DICKINSON WRIGHT PLLC

150 E. GAY STREET, 24TH FLOOR
COLUMBUS, OH 43215-3192
TELEPHONE: (614) 744-2570
FACSIMILE: (844) 670-6009
http://www.dickinsonwright.com

CHRISTINE M.T. PIRIK
CPirik@dickinsonwright.com
(614) 591-5461

June 20, 2019

Ms. Tanowa Troupe, Secretary
Ohio Power Siting Board
Docketing Division
180 East Broad Street, 11th Floor
Columbus, OH 43215

Re: Case Nos. 09-479-EL-BGN, 11-3446-EL-BGA, 16-469-EL-BGA, and 16-2404-EL-BGA
In the Matter of the Application of Hardin Wind Energy LLC for a Certificate of Environmental Compatibility and Public Need for the Hardin Wind Farm.

Phase 3 – Compliance with Condition 57(a), Case No. 09-479-EL-BGN – 2018 and 2019 Wetlands Delineation Reports (Turbine Foundations and Access Roads)

Dear Ms. Troupe:

Hardin Wind Energy LLC ("Applicant") is certified to construct a wind-powered electric generation facility in Hardin County, Ohio, in accordance with the orders issued by the Ohio Power Siting Board ("OPSB") in the above-referenced cases.

The Applicant is currently preparing to begin Phase 3 of the project, which will entail construction of the access roads and turbine foundations that were not included in Phases 1 and 2.

At this time, for purposes of complying with the certificate conditions for Phase 3, the Applicant is filing the attached 2018 and 2019 Wetlands Delineation Reports (Attachments A and B, respectively). The 2019 Report supplements the 2018 Report; together the reports cover the full wetlands delineation review for the turbine foundations and access roads. These documents are being provided in compliance with Condition 57(a) of OPSB's March 22, 2010 Order in Case No. 09-479-EL-BGN.

We are available, at your convenience, to answer any questions you may have.

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
William V. Vorys (0093479)
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
Columbus, Ohio 43215
Attorneys for Hardin Wind Energy LLC

cc: Ed Steele
Derek Collins

COLUMBUS 39579-20 117780v1

WETLANDS AND OTHER WATERS OF THE U.S. DELINEATION REPORT

Hardin Wind Energy Project

Hardin County, Ohio

August 2018

TRC Project No. 302899.0000.0000

Prepared For:

Hardin Wind Energy LLC
One South Wacker Drive, Suite 1800
Chicago, IL 60606
Phone: 812.224.1400

Tracy Engle
Office Practice Leader

Prepared By:

TRC Environmental Corporation
921 Eastwind Drive, Suite 122
Westerville, OH 43081
Phone: 614.423.6342

Maggie Molnar
Ecologist

TRC
Results you can rely on

CONFIDENTIAL BUSINESS INFORMATION

TABLE OF CONTENTS

List of Tables

Appendices:

A. Figures
    1. USGS 7.5-minute Topographic Map
    2. USDA Soil Survey Map
    3. National Wetlands Inventory and National Hydrography Dataset Map
    4. Nationwide Permits Stream Eligibility Map
    5. Federal Emergency Management Agency Flood Hazard Map
    6. Delineation Findings
        a. Delineated Resource Boundaries
        b. Delineated Resource Preliminary ORAM, QHEI and HHEI Scores
    7. Photo Documentation and Locations
B. Photographic Log
    1. Wetland Resource Photographs
    2. Other Waters of the U.S. Resource Photographs
C. USACE Wetland Determination Data Forms
D. Ohio EPA ORAM Data Forms
E. Ohio EPA Stream Data Forms

ACRONYMS

CR	County Road
DOW	Division of Wildlife
FAC	Facultative
FACU	Facultative upland
FACW	Facultative wetland
FEMA	Federal Emergency Management Agency
GPS	Global Positioning System
HHEI	Headwater Habitat Evaluation Index
HUC	Hydrologic Unit Code
HWE	Hardin Wind Energy LLC
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OAC	Ohio Administrative Code
OBL	Obligate wetland
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
OHWM	Ordinary High-Water Mark
ORAM	Ohio Rapid Assessment Method
PEM	Palustrine emergent
PFO	Palustrine forested
PHWH	Primary Headwater Habitat

POW	Palustrine open-water
Project	Hardin Wind Energy Project
PSS	Palustrine scrub-shrub
QHEI	Qualitative Habitat Evaluation Index
Report	Wetlands and Other Waters of the U.S. Delineation Report
TNM	The National Map
TRC	TRC Environmental Corporation
UPL	Upland
U.S.	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WWH	Warmwater Habitat
WQC	Water Quality Certification

1.0 INTRODUCTION

On behalf of Hardin Wind Energy LLC (HWE), TRC Environmental Corporation (TRC) has prepared this Wetlands and Other Waters of the United States (U.S.) Delineation Report (Report) as part of the environmental studies conducted for the Hardin Wind Energy Project (Project), located in Hardin County, Ohio (Appendix A, Figure 1). This Report contains the methodology and results of the wetland identification and delineation investigations performed by TRC. Ms. Maggie Molnar, PWS and Mr. Justin Pitts (TRC) are environmental scientists with over 17 years of combined experience and were the lead field scientists and preparers of this Report.

The primary objective of the survey was to identify and evaluate wetlands and other waters of the U.S. within the Study Area, such that the resources could be considered in the planning, design, permitting, and installation of the proposed Project in accordance with Ohio Administrative Code (OAC) Chapter 4906-4-08 (B)(1)(a)(iv-v)-(b).

The Study Area is approximately 1,419 acres (574 hectares) in total, including areas of Marion, Cessna, Lynn, McDonald, and Roundhead Townships, within Hardin County, Ohio, where seventy (70) proposed turbines and subsequent collection lines and access roads may be located. The Study Area included a 100-foot buffer (50 feet on either side of centerline) for the turbine access roads and a 500-foot buffer around the turbines. The Study Area was dominated by rotational upland cropland with pockets of emergent herbaceous and scrub/shrub wetland, forested wetland, and deciduous forest. The Study Area is bounded by County Road (CR) 90 and Township Road 80 to the north, CR 115 to the east, State Route 235 to the west, as well as residential properties and CR 150 to the south. Currently, the undeveloped land is privately owned (Appendix A, Figure 1).

The Study Area lies within the Eastern Corn Belt Plains, which typically have loamy and well-drained soils, and most commonly characterized by its rolling plains and local end moraines (Wilken, Jiménez Nava and Griffith 2011). The vegetation of the ecoregion was originally dominated by American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), and American basswood (*Tilia americana*) forests. Overall the landscape has been significantly altered to accommodate agricultural activities which have negatively altered stream chemistry and turbidity (US EPA 2010; US EPA 2013; Wilken, Jiménez Nava and Griffith 2011). Topography in the region consists of flat farmland, with elevations ranging from 958 feet (292 meters) to 1030 feet (314 meters) above mean sea level. The proposed Project is located within the Ohio River and Lake Erie drainage basins. The United States Department of Agriculture (USDA) Natural

Resources Conservation Service (NRCS) maintains a classification system for identifying watersheds by hydrologic unit code (HUC). The Project is located mostly within the Upper Scioto River watershed (8-Digit HUC: 05060001) with a small portion, located northeast of SR-309, within the Blanchard River watershed (8-Digit HUC: 04100008) (USDA/NRCS, Watershed Boundary Dataset 2013). The streams and tributaries found within the Study Area include Cooney Ditch, Twin Branches, and multiple unnamed tributaries to these waterbodies, as well as unnamed tributaries to Scioto River and Cottonwood Ditch (Appendix A, Figure 1).

2.0 METHODOLOGY

Pursuant to the United States Army Corps of Engineers (USACE) wetlands and other waters of the U.S. delineation methodology, potential wetland and other waters of the U.S. located within the Study Area were identified, delineated, and mapped through the combined use of existing available public source information and field investigation. In addition, in accordance with the State of Ohio's Water Quality Standards (OAC Rule 3745-1-54), wetlands within the Study Area were evaluated and provisionally categorized utilizing Ohio EPA's Ohio Rapid Assessment Method (ORAM).

2.1 Desktop Review Methodology

The sources utilized for the desktop review included: the United States Geological Survey (USGS) Alger, Foraker, and Roundhead, Ohio (1988) 7.5-minute series topographical quadrangles (USGS 1994) (Appendix A, Figure 1), soil datasets acquired from the NRCS Web Soil Survey (USDA 2018) for Hardin County, Ohio (Appendix A, Figure 2), the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) for Ohio (USFWS 2018) (Appendix A, Figure 3), the USGS National Hydrography Dataset (NHD) (USGS no date [n.d.]) (Appendix A, Figure 3), the Ohio Environmental Protection Agency (Ohio EPA) 401 Water Quality Certification (WQC) for the Nationwide Permits Stream Eligibility Map (Ohio EPA 2017) (Appendix A, Figure 4), the Federal Emergency Management Agency (FEMA) flood hazard risk map (FEMA 2018) (Appendix A, Figure 5), the Ohio EPA OAC Chapter 3745-1 Water Quality Standards (Ohio EPA 2017), and the Ohio Department of Natural Resources (ODNR), Division of Wildlife (DOW). Sources were reviewed to identify conditions that may be present within the Study Area. The results of the desktop review were used to aid in the field investigation.

2.2 Field Methodology-Wetlands

Wetland resources within the Study Area were identified and their boundaries determined in accordance with the USACE *Wetlands Delineation Manual (1987 Manual)* (USACE 1987), utilizing the *Regional Supplement to the U.S. Army Corps of Engineers Wetland Delineation Manual: Midwest (Version 2.0) (Regional Supplement)* (USACE 2010). Consistent with the *1987 Manual*, wetland determinations were based on dominant plant species, soil characteristics, and hydrologic characteristics. In addition, wetlands and other waters of the U.S. were evaluated in accordance with the State of Ohio's Water Quality Standards (OAC Chapter 3745-1) as managed by the Ohio Environmental Protection Agency (Ohio EPA). Areas that exhibit hydric soils, wetland hydrology, and a dominance of hydrophytic vegetation were considered potentially jurisdictional wetlands. Wetlands or other waters of the U.S. are considered potentially jurisdictional until verified by the USACE (USACE/USEPA 2008). A photographic log of field

observations is presented in Appendix B. Completed USACE Wetland Determination Data Forms-Midwest Region are presented in Appendix C.

Soils were examined by excavating a soil pit twenty (20) inches (50 centimeters) below the ground surface using a tile spade. The exposed soil profile was examined for characteristics using hydric soil criteria described in the National Technical Committee for Hydric Soils *Field Indicators of Hydric Soils in the United States* (USDA 2010). Hue, value, and chroma of the matrix (e.g., 10YR 6/1) and mottles (e.g., 10YR 5/6) of moist soils are examined, as determined by using the *Munsell Soil Color Chart* (Munsell Color 2009).

The hydrology criterion in the *Regional Supplement* requires that an area exhibit at least one primary or at least two secondary indicators of wetland hydrology. Examples of primary wetland hydrology indicators include standing water or saturated soils, water marks on trees, drift lines, water-stained leaves, and oxidized root zones surrounding living roots. Examples of secondary wetland hydrology indicators include drainage patterns, microtopographic relief, presence of crayfish burrows, and sparsely vegetated concave surfaces. Additional secondary signs of hydrology include visible saturation on aerial photographs and a positive facultative (FAC)-neutral test as described below (USACE 2010).

Plants were identified to the lowest taxonomic level possible, using professional references to differentiate cryptic taxa (Braun 1967) (Braun 1969) (Gleason and Cronquist 1991) (Holmgren 1998) (Mohlenbrock 2001a) (Mohlenbrock 2001) (Mohlenbrock 2002) (Mohlenbrock 2006) (Mohlenbrock 2011) (Newcomb 1977) (Rhoads and Block 2007) (Rothrock 2009) (Stein, Binion and Acciavatti 2003) (Voss and Reznicek 2012) (Weakley, Ludwig and Townsend 2013). Dominant vegetation for each community was determined by estimating dominant species in the tree, sapling/shrub, herbaceous, and woody vine strata. Dominant species were determined by using the 50/20 dominance rule for each stratum, which was accomplished by estimating the percent areal cover for each species. The relative percent areal cover was calculated for each species by dividing each species percent cover by the total percent cover for all species and multiplying by 100. The species were then arranged in descending order of relative percent cover. A running total was kept by adding the relative cover of each species starting with the species with the highest relative cover until the total cover equals 50 percent. All species included in this calculation are regarded as dominant. Species of equal cover value that contributed to meeting the sum of 50 are also considered dominant. Additionally, other species that solely accounted for 20 percent or more of the relative percent cover were also considered dominant species.

The indicator status of each dominant species was determined. An indicator status of obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU) and/or upland (UPL)

has been assigned to each plant species in the *U.S. Army Corps of Engineers National Wetlands Plant List* (Lichvar, Banks, et al. 2016). In accordance with the *U.S. Army Corps of Engineers National Wetlands Plant List* (Lichvar, Banks, et al. 2016), an area was classified with hydrophytic vegetation when, under normal circumstances, more than 50 percent of the composition of the dominant species from all strata is comprised of OBL, FACW, and/or FAC species.

The FAC-neutral test, a secondary indicator of hydrology, was calculated for each data set. This test considers all FAC species as neutral for wetland determination and compares the number of dominant species wetter than FAC (e.g., OBL, FACW) against the number of dominant species drier than FAC (e.g., FACU, UPL). A positive FAC-neutral test results when dominant species wetter than FAC are more prevalent than dominant species drier than FAC. A positive FAC-neutral test is a secondary indicator of wetland hydrology.

Plots, and consequently communities, that meet the three criteria of hydric soils, wetland hydrology, and hydrophytic vegetation are considered wetlands. Wetland boundaries were mapped where one or more of these criteria gave way to upland characteristics (i.e. no longer met the soils, hydrology, and hydrophytic vegetation requirements as previously described). Samples were also taken in nearby apparent upland areas to confirm that one or more of the criteria were not met in these locations.

Wetlands within the Study Area were classified according to the USFWS *Classification of Wetlands and Deepwater Habitats for the United States* (Cowardin, et al. 1979). Wetland classifications were based upon hydrophytic vegetation type and dominance found within the delineated wetland, and included the following classification types: palustrine emergent (PEM), palustrine scrub-shrub (PSS), palustrine forested (PFO), palustrine open-water (POW), or a combination of these classifications (Cowardin, et al. 1979).

