OEPA in 2005
²Recommended for Coldwater Habitat by OEPA in 2005.
³Isolated Stream
[§]Subject to verification by US Army Corps of Engineers.
[†]Subject to verification by Ohio EPA.

FIGURES





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Summary: Application Appendix C - Surface Water Report (1-42) electronically filed by Mr. Michael J. Settineri on behalf of Buckeye Wind LLC