The wetland boundaries were flagged and surveyed through the use of a Global Positioning System (GPS) receiver capable of sub-meter accuracy (Model R1, handheld, Trimble, Sunnyvale, California). The delineated wetlands were labeled (e.g., *Wetland HW-MA, Wetland HW-MB,* etc.) and correspond to the wetlands illustrated on the Delineated Resources map provided in Appendix A, as Figure 6A. The wetland boundaries were mapped as polygons and the wetland areal extents were calculated using the shapefile properties utility in ArcMap.

Wetland boundaries that extended beyond the Study Area were delineated to the edge of the Study Area and categorized as “Open Ended” within the GPS data to indicate that the wetland continued.

2.3 Ohio Rapid Assessment Method

The regulation of wetlands under Section 401 and 404 of the Clean Water Act requires the assessment of the function and quality of wetlands in order to determine the appropriate level of mitigation that should be required for the destruction, alteration, or degradation of a wetland. In accordance with Ohio EPA requirements (OAC Rule 3745-1-54), delineated wetlands within the Study Area were evaluated using the Ohio Rapid Assessment Method in an attempt to determine the ecological quality and the level of function of these wetlands (ORAM Version 5.0) (Mack 2001). The wetland value information, as determined by the ORAM, is provided to the Ohio EPA for the purposes of placing wetlands in the appropriate wetland Antidegradation Category as defined in Ohio's Wetland Antidegradation Rule (OAC Rule 3745-1-54). These ORAM scoring sheets (data forms) are populated based on a review of resource material (e.g. FEMA 100-year floodplain, known occurrence of state/federal threatened or endangered species, etc.), data obtained in the field, and the acreage as determined by delineation and mapping. Utilizing the ORAM wetland categories as defined by Ohio EPA, wetlands were provisionally categorized as low quality (Category 1) to high quality (Category 3). The score from the Quantitative Rating ranges from 0 to 100 and the scoring breakdown for wetland regulatory categories is as follows:

Category 1: 0 - 29.9 (Low Quality)
Category 1 or 2 Gray Zone: 30 - 34.9
Modified Category 2: 35 - 44.9
Category 2: 45-59.9 (Moderate Quality)
Category 2 or 3: 60 - 64.9
Category 3: 65 - 100 (High Quality)

The ORAMs were performed using detailed field evaluations and, for wetland features extending beyond the Study Area, were supplemented by aerial photographic interpretation to aid in approximate boundary determination and total area estimates. While the score and conclusions of the ORAM are designed such that they correlate well with more detailed measures of the biology of the wetlands, they are not considered absolutely definite. ORAM scores are considered preliminary until verified by the Ohio EPA. Refer to Appendix D for completed ORAM data forms.

The scoring sheets (ORAM Version 5.0 Field Form Quantitative Rating) for individual wetlands were completed and were the basis for the provisional wetland categorizations. The delineated wetlands and preliminary ORAM scores are illustrated in Appendix A, Figure 6B.

2.4 Field Methodology - Other Waters of the U.S.

The Study Area was screened for the presence of areas that meet the criteria for "other waters of the U.S." specified in the *1987 Manual*. Other waters of the U.S. consist of ephemeral, intermittent, and perennial streams, as well as open water features, such as ponds. Drainage channels that exhibited defined "bed and bank" and an ordinary high-water mark (OHWM) in the channel were identified and delineated as jurisdictional streams. Drainage channels that do not exhibit an OHWM and/or defined bed and bank were regarded as non-jurisdictional drainages. Non-jurisdictional drainages were not delineated as part of the study. Delineated resources are illustrated in Appendix A, Figure 6A. Jurisdictional determinations are made by the USACE; therefore, all determinations are preliminary until verified by the USACE (USACE/USEPA 2008).

Identified streams were evaluated utilizing Ohio EPA approved methods for stream habitat assessment which include the Qualitative Habitat Evaluation Index (QHEI) and/or the Headwater Habitat Evaluation Index (HHEI) assessment method (Ohio EPA 2006, Ohio EPA 2012). These approved assessment methods provide an empirical, quantified evaluation of streams as required by the State of Ohio for permitting and mitigation purposes. These methods assess stream habitat to provide a qualitative index (score) to determine the level of compensatory mitigation that may be needed for impacts to waters of the U.S.

Use of the QHEI or HHEI assessment method is determined based on the size of the stream's drainage area and/or the stream's pool depths. Where coverage was available, the drainage area was calculated using automated basin characteristics from USGS StreamStats v 4.0: Ohio (USGS 2017).

Following Ohio EPA guidance, streams with a drainage area of greater than 1.0 square mile (2.6 square kilometers), or which have pools with maximum depths over 15.8 inches (40.0 centimeters), as determined by measuring pool depth within the stream, were evaluated using the QHEI. Data on these streams were collected on the QHEI form provided by the Ohio EPA. The QHEI is composed of six principal metrics: substrate, instream cover, channel morphology, riparian zone and bank erosion, pool/glide and riffle-run quality, and map gradient. Each metric is scored separately and summed to obtain the total QHEI score. Using the scoring methods associated with these forms, the stream is placed into the following general narrative ranges, dependent on stream size; for smaller streams ($\leq$20 sq. mi): Excellent >70, Good 55-69, Fair 43-54, Poor 30-42, and Very Poor <30; for larger streams (>20 sq. mi): Excellent >75, Good 60-74, Fair 45-59, Poor 30-44, and Very Poor <30.

The HHEI was utilized to score streams with a drainage area of less than 1.0 square mile (2.6 square kilometers). Data on these streams were collected on the HHEI forms, provided by the Ohio EPA. Observational data regarding the physical nature of the stream corridor including stream flow, riparian zone

land use and buffer width, and channel modification were recorded. Measurements included bankfull width, maximum pool depth and substrate composition.

Using the scoring method associated with these forms, a Class I, II, or III was assigned to each stream (with Class I being the least protected and Class III being the most protected). Streams that exhibited a major change in morphology were scored at multiple representative locations. QHEI and HHEI scores are considered preliminary until verified by the Ohio EPA. Appendix E provides completed Ohio EPA Stream Data Sheets (QHEI and HHEI Data Forms). The delineated streams and QHEI and HHEI scores are illustrated in Appendix A, Figure 6B.

The Study Area was investigated for other waters of the U.S. that are considered "open water" by the USACE. By definition, open water was "an area that, during a year with normal patterns of precipitation, has standing or flowing water for sufficient duration to establish an OHWM, where aquatic vegetation is either non-emergent, spares or absent" (USACE n.d.). When identified, the derived open water (pond) boundaries were surveyed through the use of a GPS receiver capable of sub-meter accuracy (model GeoHX handheld, Trimble, Sunnyvale, California). Delineated open waters are labeled (e.g., *WB-HW-M1*, *WB-HW-M2* etc.) and areas area mapped as polygons.

3.0 RESULTS

During the investigations identified within this Report, ten (10) wetlands, ten (10) streams, and one (1) waterbody were identified and delineated within the Study Area (Tables 3.1, 3.2.1, and 3.2.2).

Table 3.1 Potential Wetlands and Other Waters of the U.S. Investigated and Jurisdictional Determinations within the Study Area

Resource ID	Field Survey Date	Location (Latitude, Longitude)	Provisional Determination[1]	Acreage (Hectares) of Jurisdictional Waters[1] in Study Area and Cowardin Classification[2]
HW-MA	5/10/18	40.69490, -83.74977	Waters of the U.S., Wetland	0.08 (0.03)/PEM
HW-MB	5/10/18	40.69465, -83.74859	Waters of the U.S., Wetland	0.27 (0.11)/PEM
HW-MC	5/11/18	40.70766, -83.70549	Waters of the U.S., Wetland	0.39 (0.16)/PFO
HW-MD	5/11/18	40.70149, -83.70381	Waters of the U.S., Wetland	0.35 (0.14)/PFO
HW-MD_A	5/14/18	40.70031, -83.83539	Waters of the U.S., Wetland	0.14 (0.06)/PEM
HW-MH	5/15/18	40.65228, -83.79242	Waters of the U.S., Wetland	0.13 (0.05)/PEM
HW-MJ	5/16/18	40.68208 -83.73811	Waters of the U.S., Wetland	0.10 (0.04)/PEM
HW-MK	5/17/18	40.62303, -83.81228	Waters of the U.S., Wetland	0.02 (0.01)/PFO
HW-ML	5/17/18	40.62409, -83.80188	Waters of the U.S., Wetland	0.28 (0.11)/PEM
HW-MM	5/18/18	40.63594, -83.77854	Waters of the U.S., Wetland	0.08 (0.03)/PEM
HW-M1	5/10/18	40.69665, -83.76118	Waters of the U.S., Stream	2.15 (0.87)/R5
HW-M2	5/10/18	40.70068, -83.75114	Waters of the U.S., Stream	0.02 (0.01)/R6
HW-M3	5/10/18	40.69823, -83.74951	Waters of the U.S., Stream	<0.01 (<0.01)/R6
HW-M4	5/14/18	40.69135, -83.83257	Waters of the U.S., Stream	0.10 (0.04)/R5
HW-M5	5/14/18	40.68535, -83.84225	Waters of the U.S., Stream	<0.01 (<0.01)/R5
HW-M6	5/14/18	40.68767, -83.84225	Waters of the U.S., Stream	<0.01 (<0.01)/R4
HW-M7	5/14/18	40.67036, -83.84464	Waters of the U.S., Stream	0.03 (0.01)/R5
HW-M8	5/14/18	40.67046, -83.83649	Waters of the U.S., Stream	0.07 (0.03)/R4
HW-M9	5/14/18	40.67472, -83.82681	Waters of the U.S., Stream	0.07 (0.03)/R5
HW-M10	5/16/18	40.65989, -83.82030	Waters of the U.S., Stream	0.01 (<0.01)/R5

Table 3.1 Potential Wetlands and Other Waters of the U.S. Investigated and Jurisdictional Determinations within the Study Area

Resource ID	Field Survey Date	Location (Latitude, Longitude)	Provisional Determination[1]	Acreage (Hectares) of Jurisdictional Waters[1] in Study Area and Cowardin Classification[2]
WB-HW-M1	5/14/18	40.67487, -83.82799	Waters of the U.S., Pond	0.07 (0.03)/POW

[1] Preliminarily assigned. Not considered final until verified by the USACE
[2] Cowardin Classification
PEM = Palustrine Emergent
PFO = Palustrine Forested
POW = Palustrine Open Water
R4 = Intermittent Stream
R5 = Perennial Stream
R6 = Ephemeral Stream

3.1 Background Resources

3.1.1 USGS Topographic Map

Based on desktop review, the Study Area contained no wetland features according to the Alger, Foraker, and Roundhead, Ohio (1985) 7.5-minute series topographical quadrangles (USGS 1994) (Appendix A, Figure 1). The majority of the terrain is almost completely level with the exception of stream channels. Elevation ranges from approximately 958 to 1030 feet (292 to 314 meters) above mean sea level and increases moving north from the Scioto River.

3.1.2 Soils

According to the soil dataset acquired from the NRCS Web Soil Survey for Hardin County, Ohio, the Study Area was underlain by twenty-five (25) different soil types; twelve (12) soil types are mapped as hydric and thirteen (13) soil types are mapped as non-hydric \(USDA 2018) (Table 3.1.2 and Appendix A, Figure 2). Hydric soils account for 83.19% of the Study Area.

Table 3.1.2 Soils Mapped within the Study Area

Soil Code	Soil Name	Percent (%) in Study Area	Hydric Status
Mc	McGuffey muck	25.20%	Hydric
Mf	Milford silty clay loam, 0 to 2 percent slopes	16.45%	Hydric
Ro	Roundhead muck	16.15%	Hydric
PkA	Pewamo silty clay loam, 0 to 1 percent slopes	9.91%	Hydric
Ln	Linwood muck	6.36%	Hydric

Table 3.1.2 Soils Mapped within the Study Area

Soil Code	Soil Name	Percent (%) in Study Area	Hydric Status
Mns3A	Minster silty clay loam, 0 to 1 percent slopes	4.62%	Hydric
Po	Pewamo variant muck	1.72%	Hydric
Co	Colwood loam	1.00%	Hydric
Ot	Olentangy silt loam	0.78%	Hydric
We	Westland clay loam	0.66%	Hydric
Ca	Carlisle muck, Central Ohio clayey till plain, drained, 0 to 2 percent slopes	0.24%	Hydric
Mny3A	Minster silty clay loam, gravelly substratum, 0 to 1 percent slopes	0.10%	Hydric
Ble1B1	Blount silt loam, end moraine, 2 to 4 percent slopes	5.24%	Non-hydric
Blg1A1	Blount silt loam, ground moraine, 0 to 2 percent slopes	3.94%	Non-hydric
Blg1B1	Blount silt loam, ground moraine, 2 to 4 percent slopes	2.32%	Non-hydric
Ble1A1	Blount silt loam, end moraine, 0 to 2 percent slopes	2.14%	Non-hydric
DeA	Del Rey silt loam, 0 to 3 percent slopes	0.97%	Non-hydric
Gwe1B1	Glynwood silt loam, end moraine, 2 to 6 percent slopes	0.82%	Non-hydric
KbA	Kibbie loam, 0 to 3 percent slopes	0.50%	Non-hydric
HkA	Haskins silt loam, 0 to 2 percent slopes	0.45%	Non-hydric
Gwg5C2	Glynwood clay loam, ground moraine, 6 to 12 percent slopes, eroded	0.15%	Non-hydric
FuA	Fulton silt loam, 0 to 2 percent slopes	0.14%	Non-hydric
Gwd5C2	Glynwood clay loam, 6 to 12 percent slopes, eroded	0.07%	Non-hydric
Gwg1B1	Glynwood silt loam, ground moraine, 2 to 6 percent slopes	0.04%	Non-hydric
SkA	Sleeth silt loam, 0 to 3 percent slopes	0.03%	Non-hydric

3.1.3 National Wetlands Inventory

According to the USFWS NWI (USFWS 2018), there are two (2) freshwater forested/shrub wetlands located within the Study Area (Appendix A, Figure 3).

3.1.4 National Hydrography Database

The USGS NHD (USGS 2017) Downloadable Data Collection from The National Map (TNM) is a comprehensive set of digital spatial data that encodes information about naturally occurring and constructed bodies of surface water (lakes, ponds, and reservoirs), paths through which water flows (canals, ditches, streams, and rivers), and related entities such as point features (springs, wells, stream gages, and dams).

Six (6) streams mapped in the National Hydrography Dataset were identified within the Study Area (Appendix A, Figure 3).

3.1.5 Ohio EPA Stream Eligibility for Nationwide Permit Program

Ohio EPA, as part of Ohio's 401-WQC process, has determined which HUC12 watersheds within the state have streams eligible for coverage under Nationwide Permits. There are three categories identified within Ohio: eligible, ineligible, and possibly eligible, with additional field screening required. All streams identified as part of this Project are located within Eligible areas as according to Ohio EPA's Stream Eligibility for Nationwide Permit Program (Ohio EPA 2017) and are therefore eligible for coverage under the 401-WQC for Nationwide Permits (Appendix A, Figure 4).

3.1.6 FEMA Flood Hazard

According to the FEMA Flood Hazard mapping, a portion of the Study Area along Cottonwood Ditch is located within FEMA Flood Zone A (FEMA 2018) (Appendix A, Figure 5).

3.1.7 Water Quality Standards

Two (2) streams within the Study Area have a Designated Use from Ohio EPA according to OAC Chapter 3745-1 Water Quality Standards (Ohio EPA 2017). Cooney Ditch and Twin Branches are listed as Warmwater Habitat (WWH). These designations are based on the results of a biological field assessment performed by the Ohio EPA. WWH habitat streams have been determined, by OAC Chapter 3745-1 Water Quality Standards, to be capable of supporting and maintaining a balanced community of warmwater aquatic organisms. WWH is the most common designation assigned to streams within Ohio.

3.2 Field Delineations

TRC performed wetland and other waters of the U.S. identification and delineation on May 10th, 11th, and 14th – 18th, 2018. Weather conditions were seasonably warm, reaching a high of 82 degrees Fahrenheit (28 degrees Celsius) with little rain, and clear and mostly sunny skies. The investigation was performed within normal growing season. The presence of apparent hydrology and hydric soil indicators, as well as identifiable plant species within the wetland area, allowed for positive wetland determinations. The USACE maintains the final authority that determines jurisdiction; therefore, statements about jurisdiction within this Report are preliminary and subject to final determination by the USACE and Ohio EPA.

3.2.1 Wetlands

During the course of this investigation ten (10) wetlands were identified and delineated within the Study Area. The wetlands are listed in Table 3.2.1, described below and shown in Appendix A on Figures 6A and 6B. The completed USACE Wetland Determination Data Forms-Midwest Region are presented in Appendix C.

Table 3.2.1 Wetland Delineated within the Study Area

Wetland ID	Vegetation Class[1]	Extends Offsite?	Acres (Hectares)[2]	ORAM Score[3]	ORAM Category[3]	Jurisdictional Status[4]
HW-MA	PEM	No	0.08 (0.03)	12	1	Jurisdictional
HW-MB	PEM	No	0.27 (0.11)	12	1	Jurisdictional
HW-MC	PFO	Yes	0.39 (0.16)	34	1 or 2 Gray Zone	Jurisdictional
HW-MD	PFO	Yes	0.35 (0.14)	37	Modified 2	Jurisdictional
HW-MD_A	PEM	Yes	0.14 (0.06)	15	1	Jurisdictional
HW-MH	PEM	Yes	0.13 (0.05)	20	1	Jurisdictional
HW-MJ	PEM	No	0.10 (0.04)	20	1	Jurisdictional
HW-MK	PFO	No	0.02 (0.01)	24	1	Jurisdictional
HW-ML	PEM	Yes	0.28 (0.11)	22	1	Jurisdictional
HW-MM	PEM	Yes	0.08 (0.03)	12	1	Jurisdictional

[1] PEM = palustrine emergent
PSS = palustrine scrub/shrub
PFO = palustrine forested
[2] Represents delineated acreage within Study Area
[3] Preliminarily assigned. Not considered final until verified by Ohio EPA
[4] Preliminarily assigned. Not considered final until verified by the USACE

Much of the Study Area is maintained active, rotational agriculture (primarily corn and soy beans). However, a total of ten (10) wetlands were identified throughout the Study Area. These wetlands mostly occurred within in the tree-lines, grassed swales, and forested portions of the Study Area. Historic and recent tiling is prevalent within the Study Area for the purpose of creating useable farmland. All wetlands within the Study Area are potentially jurisdictional as they display a physical connection or adjacency to a jurisdictional stream.

Wetland HW-MA

Wetland HW-MA (Appendix A; Figure 6A and 6B; Page 22 of 29) is a 0.08-acre (0.03-hectare) PEM wetland dominated by common barnyard grass (*Echinochloa crus-galli*) and corn (*Zea mays*). This area has been actively farmed, however, the planted corn is not thriving and is stunted. This has allowed for common barnyard grass to take over. The wetland is preliminarily assigned an ORAM score of 12, corresponding to a Category 1 wetland (low quality). The score was limited by disturbances to the

hydrology, substrate, and habitat of Wetland HW-MA (i.e. tiling, clearcutting, nutrient enrichment, and farming).

Wetland HW-MB

Wetland HW-MB (Appendix A; Figure 6A and 6B; Page 22 of 29) is a 0.27-acre (0.11-hectare) PEM wetland dominated by common barnyard grass and corn. This area has been actively farmed, however, the planted corn is not thriving and is stunted. This has allowed for common barnyard grass to take over. The wetland is preliminarily assigned an ORAM score of 12, corresponding to a Category 1 wetland (low quality). The score was limited by disturbances to the hydrology, substrate, and habitat of Wetland HW-MB (i.e. tiling, clearcutting, nutrient enrichment, and farming).

Wetland HW-MC

Wetland HW-MC (Appendix A; Figure 6A and 6B; Page 29 of 29) is a 0.39-acre (0.16-hectare) PFO wetland dominated by red maple (*Acer rubrum),* sugar maple (*Acer saccharum),* and green ash (*Fraxinus pennsylvancia)* in the tree stratum. In the shrub stratum Wetland HW-MC is dominated by spice bush (*Lindera benzoin)* and green ash. Finally, the herb stratum is dominated by eastern woodland sedge *(Carex blanda)* and false mermaidweed (*Floerkea proserpinacoides).* The wetland is preliminarily assigned an ORAM score of 34, corresponding to a Category 1 or 2 gray zone wetland. The determination of a Category 1 or 2 gray zone wetland was based on size and buffer width. The score was limited by intensity of surrounding land use, sources of water (precipitation), and disturbances to hydrology, substrate, and habitat (i.e. nutrient enrichment, selective cutting, sedimentation, tiling, etc.).

Wetland HW-MD

Wetland HW-MD (Appendix A; Figure 6A and 6B; Page 28 of 29) is a 0.35-acre (0.14-hectare) PFO wetland dominated by green ash, shagbark hickory *(Carya ovata),* and red oak *(Quercus rubra)* in the tree stratum. In the shrub stratum Wetland HW-MD is dominated by spice bush and sugar maple. Finally, the herb stratum is dominated by green ash, false mermaidweed, Virginia creeper (*Parthenocissus quinquefolia),* and common marsh bedstraw (*Galium palustre).* The wetland is preliminarily assigned an ORAM score of 37, corresponding to a Modified Category 2 wetland. The determination of a Modified Category 2 wetland was based on size, buffer width, microtopography, and moderate horizontal interspersion. The score was limited by intensity of surrounding land use, sources of water (precipitation), and disturbances to hydrology, substrate, and habitat (i.e. nutrient enrichment, woody debris removal, selective cutting, sedimentation, tiling, filling/grading, etc.).

Wetland HW-MD_A

Wetland HW-MD_A (Appendix A; Figure 6A and 6B; Page 24 of 29) is a 0.14-acre (0.06-hectare) PEM wetland dominated by reed canary grass (*Phalaris arundiancea*). This area has been ditched and has tiles from the field draining into it. The water is stagnant, allowing for wetland vegetation to grow. The wetland is preliminarily assigned an ORAM score of 15, corresponding to a Category 1 wetland. The score was limited by intensity of surrounding land use, and disturbances to hydrology, substrate, and habitat (i.e. nutrient enrichment, sedimentation, farming, dredging, tiling, filling/grading, etc.).

Wetland HW-MH

Wetland HW-MH (Appendix A; Figure 6A and 6B; Page 6 of 29) is a 0.13-acre (0.05-hectare) PEM wetland dominated by reed canary grass and hybrid cattail. This area is located within a drainage ditch that receives hydrology from adjacent field tiles. The water was stagnant at the time of the investigation, allowing for wetland vegetation to revert and dominate. The wetland is preliminarily assigned an ORAM score of 20, corresponding to a Category 1 wetland. The score was limited by intensity of surrounding land use, very narrow buffer width, poor habitat development, moderate coverage of invasive plants, and disturbances to hydrology, substrate, and habitat (i.e. nutrient enrichment, sedimentation, farming, dredging, tiling, and filling/grading, etc.).

Wetland HW-MJ

Wetland HW-MJ (Appendix A; Figure 6A and 6B; Page 18 of 29) is a 0.10-acre (0.04-hectare) PEM wetland dominated by hybrid cattail. The wetland is preliminarily assigned an ORAM score of 20, corresponding to a Category 1 wetland. The score was limited by the wetland's size, intensity of surrounding land use, narrow buffer width, poor habitat development, moderate coverage of invasive plants, and disturbances to hydrology, substrate, and habitat (i.e. clearcutting, sedimentation, farming, and tiling, etc.).

Wetland HW-MK

Wetland HW-MK (Appendix A; Figure 6A and 6B; Page 1 of 29) is a 0.02-acre (0.01-hectare) PFO wetland dominated by in the tree stratum by peachleaf willow (*Salix amygdaloides*). The shrub stratum is dominated by sandbar willow (*Salix interior*) and the herb stratum is dominated by reed canary grass and stinging nettles (*Urtica dioca*). The wetland is preliminarily assigned an ORAM score of 24, corresponding to a Category 1 wetland. The score was limited by the wetland's size, intensity of surrounding land use, very narrow buffer width, moderate coverage of invasive plants, and disturbances to hydrology, substrate, and

habitat (i.e. selective cutting, sedimentation, farming, nutrient enrichment, dredging, filling/grading, and tiling, etc.).

Wetland HW-ML

Wetland HW-ML (Appendix A; Figure 6A and 6B; Page 2 of 29) is a 0.28-acre (0.11-hectare) linear, PEM wetland dominated by reed canary grass with a small amount of cockspur hawthorn (*Crateagus crus-galli*). This area is located within a drainage ditch that receives hydrology from adjacent field tiles. This area has been ditched and has tiles from the field draining into it. The water is stagnant, allowing for wetland vegetation to dominate. The wetland is preliminarily assigned an ORAM score of 22, corresponding to a Category 1 wetland. The score was limited by the intensity of surrounding land use, very narrow buffer width, moderate coverage of invasive plants, and disturbances to hydrology, substrate, and habitat (i.e. clearcutting, sedimentation, nutrient enrichment, dredging, filling/grading, and ditching, etc.).

Wetland HW-MM

Wetland HW-MM (Appendix A; Figure 6A and 6B; Page 4 of 29) is a 0.08-acre (0.03-hectare) PEM wetland dominated by reed canary grass and shallow sedge (*Carex lurida*). The wetland is preliminarily assigned an ORAM score of 12, corresponding to a Category 1 wetland. The score was limited by the intensity of surrounding land use, very narrow buffer width, moderate coverage of invasive plants, poor habitat development, and disturbances to hydrology, substrate, and habitat (i.e. mowing, sedimentation, nutrient enrichment, tiling, and filling/grading, etc.).

3.2.2 Other Waters of the U.S.

A. Streams

During field investigation, ten (10) streams with defined bed and bank and OHWM were identified within the Study Area. Delineated streams within the Study Area are within the Upper Scioto River watershed (8-Digit HUC: 05060001) with a small portion, located northeast of SR-309, within the Blanchard River watershed (8-Digit HUC: 04100008) (USGS/NRCS, Watershed Boundary Dataset 2013). The streams are listed in Table 3.2.2, described below and shown in Appendix A on Figures 6A and 6B. The streams were channelized agricultural drainages and received direct drainage from field drain tile sources which has influenced channel morphology, increased embeddedness, reduced sinuosity and flow regime, and affected water quality of the streams. Streams which exhibit any or all of these modifications are recorded as "Modified" channels. Table 3.2.2. below provides flow regime, drainage area, preliminary HHEI and QHEI scores, and HHEI class and QHEI ratings for streams identified in the Study Area. Completed Ohio EPA

stream assessment forms are provided in Appendix E. All jurisdiction determinations are preliminary until the USACE makes the final determination.

Table 3.2.2 Other Waters of the U.S. Delineated within the Study Area

Stream ID[1]	Flow Regime	Length[2] (ft; m)	Drainage Area (sq mi; sq km)[3]	HHEI (H) / QHEI (Q) Score[4, 5]	HHEI Class/ QHEI Rating
HW-M1 (Cooney Ditch)	Perennial	9366.03 (2854.77)	2.94 (7.61)	22 (Q)	Very Poor
HW-M2	Ephemeral	422.24 (128.70)	0.03 (0.08)	25 (H)	Modified Class I
HW-M3	Ephemeral	205.62 (62.67)	0.04 (0.10)	12 (H)	Modified Class I
HW-M4	Perennial	851.90 (259.66)	1.27 (3.29)	16 (Q)	Very Poor
HW-M5	Perennial	64.29 (19.60)	3.29 (8.52)	32 (Q)	Poor
HW-M6	Intermittent	10.94 (3.33)	0.48 (1.24)	25 (H)	Modified Class I
HW-M7	Perennial	1360.13 (414.57)	2.52 (6.53)	27 (Q)	Very Poor
HW-M8	Intermittent	998.59 (304.37)	0.75 (1.94)	45 (H)	Modified Class II
HW-M9 (Twin Branches)	Perennial	578.23 (176.24)	1.97 (5.10)	23 (Q)	Very Poor
HW-M10	Perennial	91.60 (27.92)	1.67 (4.32)	19 (Q)	Very Poor

1 Preliminary assigned. Not considered final until verified by the USACE
2 Represents delineated length, in feet, and meters within Study Area
3 Where within coverage, drainage area was calculated using automated basin characteristics from USGS StreamStats v 4.0: Ohio (USGS 2018).
4 Primary Headwater Habitat Evaluation Index (HHEI), for streams with drainage areas of less than 1.0 square mile and a maximum pool depth of less than 40 centimeters.
5 Qualitative Habitat Evaluation Index (QHEI), for larger streams with greater than 1.0 square mile.

Stream HW-M1

Stream HW-M1 (Cooney Ditch) (Appendix A; Figure 6A and 6B; Page 21 and 22 of 29) is a perennial stream with a drainage area of approximately 2.94 square miles (7.61 square kilometers). The stream flows west to east through the Study Area for approximately 9,366.03 feet (2,854.77 meters). Stream HW-M1 (Cooney Ditch) drains to Cottonwood Ditch, and as such, is preliminarily determined to be a jurisdictional water of the U.S. Based on the QHEI habitat assessment method, dominant substrates are comprised of silt; instream cover (i.e. overhanging vegetation, shallows, pools, rootmats, boulders, and aquatic macrophytes) is sparse; channel sinuosity is none, development is poor, channelization is recent, stability is low; bank erosion is moderate; riparian width is non-existent; floodplain quality is row crop; maximum pool depth is between 7.87 to 15.75 inches (0.20 to 0.40 meter); and bank full width is 10 feet (3.05 meters).

Cooney Ditch (Stream HW-M1) has an Ohio EPA designated use of WWH. This stream has been preliminarily assigned a QHEI score of 22; therefore, categorized as in the Very Poor QHEI narrative range.

Stream HW-M2

Stream HW-M2 (Appendix A; Figure 6A and 6B; Page 26 of 29) is a modified ephemeral stream with a drainage area of approximately 0.03 square mile (0.08 square kilometer). The stream flows north to south through the Study Area for approximately 422.24 feet (128.70 meters). Stream HW-M2 drains to HW-M3 which drains to HW-M1 (Cooney Ditch), and as such, Stream HW-M2 is preliminarily determined to be jurisdictional. Based on the HHEI assessment methods, the dominant substrates are comprised of silt and gravel, the maximum pool depth is 3.00 inches (0.91 centimeters) and bank full width is 1.75 feet (0.53 meter). Consequently, this stream has been preliminarily assigned an HHEI score of 25; therefore, categorized as a Modified Class I Primary Headwater Habitat (PHWH).

Stream HW-M3

Stream HW-M3 (Appendix A; Figure 6A and 6B; Page 26 of 29) is a modified ephemeral stream with a drainage area of approximately 0.04 square mile (0.10 square kilometer). The stream flows north to south through the Study Area for approximately 205.62 feet (62.67 meters). Stream HW-M3 drains to Stream HW-M1 (Cooney Ditch), and as such, Stream 3 is preliminarily determined to be jurisdictional. Based on the HHEI assessment methods, the dominant substrates are comprised of silt, the stream had a moist channel and a bank full width of 1.00 feet (0.30 meter). This stream has been preliminarily assigned an HHEI score of 12; therefore, categorized as a Modified Class I PHWH.

Stream HW-M4

Stream HW-M4 (Appendix A; Figure 6A and 6B; Page 20 of 29) is a perennial stream with a drainage area of approximately 1.27 square miles (3.29 square kilometers). The stream flows north to south through the Study Area for approximately 851.90 feet (259.66 meters). Stream HW-M4 drains to Cottonwood Ditch, and as such, is preliminarily determined to be a jurisdictional water of the U.S. Based on the QHEI habitat assessment method, dominant substrates are comprised of silt; instream cover is nearly absent; channel sinuosity is none, development is poor, channelization is recent, stability is low; bank erosion is moderate; riparian width is very narrow; floodplain quality is row crop; maximum pool depth is between 7.87 to 15.75 inches (0.20 to 0.40 meter); and bank full width is 5.00 feet (1.52 meters). Stream HW-M4 does not have an Ohio EPA designated use. This stream has been preliminarily assigned a QHEI score of 16; therefore, categorized as in the Very Poor QHEI narrative range.

Stream HW-M5

Stream HW-M5 (Appendix A; Figure 6A and 6B; Page 20 of 29) is a perennial stream with a drainage area of approximately 3.29 square miles (8.52 square kilometers). The stream flows south to north through the Study Area for approximately 64.29 feet (19.60 meters). Stream HW-M5 drains to Cottonwood Ditch, and as such, is preliminarily determined to be a jurisdictional water of the U.S. Based on the QHEI habitat assessment method, dominant substrates are comprised of silt and gravel; instream cover (i.e. overhanging vegetation, shallows in slow water, and aquatic macrophytes) is nearly absent; channel sinuosity is none, development is poor, channelization is recovery, stability is low; bank erosion is moderate; riparian width is nonexistent to very narrow; floodplain quality is row crop; maximum pool depth less than 7.87 inches (0.20 meter); and bank full width is 5.00 feet (1.52 meters). This stream has been preliminarily assigned a QHEI score of 32; therefore, categorized as in the Poor QHEI narrative range.

Stream HW-M6

Stream HW-M6 (Appendix A; Figure 6A and 6B; Page 20 of 29) is a modified intermittent stream with a drainage area of approximately 0.48 square mile (1.24 square kilometers). The stream flows west to east through the Study Area for approximately 10.94 feet (3.33 meters). Stream HW-M6 drains to Stream HW-M5, which drains to Cottonwood Ditch, and, as such Stream HW-M6 is preliminarily determined to be jurisdictional. Based on the HHEI assessment methods, the dominant substrates are comprised of gravel and silt, maximum pool depth is 2.00 inches (0.05 meter) and a bank full width of 1.00 feet (0.30 meter). This stream has been preliminarily assigned an HHEI score of 25; therefore, categorized as a Modified Class I PHWH.

Stream HW-M7

Stream HW-M7 (Appendix A; Figure 6A and 6B; Page 8 of 29) is a perennial stream with a drainage area of approximately 2.52 square miles (6.53 square kilometers). The stream flows south to north through the Study Area for approximately 1,360.13 feet (414.56 meters). Stream HW-M7 drains to Cottonwood Ditch, and as such, is preliminarily determined to be a jurisdictional water of the U.S. Based on the QHEI habitat assessment method, dominant substrates are comprised of silt; instream cover (i.e. overhanging vegetation, shallows in slow water, and aquatic macrophytes) is nearly absent; channel sinuosity is low, development is poor, channelization is recovery, stability is low; bank erosion is moderate; riparian width is very narrow; floodplain quality is row crop; maximum pool depth is between 7.87 to 15.75 inches (0.20 to 0.40 meter); and bank full width is 8.00 feet (2.44 meters). Macroinvertebrates were not sampled or observed during the time of delineation. This stream has been preliminarily assigned a QHEI score of 27; therefore, categorized as in the Very Poor QHEI narrative range.

Stream HW-M8

Stream HW-M8 (Appendix A; Figure 6A and 6B; Page 8 of 29) is a modified intermittent stream with a drainage area of approximately 0.75 square mile (1.94 square kilometers). The stream flows west to east through the Study Area for approximately 998.59 feet (304.37 meters). Stream HW-M8 drains to Twin Branches, and as such, is preliminarily determined to be a jurisdictional water of the U.S. Based on the HHEI assessment methods, the dominant substrates are comprised of gravel and silt, maximum pool depth is 6.00 inches (0.15 meter) and a bank full width of 3.00 feet (0.91 meter). This stream has been preliminarily assigned an HHEI score of 45; therefore, categorized as a Modified Class II PHWH.

Stream HW-M9 (Twin Branches)

Stream HW-M9 (Twin Branches) (Appendix A; Figure 6A and 6B; Page 8 of 29) is a perennial stream with a drainage area of approximately 1.97 square miles (5.10 square kilometers). The stream flows west to east through the Study Area for approximately 578.23 feet (176.24 meters). Stream HW-M9 (Twin Branches) drains to Scioto River, and as such, is preliminarily determined to be a jurisdictional water of the U.S. Based on the QHEI habitat assessment method, dominant substrates are comprised of silt; instream cover (i.e. overhanging vegetation, shallows in slow water, and aquatic macrophytes) is nearly absent; channel sinuosity is low, development is poor, channelization is recovery, stability is moderate; bank erosion is none/little; riparian width is non-existent; floodplain quality is row crop and urban/industrial; maximum pool depth is less than 7.87 inches (0.20 meter); and bank full width is 5.25 feet (1.60 meters). Twin Branches (Stream HW-M9) has an Ohio EPA designated use of WWH. This stream has been preliminarily assigned a QHEI score of 23; therefore, categorized as in the Very Poor QHEI narrative range.

Stream HW-M10

Stream HW-M10 (Appendix A; Figure 6A and 6B; Page 9 of 29) is a perennial stream with a drainage area of approximately 1.67 square miles (4.32 square kilometers). The stream flows west to east through the Study Area for approximately 91.60 feet (27.92 meters). Stream HW-M10 drains to Scioto River, and as such, is preliminarily determined to be a jurisdictional water of the U.S. Based on the QHEI habitat assessment method, dominant substrates are comprised of silt; instream cover (i.e. overhanging vegetation, shallows in slow water, and aquatic macrophytes) is nearly absent; channel sinuosity is non-existent, development is poor, channelization is recovery, stability is low; bank erosion is moderate; riparian width is non-existent; floodplain quality is row crop; maximum pool depth is less than 7.87 inches (0.20 meter); and bank full width is 6.00 feet (1.83 meters). Stream HW-M10 does not have an Ohio EPA designated use. This stream has been preliminarily assigned a QHEI score of 19; therefore, categorized as in the Very Poor QHEI narrative range.

B. Open Waters (Ponds)

The Study Area was investigated for areas that are considered "open water" by the USACE. Field investigations identified one (1) potentially jurisdictional open water resource (pond) within the Study Area (Table 3.2.3). The open water resource (WB-HW-M1) drains to HW-M9 within the Study Area. The pond appears to be a man-made drainage tile pump station.

Table 3.2.3 Waterbodies Delineated within the Study Area

Waterbody ID	Acres (Hectares)
WB-HW-M1	0.07 (0.03)

4.0 REFERENCES CITED

Braun, E Lucy. 1967. *The Vascular Flora of Ohio, Volume 1-The Monocotyledoneae: Cattails to Orchids.* Columbus, OH: The Ohio State University Press.

—. 1969. *The Woody Plants of Ohio: Trees, Shrubs, and Woody Climbers Native, Naturalized, and Escaped.* Columbus, OH: Ohio State University Press.

Cowardin, V Carter, F C Golet, and E T LaRoe. 1979. "Classification of Wetlands and Deepwater Habitats of the United States." Office of Biological Services, U.S. Fish and Wildlife Service, Washington, D.C., 103.

FEMA. 2018. *FEMA Flood Map Serice Center.* https://msc.fema.gov/portal.

Gleason, Henry A, and Arthur Cronquist. 1991. *Manual of the Vascular Plants of Northeastern United States and Adjacent Canada.* 2nd. Bronx, NY: The New York Botanical Press.

Holmgren, Noel H. 1998. *Illustrated Companion to Gleason and Cronquist's Manual: Illustrations of the Vascular Plants of Northeastern United States and Adjacent Canada.* Bronx, NY: The New York Botanical Garden.

Lichvar, R W, D L Banks, W N Kirchner, and N C Melvin. 2016. *The National Wetland Plant List: 2016 Ratings.* Phytoneuron 2016-30.

Mack, John J. 2001. "Ohio Rapid Assessment Method for Wetlands, Manual for Using Version 5.0." Ohio EPA Technical Bulletin Wetland/2001-1-1, Division of Surface Water, 401 Wetland Ecology Unit, Ohio Environmental Protection Agency, Columbus, OH, 72.

Mohlenbrock, Robert H. 2006. *Illustrated Flora of Illinois, Flowering Plants: Flowering Rush to Rushes.* 2nd. Carbondale, IL: Southern Illinois University Press.

—. 2002. *Illustrated Flora of Illinois, Grasses: Bromus to Paspalum.* 2nd. Carbondale, IL: Southern Illinois University Press.

—. 2011. *Illustrated Flora of Illinois, Sedges: Carex.* 2nd. Carbondale, IL: Southern Illinois University Press.

—. 2001. *Illustrated Flora of Illinois, Sedges: Cyperus to Scleria.* 2nd. Carbondale, IL: Southern Illinois University Press.

—. 2001a. *Ilustrated Flora of Illinois, Grasses: Panicum to Danthonia.* 2nd. Carbondale, IL: Southern Illinois University Press.

Munsell Color. 2009. *Munsell Soil Color Book.* 2013. Grand Rapids, MI.

Newcomb, Lawrence. 1977. *Newcomb's Wildflower Guide.* Little, Brown and Company.

OEPA. 1986; 2015. "The Biological Criteria for the Protection of Aquatic Life, Volumes I-III." Division of Surface Water, Ohio Environmental Protection Agency, Columbus.

Ohio EPA. 2017. *401 Water Quality Certification for Nationwide Permits Stream Eligibility Web Map.* October 19. Accessed May 10, 2018. http://www.epa.ohio.gov/dsw/401/permitting.aspx.

—. 2017a. *Water Quality Standards Program.* February 6. Accessed May 10, 2018. http://www.epa.ohio.gov/dsw/rules/3745_1.aspx.

Rhoads, Ann Fowler, and Timothy A Block. 2007. *The Plants of Pennsylvania.* 2nd. Philadelphia, PA: University of Pennsylvania Press.

Rothrock, Paul E. 2009. *Sedges of Indiana and the Adjacent States: The Non-Carex Species.* Indianapolis, IN: Indiana Academy of Science.

Stein, John, Denise Binion, and Robert Acciavatti. 2003. *Field Guide to Native Oak Species of Eastern North America.* Morgantown, WV: U.S. Department of Agriculture, Forest Service.

US EPA. 2013. "Level III Ecoregions of the Conterminous United States." U.S. EPA Office of Research and Development (ORD) - National Health and Environmental Effects Research Laboratory (NHEEL), U.S. Environmental Protection Agency, Corvallis, OR.

—. 2010. *U.S. Environmental Protection Agency.* Accessed May 10, 2018. ftp://ftp.epa.gov/wed/ecoregions/pubs/CEC_LEVEL_III_Descriptions_US_May2010.doc.

USACE. no date (n.d.). *Definition of Terms.* Accessed May 10, 2018. http://www.nap.usace.army.mil/Missions/Regulatory/FAQs/definitions.aspx.

USACE. 1987. *Corps of Engineers Wetlands Delineation Manual.* Vicksburg, MS: Environmental Laboratory U.S. Army Corps of Engineers, Waterways Experiment Station, Wetlands Research Program Technical Report Y-87-1.

USACE. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest (Version 2.0).* U.S. Army Corps of Engineers, Vicksburg: U.S. Army Engineer Research and Development Center Environmental Laboratory, 176.

USACE/USEPA. 2008. "Memorandum Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell V. United States."

USDA. 2010. *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 7.0, 2010.* Natural Resources Conservation Service, U.S. Department of Agriculture, In Cooperation with the National Technical Committee for Hydric Soils, 43 pp.

—. 2018. *Web Soil Survey 3.0.* http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

USDA/NRCS. 2013. *Watershed Boundary Dataset.* Accessed July 9, 2018. https://datagateway.nrcs.usda.gov/GDGOrder.aspx.

USFWS. 2018. *National Wetlands Inventory Online Mapper v 2.0.* https://www.fws.gov/wetlands/data/mapper.HTML.

USGS/NRCS. 2018. *National Hydrography Dataset.* https://nhd.usgs.gov/data.html.

—. n.d. *National Hydrography Dataset.* Accessed May 10, 2018. https://nhd.usgs.gov/data.html.

USGS. 2018. *StreamStats, v 3.0.* U.S. Geological Survey. Accessed May 10, 2018. https://streamstatsags.cr.usgs.gov/v3_beta/viewer.htm.

USGS. 1994. "Topographical Quadrangle Maps (7.5-minute series)." U.S. Geological Survey.

Voss, Edward G, and Anton A Reznicek. 2012. *Field Manual of Michigan Flora.* Ann Arbor, MI: University of Michigan Press.

Weakley, Alan S, J. Christopher Ludwig, and John F Townsend. 2013. *Flora of Virginia.* 2nd. Edited by Bland Crowder. Foundation of the Flora of Virginia Project, Inc. and Botanical Research Institute of Texas.

Wilken, Ed, Francisco Jiménez Nava, and Glenn Griffith. 2011. *North American Terrestrial Ecoregions Level III.* Commission for Environmental Cooperation, Canada. http://www.cec.org/Atlas/Files/Terrestrial_Ecoregions_L1/TerrestrialEcoregions_L1_GeoPDF.zip.

Appendix A

Figures

WETLANDS AND OTHER WATERS OF THE U.S. DELINEATION REPORT

ADDENDUM 1

Hardin Wind Energy Project

Hardin County, Ohio

May 2019

TRC Project No. 302899.0000.0000

Prepared For:

Hardin Wind Energy LLC

One South Wacker Drive, Suite 1800

Chicago, IL 60606

Phone: 812.224.1400

Tracy Engle
Office Practice Leader

Prepared By:

TRC Environmental Corporation

921 Eastwind Drive, Suite 122

Westerville, OH 43081

Phone: 614.423.6353

Justin Pitts
Ecological Project Manager

CONFIDENTIAL BUSINESS INFORMATION

TABLE OF CONTENTS

List of Tables

Appendices:

A. Figures
    1. USGS Topographic Map Proposed Survey Location Map
    2. USDA Soil Survey Map
    3. National Wetlands Inventory Map

ACRONYMS

August 2018 Report	August 2018 Hardin Wind Energy Project Wetlands and Other Waters of the U.S. Delineation Report
FEMA	Federal Emergency Management Agency
GPS	Global Positioning System
HHEI	Headwater Habitat Evaluation Index
HUC	Hydrologic Unit Code
HWE	Hardin Wind Energy LLC
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OAC	Ohio Administrative Code
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
OHWM	Ordinary High-Water Mark
ORAM	Ohio Rapid Assessment Method
PEM	Palustrine emergent
PHWH	Primary Headwater Habitat
Project	Hardin Wind Energy Project
QHEI	Qualitative Habitat Evaluation Index
TNM	The National Map
TRC	TRC Environmental Corporation
U.S.	United States

USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WWH	Warmwater Habitat

1.0 INTRODUCTION

On behalf of Hardin Wind Energy LLC (HWE), TRC Environmental Corporation (TRC) has prepared this Addendum to the August 2018 Hardin Wind Energy Project Wetlands and Other Waters of the U.S. Delineation Report (August 2018 Report) (TRC Environmental Corporation 2018) for the Hardin Wind Energy Project (Project), located in Hardin County, Ohio (Appendix A, Figure 1). At the request of HWE, TRC conducted a wetlands and other waters of the U.S. survey for modifications to the wind turbine layout and construction access roads, and for the inclusion of roadway intersection turning radii assessments associated with the proposed Project. This Addendum contains the methodology and results of additional wetland and other waters of the U.S. identification and delineation investigations performed by TRC. Combined with the August 2018 Report, this Addendum ensures that all final turbine locations, access roads, and turning radii required for the Project have been screened for presence of wetlands and other waters of the U.S. Mr. Justin Pitts (TRC) and Ms. Sarah Bender (TRC), environmental scientists with over 16 years of combined experience, were the lead field scientists and preparers of this Addendum.

The primary objective of the survey was to identify and evaluate wetlands and other waters of the U.S. within the May 2019 Hardin Wind Addendum Study Area, such that the resources could be considered in the planning, design, permitting, and installation of the proposed Project in accordance with Ohio Administrative Code (OAC) Chapter 4906-4-08 (B)(1)(a)(iv-v)-(b).

For this Addendum, TRC surveyed an additional 93 acres (38 hectares) on May 2, 2019. In total, the combined August 2018 Hardin Wind Study Area and May 2019 Hardin Wind Addendum Study Area for the Project is approximately 1,230 acres (498 hectares), including areas of Marion, Cessna, Lynn, McDonald, and Roundhead Townships, in Hardin County, Ohio, where sixty (60) proposed turbines and subsequent collection lines and access roads may be located (Figure 1). The August 2018 Hardin Wind Study Area and May 2019 Hardin Wind Addendum Study Area included a 100-foot buffer (50 feet on either side of centerline) for the turbine access roads and a 500-foot buffer around the turbines.

The Project lies within the Eastern Corn Belt Plains, which typically have loamy and well-drained soils, and most commonly characterized by its rolling plains and local end moraines (Wilken, Jiménez Nava and Griffith 2011). The vegetation of the ecoregion was originally dominated by American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), and American basswood (*Tilia americana*) forests. Overall the landscape has been significantly altered to accommodate agricultural activities which have negatively

altered stream chemistry and turbidity (US EPA 2010; US EPA 2013; Wilken, Jiménez Nava and Griffith 2011). Topography in the region consists of flat farmland, with elevations ranging from 958 feet (292 meters) to 1030 feet (314 meters) above mean sea level. The proposed Project is located within the Ohio River and Lake Erie drainage basins. The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) maintains a classification system for identifying watersheds by hydrologic unit code (HUC). The Project is located mostly within the Upper Scioto River watershed (8-Digit HUC: 05060001) with a small portion, located northeast of SR-309, within the Blanchard River watershed (8-Digit HUC: 04100008) (USDA/NRCS 2013).

2.0 METHODOLOGY

Pursuant to the United States Army Corps of Engineers (USACE) wetlands and other waters of the U.S. delineation methodology, potential wetland and other waters of the U.S. located within the May 2019 Hardin Wind Addendum Study Area were identified, delineated, and mapped through the combined use of existing available public source information and field investigation. In addition, in accordance with the State of Ohio's Water Quality Standards (OAC Rule 3745-1-54), wetlands within the May 2019 Hardin Wind Addendum Study Area were evaluated and provisionally categorized utilizing Ohio EPA's Ohio Rapid Assessment Method (ORAM).

2.1 Desktop Review Methodology

The sources utilized for May 2019 desktop review included the following: the United States Geological Survey (USGS) Alger, Foraker, and Roundhead, Ohio (1988) 7.5-minute series topographical quadrangles (USGS 1994) (Appendix A, Figure 1); soil datasets acquired from the NRCS Web Soil Survey (USDA (b) 2019) for Hardin County, Ohio (Appendix A, Figure 2 [Pages 1 and 2]); the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory Map (NWI) near Alger, Ohio (USFWS 2019) and the USGS National Hydrography Dataset (NHD) (USGS 2017) (Appendix A, Figure 3); the Federal Emergency Management Agency (FEMA) flood hazard risk map (FEMA 2019) (Appendix A, Figure 4) and the Ohio EPA OAC Chapter 3745-1 Water Quality Standards (Ohio EPA 2017). Sources were reviewed to identify conditions that may be present within the May 2019 Hardin Wind Addendum Study Area. The results of the desktop review were used to aid in the field investigation.

2.2 Field Methodology-Wetlands

Wetland resources within the May 2019 Hardin Wind Addendum Study Area were identified and their boundaries determined in accordance with the USACE *Wetlands Delineation Manual (1987 Manual)* (USACE 1987), utilizing the *Regional Supplement to the U.S. Army Corps of Engineers Wetland Delineation Manual: Midwest (Version 2.0) (Regional Supplement)* (USACE 2010). Consistent with the *1987 Manual*, wetland determinations were based on dominant plant species, soil characteristics, and hydrologic characteristics. In addition, wetlands and other waters of the U.S. were evaluated in accordance with the State of Ohio's Water Quality Standards (OAC Chapter 3745-1) as managed by the Ohio Environmental Protection Agency (Ohio EPA). Areas that exhibit hydric soils, wetland hydrology, and a dominance of hydrophytic vegetation were considered potentially jurisdictional wetlands. Wetlands or other waters of the U.S. are considered potentially jurisdictional until verified by the USACE

(USACE/USEPA 2008). A photographic log of field observations is presented in Appendix B and completed USACE Wetland Determination Data Forms-Midwest Region are presented in Appendix C.

Wetlands within the May 2019 Hardin Wind Addendum Study Area were classified according to the USFWS *Classification of Wetlands and Deepwater Habitats for the United States* (Cowardin, et al. 1979). Wetland classifications were based upon hydrophytic vegetation type and dominance found within the delineated wetland, and included the following classification types: palustrine emergent (PEM), palustrine scrub-shrub (PSS), palustrine forested (PFO), palustrine open-water (POW), or a combination of these classifications (Cowardin, et al. 1979).

The wetland boundaries were flagged and surveyed through the use of a Global Positioning System (GPS) receiver capable of sub-meter accuracy (Model R1, handheld, Trimble, Sunnyvale, California). The delineated wetlands were labeled (e.g. W-SKB-1, HW-MM, etc.), and correspond to the wetlands illustrated on the Delineated Resource map provided in Appendix A, as Figure 5 (Pages 1 through 3). The wetland boundaries were mapped as polygons and the wetland areal extents were calculated using the shapefile properties utility in ArcMap.

2.3 Ohio Rapid Assessment Method

The regulation of wetlands under Section 401 and 404 of the Clean Water Act requires the assessment of the function and quality of wetlands in order to determine the appropriate level of mitigation that should be required for the destruction, alteration, or degradation of a wetland. In accordance with Ohio EPA requirements (OAC Rule 3745-1-54), delineated wetlands within the May 2019 Hardin Wind Addendum Study Area were evaluated using the Ohio Rapid Assessment Method in an attempt to determine the ecological quality and the level of function of these wetlands (ORAM Version 5.0) (Mack 2001). The wetland value information, as determined by the ORAM, is provided to the Ohio EPA for the purposes of placing wetlands in the appropriate wetland Antidegradation Category as defined in Ohio's Wetland Antidegradation Rule (OAC Rule 3745-1-54). The scoring sheets (ORAM Version 5.0 Field Form Quantitative Rating) for individual wetlands were completed and were the basis for the provisional wetland categorizations. ORAM scores are considered preliminary until verified by the Ohio EPA. Delineated wetlands and preliminary ORAM scores are illustrated in Appendix A, Figure 5. Completed ORAM data forms are included in Appendix D.

2.4 Field Methodology - Other Waters of the U.S.

The May 2019 Hardin Wind Addendum Study Area was screened for the presence of areas that meet the criteria for "other waters of the U.S." specified in the *1987 Manual*. Other waters of the U.S. consist of ephemeral, intermittent, and perennial streams, as well as open water features, such as ponds. Drainage channels that exhibited defined "bed and bank" and an ordinary high-water mark (OHWM) in the channel were identified and delineated as jurisdictional streams. Drainage channels that do not exhibit an OHWM and/or defined bed and bank were regarded as non-jurisdictional drainages. Non-jurisdictional drainages were not delineated as part of the study.

3.0 RESULTS

During the investigations identified within this Addendum, one (1) wetland, (W-SKB-1) was identified and delineated within the May 2019 Hardin Wind Addendum Study Area (Tables 3.1, 3.2.1, 3.2.2). In addition, one (1) wetland, HW-MM, and one (1) stream, HW-M9, from the August 2018 Hardin Wind Study Area field investigation were extended during the May 2019 investigation.

Table 3.1 Potential Wetlands and Other Waters of the U.S. Investigated and Jurisdictional Determinations within the Hardin Wind Study Area

Resource ID	Field Survey Date	Location (Latitude, Longitude)	Provisional Determination[1]	Acreage (Hectares) of Jurisdictional Waters[1] in Study Area and Cowardin Classification[2]
W-SKB-1	5/2/2019	40.69254, -83.76359	Waters of the U.S., Wetland	0.27 (0.11)/PEM
HW-MM	5/18/18	40.63594, -83.77854	Waters of the U.S., Wetland	0.08 (0.03)/PEM
HW-M9	5/4/18	40.67472, -83.82681	Waters of the U.S., Stream	0.26 (0.11)/R5

[1] Preliminarily assigned. Not considered final until verified by the USACE
[2] Cowardin Classification
PEM = Palustrine Emergent
R5 = Perennial Stream

3.1 Background Resources

3.1.1 USGS Topographic Map

Based on the desktop review, the May 2019 Hardin Wind Addendum Study Area contained no wetland features according to the Alger, Foraker, and Roundhead, Ohio (1985) 7.5-minute series topographical quadrangles (USGS 1994) (Appendix A, Figure 1).

3.1.2 Soils

According to the soil dataset acquired from the NRCS Web Soil Survey for Hardin County, Ohio, the May 2019 Hardin Wind Addendum Study Area at wetland W-SKB-1 is underlain by one (1) soil type: Milford silty clay loam, 0-2% slopes (Mf); at wetland HW-MM is underlain by one soil type: Pewamo silty clay loam, 0-1% slopes (PkA); at stream HW-M9 is underlain by one (1) soil type: McGuffey muck (Mc) (USDA (a) 2019) (Appendix A, Figure 2 [Pages 1 – 3]). Milford silty clay loam, 0-2% slopes, Pewamo silty clay loam, 0-1% percent slopes, and McGuffey muck are listed as hydric soils in Hardin County, Ohio (USDA (a) 2019). As detailed in the August 2018 Report, the August 2018 Hardin Wind Study Area for the Project

is underlain by twenty-five (25) different soil types; thirteen (13) soils are mapped as non-hydric and twelve (12) soils are mapped as hydric (USDA (a) 2019).

3.1.3 National Wetland Inventory

According to the USFWS NWI (USFWS 2019), no wetlands are located within the May 2019 Hardin Wind Addendum Study Area. (Appendix A, Figure 3).

3.1.4 National Hydrography Dataset

According to the USGS NHD (USGS 2017) Downloadable Data Collection from The National Map (TNM), no mapped streams are identified within the May 2019 Hardin Wind Addendum Study Area (Appendix A, Figure 3).

3.1.5 FEMA Flood Hazard

According to the FEMA Flood Hazard mapping, a portion of the May 2019 Hardin Wind Addendum Study Area is located within FEMA Flood Zone A (FEMA 2019) (Appendix A, Figure 4).

3.1.6 Water Quality Standards

One (1) stream within the May 2019 Hardin Wind Addendum Study Area has a Designated Use from Ohio EPA according to OAC Chapter 3745-1 Water Quality Standards (Ohio EPA 2017). Twin Branches is listed as Warmwater Habitat (WWH). This designation is based on the results of a biological field assessment performed by the Ohio EPA. According to the OAC Chapter 3745-1 Water Quality Standards, WWH are capable of supporting and maintaining a balanced community of warmwater aquatic organisms.

3.2 Field Delineations

TRC performed this wetland and other waters of the U.S. identification and delineation on May 2, 2019. Weather conditions were warm, reaching a high of 76 degrees Fahrenheit (24 degrees Celsius), with no rain. The presence of apparent hydrology and hydric soil indicators, as well as identifiable plant species within the wetland area, allowed for positive wetland determinations. The USACE maintains the final authority that determines jurisdiction; therefore, statements about jurisdiction within this Report are preliminary and subject to final determination by the USACE and Ohio EPA.

3.2.1 Wetlands

During the course of the May 2019 field investigation, one (1) wetland, W-SKB-1, was identified and delineated within the May 2019 Hardin Wind Addendum Study Area. In addition, one (1) wetland, HW-mm, from the August 2018 field investigation was extended during the May 2019 field investigation. The wetlands identified are listed in Table 3.2.1, described below and shown in Appendix A, Figure 5. The completed USACE Wetland Determination Data Forms-Midwest Region are presented in Appendix C and Ohio EPA ORAM Data Forms are presented in Appendix D.

Table 3.2.1 Wetlands Delineated within the Hardin Wind Study Area

Wetland ID	Vegetation Class[1]	Extends Offsite?	Acres (Hectares)[2]	ORAM Score[3]	ORAM Category[3]	Jurisdictional Status[4]
W-SKB-1	PEM	No	0.27 (0.11)	13	1	Jurisdictional
HW-MM	PEM	No	0.08 (0.03)	12	1	Jurisdictional

[1] PEM = palustrine emergent
[2] Represents delineated acreage within Study Area
[3] Preliminarily assigned. Not considered final until verified by Ohio EPA
[4] Preliminarily assigned. Not considered final until verified by the USACE

Wetland W-SKB-1

Wetland W-SKB-1 (Appendix A, Figure 5) is a 0.27-acre (0.11 hectare) PEM wetland dominated by eastern cottonwood (*Populus deltoides*), red osier (*Cornus alba*) and Indian-hemp (*Apocynum cannabinum*). This area has been actively farmed; however, the growth of the planted corn is stunted and sparse. The wetland is preliminary assigned an ORAM score of 13, corresponding to a Category 1 wetland (low quality). The score was limited by disturbances to the hydrology, substrate, and habitat of Wetland W-SKB-1 (i.e. tiling, clearcutting, nutrient enrichment and farming).

Wetland HW-MM

Wetland HW-MM (Appendix A; Figure 5) is a 0.08-acre (0.03-hectare) PEM wetland dominated by reed canary grass (*Phalaris arundinacea)* and shallow sedge (*Carex lurida*). The wetland is preliminarily assigned an ORAM score of 12, corresponding to a Category 1 wetland. The score was limited by the intensity of surrounding land use, very narrow buffer width, moderate coverage of invasive plants, poor habitat development, and disturbances to hydrology, substrate, and habitat (i.e. mowing, sedimentation, nutrient enrichment, tiling, and filling/grading, etc.).

3.2.2 Other Waters of the U.S.

During the course of this field investigation, one (1) stream, Twin Branches, from the August 2018 field investigation was extended during the May 2019 investigation. Twin Branches is located within the Upper Scioto River watershed (8-Digit HUC: 05060001) (USDA/NRCS 2013). The stream is listed in Table 3.2.2, described below and shown in Appendix A, Figure 5. Table 3.2.2. below provides flow regime, drainage area, preliminary HHEI and QHEI scores, and HHEI class and QHEI ratings for streams identified in the Study Area. Completed Ohio EPA stream assessment data forms are provided in Appendix E. All jurisdiction determinations are preliminary until the USACE makes the final determination.

Table 3.2.2 Other Waters of the U.S. Delineated within the Hardin Wind Study Area

Stream ID[1]	Flow Regime	Length[2] (ft; m)	Drainage Area (sq mi; sq km)[3]	QHEI (Q) Score[4]	HHEI Class/ QHEI Rating
HW-M9 (Twin Branches)	Perennial	12,979.05 (3,956.01)	1.97 (5.10)	23 (Q)	Very Poor

1 Preliminary assigned. Not considered final until verified by the USACE
2 Represents delineated length, in feet, and meters within Study Area
3 Where within coverage, drainage area was calculated using automated basin characteristics from USGS StreamStats v 4.0: Ohio (USGS 2018).
4 Qualitative Habitat Evaluation Index (QHEI), for larger streams with greater than 1.0 square mile.

Stream HW-M9 (Twin Branches)

Stream HW-M9 (Twin Branches) (Appendix A; Figure 5) is a perennial stream with a drainage area of approximately 1.97 square miles (5.10 square kilometers). The stream flows west to east through the Study Area for approximately 12,979.05 feet (3,956.01 meters). Stream HW-M9 (Twin Branches) drains to Scioto River, and as such, is preliminarily determined to be a jurisdictional water of the U.S. Based on the QHEI habitat assessment method, dominant substrates are comprised of silt; instream cover (i.e. overhanging vegetation, shallows in slow water, and aquatic macrophytes) is nearly absent; channel sinuosity is low, development is poor, channelization is recovery, stability is moderate; bank erosion is none/little; riparian width is non-existent; floodplain quality is row crop and urban/industrial; maximum pool depth is less than 7.87 inches (0.20 meter); and bank full width is 5.25 feet (1.60 meters). Twin Branches (Stream HW-M9) has an Ohio EPA designated use of WWH. This stream has been preliminarily assigned a QHEI score of 23; therefore, categorized as in the Very Poor QHEI narrative range.

4.0 REFERENCES CITED

Cowardin, V Carter, F C Golet, and E T LaRoe. 1979. "Classification of Wetlands and Deepwater Habitats of the United States." Office of Biological Services, U.S. Fish and Wildlife Service, Washington, D.C., 103.

FEMA. 2019. *FEMA Flood Map Service Center.* https://msc.fema.gov/portal.

Mack, John J. 2001. "Ohio Rapid Assessment Method for Wetlands, Manual for Using Version 5.0." Ohio EPA Technical Bulletin Wetland/2001-1-1, Division of Surface Water, 401 Wetland Ecology Unit, Ohio Environmental Protection Agency, Columbus, OH, 72.

Ohio EPA. 2017. "OAC Chapter 3745-1 Water Quality Standards."

TRC Environmental Corporation. 2018. "Hardin Wind Energy Project Wetlands and Other Waters of the U.S. Delineation Survey Report." Delineation Survey Report.

USACE. 1987. *Corps of Engineers Wetlands Delineation Manual.* Vicksburg, MS: Environmental Laboratory U.S. Army Corps of Engineers, Waterways Experiment Station, Wetlands Research Program Technical Report Y-87-1.

USACE. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest (Version 2.0).* U.S. Army Corps of Engineers, Vicksburg: U.S. Army Engineer Research and Development Center Environmental Laboratory, 176.

USACE/USEPA. 2008. "Memorandum Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell V. United States."

USDA (a). 2019. "National Hydric Soils List." Excel spreadsheet, Natural Resources Conservation Service, U.S. Department of Agricuture. http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

USDA (b). 2019. *Web Soil Survey 3.0.* http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

USDA/NRCS. 2013. *Watershed Boundary Dataset.* Accessed April 7, 2017. https://datagateway.nrcs.usda.gov/GDGOrder.aspx.

USFWS. 2019. *National Wetlands Inventory Online Mapper 2.0.* https://www.fws.gov/wetlands/data/mapper.HTML.

USGS. 2017. *National Hydrography Dataset.* https://nhd.usgs.gov/data.html.

USGS. 1994. "Topographical Quadrangle Maps (7.5-minute series)." U.S. Geological Survey.

Wilken, Ed, Francisco Jiménez Nava, and Glenn Griffith. 2011. *North American Terrestrial Ecoregions Level III.* Commission for Environmental Cooperation, Canada. http://www.cec.org/Atlas/Files/Terrestrial_Ecoregions_L1/TerrestrialEcoregions_L1_GeoPDF.zip .

Appendix A

Figures

TRC - GIS

Coordinate System: NAD 1983 2011 StatePlane Ohio South FIPS 3402 Ft US (Foot US)
Map Rotation: 0

Plot Date: 6/19/2019, 08:17:55 AM by PJACQUES -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\INVENERGY\302899-HARDIN_WIND_SOLAR_IIHW_Fig1_USGS_11x17_Update_20190509.mxd

Legend

- Hardin Wind Turbine Location (August 2018)
- Hardin Wind Study Area (August 2018)
- Hardin Wind Addendum Turbine Location (May 2019)
- Hardin Wind Addendum Study Area (May 2019)
- Point of Interconnection Facility Studied 2017
- Township
- USGS 7.5-minute Topographic Quadrangle

0 2,500 5,000 Feet

1 " = 5,000 '

1:60,000

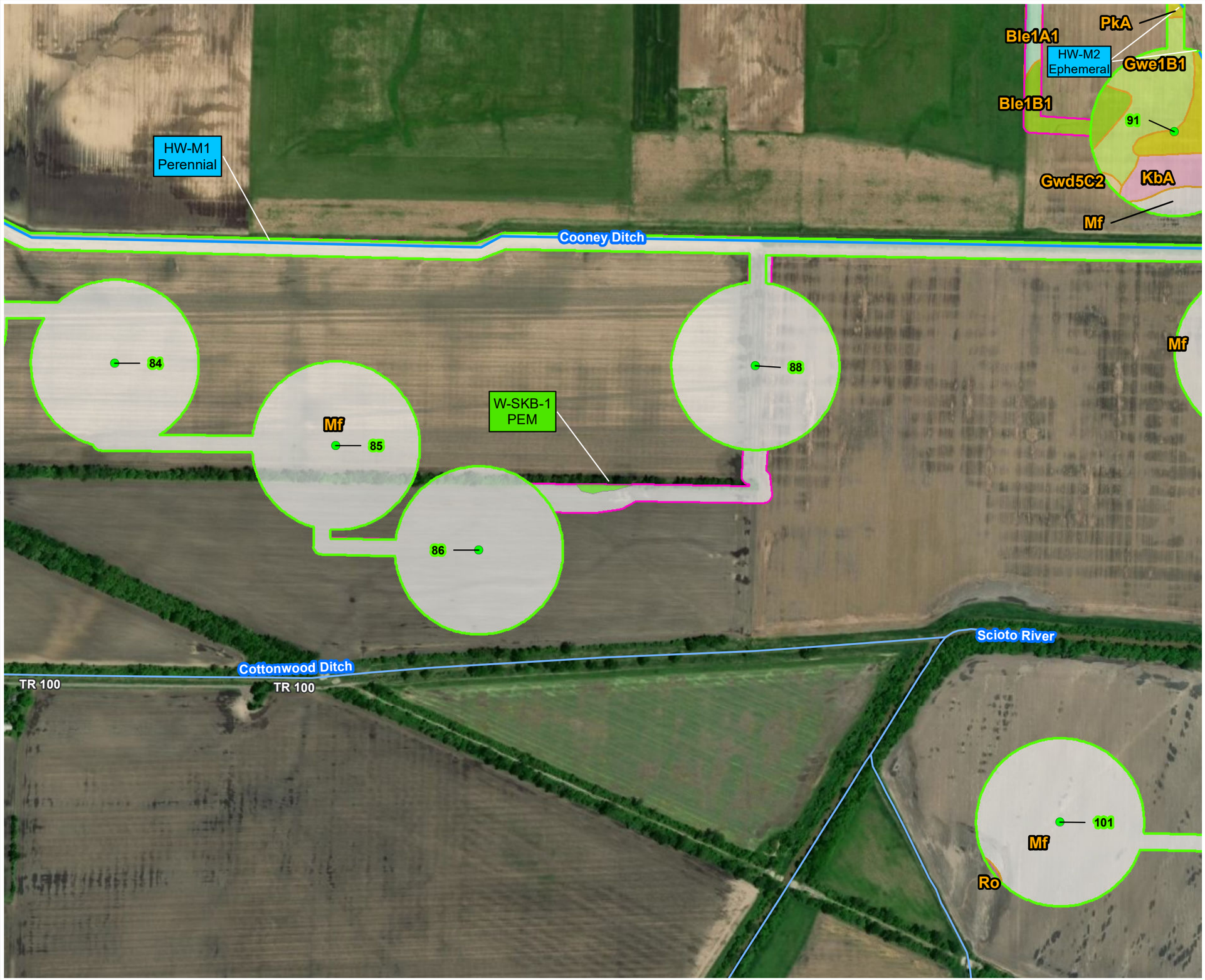
PROJECT:
HARDIN WIND ENERGY LLC
HARDIN WIND ENERGY PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:
USGS TOPOGRAPHIC MAP
PROPOSED SURVEY LOCATION MAP

DRAWN BY:	P. JACQUES	PROJ NO.:	302899.0000.0000
CHECKED BY:	M. MOLNAR		FIGURE 1
APPROVED BY:	J. PITTS		
DATE:	JUNE 2019		

690 Taylor Road, Suite 100
Gahanna, OH 43230
Phone: 614.423.6334
www.trcsolutions.com

FILE NO.: HW_Fig1_USGS_11x17_Update_20190509.mxd

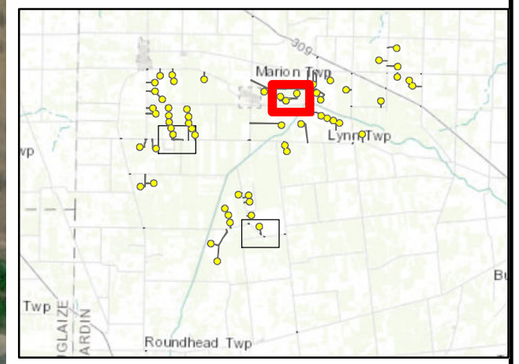


Legend

- Hardin Wind Turbine Location (August 2018)
- Hardin Wind Study Area (August 2018)
- Hardin Wind Addendum Study Area (May 2019)
- National Hydrography Dataset (NHD) Stream
- TRC Delineated Stream (August 2018)
- PEM Wetland (May 2019)

SOIL LIST

- Ble1A1 - Blount silt loam, end moraine, 0 to 2 percent slopes
- Ble1B1 - Blount silt loam, end moraine, 2-4% slopes
- Gwd5C2 - Glynwood clay loam, 6-12% slopes
- Gwe1B1 - Glynwood silt loam, end moraine, 2-6% slopes
- KbA - Kibbie loam, 0-3% slopes
- Mf - Milford silty clay loam, 0-2% slopes
- PkA - Pewamo silty clay loam, 0-1% slopes
- Ro - Roundhead muck



0 500 1,000 Feet

1 " = 565 '

1:6,780

N

PROJECT:

HARDIN WIND ENERGY LLC
HARDIN WIND ENERGY PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:

USDA SOIL SURVEY MAP

DRAWN BY:	P. JACQUES	PROJ NO.:	302899.0000.0000
CHECKED BY:	M. MOLNAR		
APPROVED BY:	J. PITTS		
DATE:	JUNE 2019		

FIGURE 2
Page 1 of 3

TRC
921 Eastwind Drive, Suite 122
Westerville, OH 43081
Phone: 614.423.6334
www.trcsolutions.com

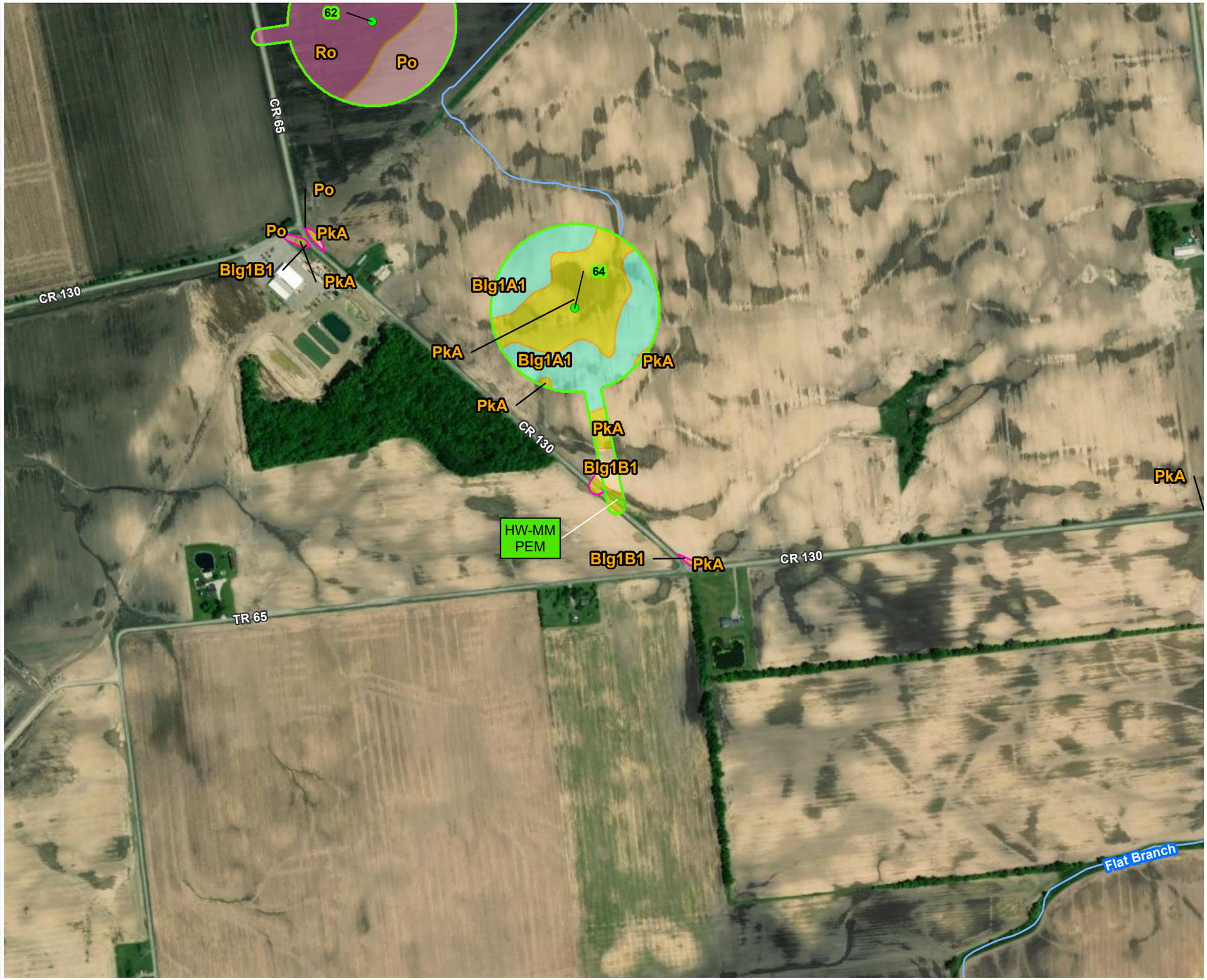
FILE NAME: HW_Fig2_SSURGO_Soils_Delineated_Wetland_WSKB1_HW_MM_11x17_Update_20190510.mxd

Coordinate System: NAD 1983 2011 StatePlane Ohio South FIPS 3402 Ft US (Foot US)
Map Rotation: 0
Plot Date: 6/19/2019, 11:03:31 AM by PJACQUES -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\INVENERGY\302899-HARDIN_WIND_SOLAR_IIHW_Fig2_SSURGO_Soils_Delineated_Wetland_WSKB1_HW_MM_11x17_Update_20190510.mxd

TRC - GIS

TRC - GIS

Plot Date: 6/19/2019, 11:03:31 AM by PJACQUES – LAYOUT: ANSI B (11"x17")
Path: S:\11-PROJECTS\INVENERGY\302899-HARDIN_WIND_SOLAR_IIHW_Fig2_SSURGO_Soils_Delineated_Wetland_WSKB1_HW_MM_11x17_Update_20190510.mxd
Coordinate System: NAD 1983 2011 StatePlane Ohio South FIPS 3402 Ft US (Foot US)
Map Rotation: 0

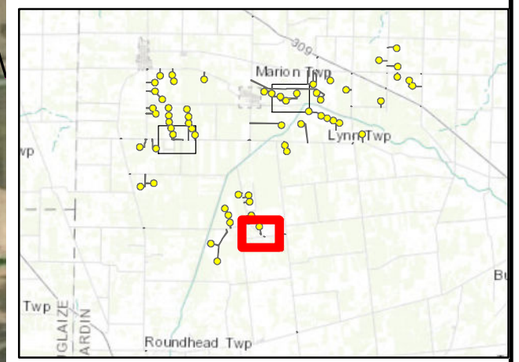


Legend

- Hardin Wind Turbine Location (August 2018)
- Hardin Wind Study Area (August 2018)
- Hardin Wind Addendum Study Area (May 2019)
- National Hydrography Dataset (NHD) Stream
- PEM Wetland (May 2019)

SOIL LIST

- Blg1A1 - Blount silt loam, ground moraine, 0 to 2 percent slopes
- Blg1B1 - Blount silt loam, ground moraine, 2 to 4 percent slopes
- PkA - Pewamo silty clay loam, 0-1% slopes
- Po - Pewamo variant muck
- Ro - Roundhead muck



0 500 1,000 Feet

1 " = 565 '
1:6,780

PROJECT:
HARDIN WIND ENERGY LLC
HARDIN WIND ENERGY PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:
USDA SOIL SURVEY MAP

DRAWN BY:	P. JACQUES	PROJ NO.:	302899.0000.0000
CHECKED BY:	M. MOLNAR		
APPROVED BY:	J. PITTS		
DATE:	JUNE 2019		

FIGURE 2
Page 2 of 3

TRC
921 Eastwind Drive, Suite 122
Westerville, OH 43081
Phone: 614.423.6334
www.trcsolutions.com

FILE NAME: HW_Fig2_SSURGO_Soils_Delineated_Wetland_WSKB1_HW_MM_11x17_Update_20190510.mxd

TRC - GIS

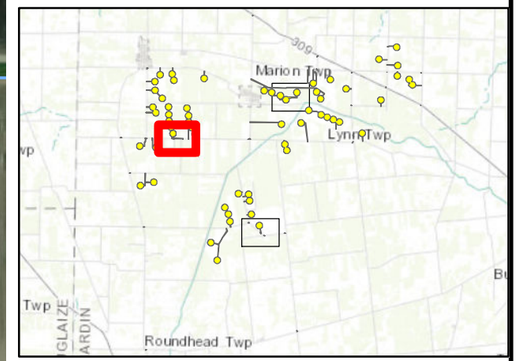
17
18
19
127
22
23
Po
Mc
Mc
Mc
WB-HW-M1
Twin Branches
CR 110
HW-M9
Perennial
HW-M9
Perennial
HW-M9
Perennial
PkA
35
Blg1B1
Blg1A1
PkA
HW-M8
Intermittent
TR 45

Legend

- Hardin Wind Turbine Location (August 2018)
- Hardin Wind Study Area (August 2018)
- Hardin Wind Addendum Study Area (May 2019)
- National Hydrography Dataset (NHD) Stream
- TRC Delineated Stream (August 2018)
- Waterbody / Pond

SOIL LIST

- Blg1A1 - Blount silt loam, ground moraine, 0 to 2 percent slopes
- Blg1B1 - Blount silt loam, ground moraine, 2 to 4 percent slopes
- Mc - McGuffey muck
- PkA - Pewamo silty clay loam, 0-1% slopes
- Po - Pewamo variant muck



0 500 1,000 Feet

1 " = 565 '

1:6,780

N

PROJECT:

HARDIN WIND ENERGY LLC
HARDIN WIND ENERGY PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:

USDA SOIL SURVEY MAP

DRAWN BY:	P. JACQUES	PROJ NO.:	302899.0000.0000
CHECKED BY:	M. MOLNAR		
APPROVED BY:	J. PITTS		
DATE:	JUNE 2019		

FIGURE 2
Page 3 of 3

TRC
921 Eastwind Drive, Suite 122
Westerville, OH 43081
Phone: 614.423.6334
www.trcsolutions.com

FILE NAME: HW_Fig2_SSURGO_Soils_Delineated_Wetland_WSKB1_HW_MM_11x17_Update_20190510.mxd

Plot Date: 6/19/2019, 11:03:31 AM by PJACQUES -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\INV\ENERGY\302899-HARDIN_WIND_SOLAR_II\HW_Fig2_SSURGO_Soils_Delineated_Wetland_WSKB1_HW_MM_11x17_Update_20190510.mxd
Coordinate System: NAD 1983 2011 StatePlane Ohio South FIPS 3402 Ft US (Foot US)
Map Rotation: 0

TRC - GIS

AUGLAIZE TOWNSHIP
MARION TOWNSHIP
CESSNA TOWNSHIP
BUCK TOWNSHIP
LYNN TOWNSHIP
ROUNDHEAD TOWNSHIP
McDONALD TOWNSHIP
WAYNE TOWNSHIP
TAYLOR CREEK TOWNSHIP

Hog Creek
Fourmile Run
Cooney Ditch
Cottonwood Ditch
Twin Branches
Cessna Creek
Scioto River
Flat Branch
Dunlap Creek
McCoy Run
Payden Run
Batchlet Run
Jordan Run
Silver Creek
Elder Creek
Poe Ditch
Scioto River

Legend

- Hardin Wind Study Area (August 2018)
- Hardin Wind Addendum Study Area (May 2019)
- Township
- National Hydrography Dataset (NHD) Stream

National Wetlands Inventory (NWI) Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

N

0 2,500 5,000 Feet

1 " = 5,000 '

1:60,000

PROJECT:
HARDIN WIND ENERGY LLC
HARDIN WIND ENERGY PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:
NATIONAL WETLANDS INVENTORY MAP

DRAWN BY:	P. JACQUES	PROJ NO.:	302899.0000.0000
CHECKED BY:	M. MOLNAR		
APPROVED BY:	J. PITTS		**FIGURE 3**
DATE:	JUNE 2019		

TRC
690 Taylor Road, Suite 100
Gahanna, OH 43230
Phone: 614.423.6334
www.trcsolutions.com

FILE NO.: HW_Fig3_NWI_11x17_Update_20190509.mxd

Coordinate System: NAD 1983 2011 StatePlane Ohio South FIPS 3402 Ft US (Foot US)
Map Rotation: 0
Plot Date: 6/18/2019, 08:35:09 AM by PJACQUES -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\INVENERGY\302899-HARDIN_WIND_SOLAR_II\HW_Fig3_NWI_11x17_Update_20190509.mxd

TRC - GIS

MARION TOWNSHIP
CESSNA TOWNSHIP
WAYNE TOWNSHIP
ROUNDHEAD TOWNSHIP
McDONALD TOWNSHIP
LYNN TOWNSHIP
ALGER
CLUM

Cooney Ditch
Cottonwood Ditch
Twin Branches
Scioto River
Dunlap Creek
Elder Creek
Poe Ditch
Flat Branch
McCoy Run
Payden Run
Batchlet Run
Jordan Run
Silver Creek
Hog Creek
Fourmile Run
Cessna Creek

Legend

- Hardin Wind Study Area (August 2018)
- Hardin Wind Addendum Study Area (May 2019)
- National Hydrography Dataset (NHD) Stream
- FEMA 100-year Floodplain Addendum 1 Impact (0.51 Acres)
- FEMA 100-year Floodplain
- Township

N

0 2,500 5,000 Feet

1 " = 5,000 '

1:60,000

PROJECT:

HARDIN WIND ENERGY LLC
HARDIN WIND ENERGY PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:

FEMA FLOOD HAZARD MAP

DRAWN BY:	P. JACQUES	PROJ NO.:	302899.0000.0000
CHECKED BY:	M. MOLNAR		
APPROVED BY:	J. PITTS		
DATE:	JUNE 2019		

FIGURE 4

690 Taylor Road, Suite 100
Gahanna, OH 43230
Phone: 614.423.6334
www.trcsolutions.com

FILE NO.: HW_Fig4_FEMA_11x17_Update_20190515.mxd

Coordinate System: NAD 1983 2011 StatePlane Ohio South FIPS 3402 Ft US (Foot US)
Map Rotation: 0
Plot Date: 6/19/2019, 11:43:36 AM by PJACQUES -- LAYOUT: ANSI B(11"x17")
Path: S:\1-PROJECTS\INVENERGY\302899-HARDIN_WIND_SOLAR_IIHW_Fig4_FEMA_11x17_Update_20190515.mxd

TRC - GIS

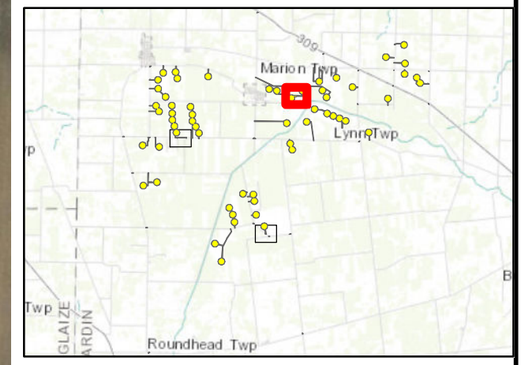
W-SKB-1
PEM

88

86

Legend

- Hardin Wind Turbine Location (August 2018)
- Hardin Wind Study Area (August 2018)
- Hardin Wind Addendum Study Area (May 2019)
- PEM Wetland
- Sample Point



N

0 125 250
Feet
1 " = 250 '
1:3,000

PROJECT:
HARDIN WIND ENERGY LLC
HARDIN WIND ENERGY PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:
DELINEATED RESOURCE MAP
W-SKB-1

DRAWN BY:	P. JACQUES	PROJ NO.:	302899.0000.0000
CHECKED BY:	M. MOLNAR		
APPROVED BY:	J. PITTS		FIGURE 5
DATE:	JUNE 2019		Page 1 of 3

690 Taylor Road, Suite 100
Gahanna, OH 43230
Phone: 614.423.6334
www.trcsolutions.com

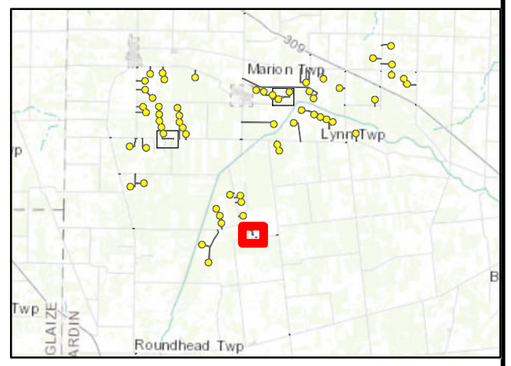
FILE NO.: HW_Fig5_Delineated_Wetland_WSKB1_HWMM_HWM9_11x17_Update_20190523.mxd

Plot Date: 6/19/2019, 10:11:48 AM by PJACQUES -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\INV\ENERGY\302899-HARDIN_WIND_SOLAR_II\HW_Fig5_Delineated_Wetland_WSKB1_HWMM_HWM9_11x17_Update_20190523.mxd
Coordinate System: NAD 1983 2011 StatePlane Ohio South FIPS 3402 Ft US (Foot US)
Map Rotation: 0

TRC - GIS

Legend

- Hardin Wind Turbine Location (August 2018)
- Hardin Wind Study Area (August 2018)
- Hardin Wind Addendum Study Area (May 2019)
- PEM Wetland
- Sample Point



N

0 125 250 Feet

1 " = 250 '

1:3,000

PROJECT:

HARDIN WIND ENERGY LLC
HARDIN WIND ENERGY PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:

DELINEATED RESOURCE MAP
HW-MM

DRAWN BY:	P. JACQUES	PROJ NO.:	302899.0000.0000
CHECKED BY:	M. MOLNAR		
APPROVED BY:	J. PITTS		
DATE:	JUNE 2019		

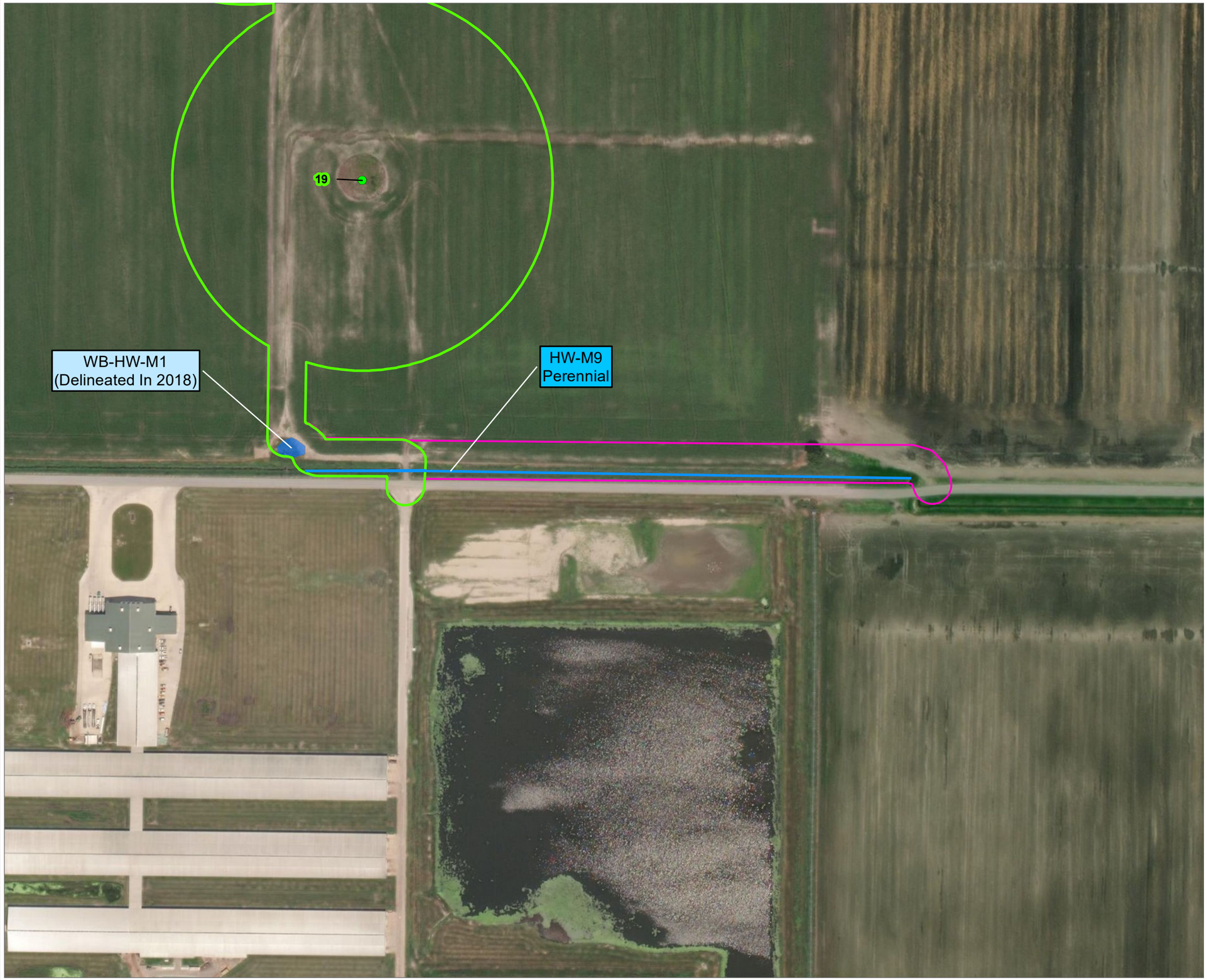
FIGURE 5
Page 2 of 3

690 Taylor Road, Suite 100
Gahanna, OH 43230
Phone: 614.423.6334
www.trcsolutions.com

FILE NO.: HW_Fig5_Delineated_Wetland_WSKB1_HWMM_HWM9_11x17_Update_20190523.mxd

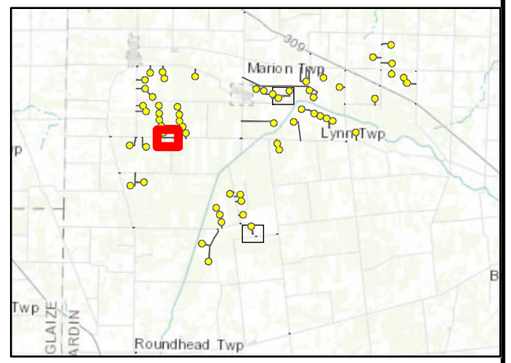
Plot Date: 6/19/2019, 10:11:48 AM by PJACQUES -- LAYOUT: ANSI B(11"x17")
Path: S:\1-PROJECTS\INVENERGY\302899-HARDIN_WIND_SOLAR_II\HW_Fig5_Delineated_Wetland_WSKB1_HWMM_HWM9_11x17_Update_20190523.mxd
Coordinate System: NAD 1983 2011 StatePlane Ohio South FIPS 3402 Ft US (Foot US)
Map Rotation: 0

TRC - GIS



Legend

- Hardin Wind Turbine Location (August 2018)
- Hardin Wind Study Area (August 2018)
- Hardin Wind Addendum Study Area (May 2019)
- TRC Delineated Stream
- Waterbody / Pond
- Sample Point



N

0 125 250
Feet

1 " = 250 '
1:3,000

PROJECT:
HARDIN WIND ENERGY LLC
HARDIN WIND ENERGY PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:
DELINEATED RESOURCE MAP
HW-M9W

DRAWN BY:	P. JACQUES	PROJ NO.:	302899.0000.0000
CHECKED BY:	M. MOLNAR		
APPROVED BY:	J. PITTS		**FIGURE 5**
DATE:	JUNE 2019		Page 3 of 3

TRC
690 Taylor Road, Suite 100
Gahanna, OH 43230
Phone: 614.423.6334
www.trcsolutions.com

FILE NO.: HW_Fig5_Delineated_Wetland_WSKB1_HWMM_HWM9_11x17_Update_20190523.mxd

Plot Date: 6/19/2019, 10:11:48 AM by PJACQUES -- LAYOUT: ANSI B(11"x17")
Path: S:\1-PROJECTS\INVENERGY\302899-HARDIN_WIND_SOLAR_II\HW_Fig5_Delineated_Wetland_WSKB1_HWMM_HWM9_11x17_Update_20190523.mxd
Coordinate System: NAD 1983 2011 StatePlane Ohio South FIPS 3402 Ft US (Foot US)
Map Rotation: 0

Appendix B

Photographic Log

PHOTOGRAPHIC RECORD

Hardin Wind Energy Project
Addendum Wetland and Other Waters of the U.S. Delineation Report

Client Name:	Site Location:	Project No.
Hardin Wind Energy LLC	Hardin County, Ohio	339845.0002.0000

Photo No. 1. **Date:** 5/2/2019 **Description:** Photo of Wetland W-SKB-01 facing north.	

Photo No. 2. **Date:** 5/2/2019 **Description:** Photo of Wetland W-SKB-01 facing east.	

PHOTOGRAPHIC RECORD

Hardin Wind Energy Project
Addendum Wetland and Other Waters of the U.S. Delineation Report

Client Name:	Site Location:	Project No.
Hardin Wind Energy LLC	Hardin County, Ohio	339845.0002.0000

Photo No. 3. **Date:** 5/2/2019 **Description:** Photo of Wetland W-SKB-01 facing south.	

Photo No. 4. **Date:** 5/2/2019 **Description:** Photo of Wetland W-SKB-01 facing west.	

PHOTOGRAPHIC RECORD

Hardin Wind Energy Project
Addendum Wetland and Other Waters of the U.S. Delineation Report

Client Name:	Site Location:	Project No.
Hardin Wind Energy LLC	Hardin County, Ohio	339845.0002.0000

Photo No. 5. **Date:** 5/2/2019 **Description:** Photo of Wetland HW-MM. The wetland was extended as part of the May 2019 Hardin Wind field investigations.	

Photo No. 6. **Date:** 5/2/2019 **Description:** Photo of Stream HW-M9. The stream was extended as part of the May 2019 field investigations.	

Appendix C

USACE Wetland Determination Data Forms

W-SKB-1

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: 339845: Hardin Wind Energy Project City/County: Hardin County Sampling Date: 5/2/19

Applicant/Owner: Hardin Wind Energy, LLC. (Invenergy) State: OH Sampling Point: W-SKB-1

Investigator(s): J, Pitts; S. Bender Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Field (Farm) Local relief (concave, convex, none): CONCAVE

Slope (%): 0% Lat: 40.692540 Long: -83.763589 Datum: WGS84

Soil Map Unit Name: MF, Milford silt clay loam, 0-2% slopes NWI classification: N/A

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

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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 X No ____	Is the Sampled Area within a Wetland?	Yes X No ____
Hydric Soil Present?	Yes X No ____		
Wetland Hydrology Present?	Yes X No ____		

Remarks:

All 3 criteria have been met. Area is a wetland. VEGETATION DISTURBED DUE TO ROTATION CROP FARMING.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. POPULUS DELTOID	40	Y	FAC
2. MALUS CORONARIA	5	N	N/A
3.			
4.			
5.			
	45 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. CORNUS ALBA	50	Y	FACW
2.			
3.			
4.			
5.			
	50 = Total Cover		
Herb Stratum (Plot size: 5')			
1. CORNUS ALBA	5	Y	FACW
2. APOCYNUM CANNABINUM	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	10 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: .80 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No ____

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

Hydrophytic vegetation criterion has been met.

Sampling Point: W-SP6-1

SOIL

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1	100					SiCl	
10-20	GLEY 2.5N/1	100					SiCl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: NO

Depth (inches): NO

Hydric Soil Present? Yes X No ___

Remarks:

Hydric soil criterion has been met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required: check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0.5"

Water Table Present? Yes X No ___ Depth (inches): 4"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0 SURFACE

Wetland Hydrology Present? Yes X No ___

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

N/A

Remarks:

Wetland hydrology criterion has been met.

UPL-SKB-1

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: 339845: Hardin Wind Energy Project City/County: Hardin County Sampling Date: 5/2/19
Applicant/Owner: Hardin Wind Energy, LLC. (Invenergy) State: OH Sampling Point: UPL-SKB-1
Investigator(s): J, Pitts; S. Bender Section, Township, Range: N/A
Landform (hillslope, terrace, etc.): Field (farm) Local relief (concave, convex, none): NON
Slope (%): 0% Lat: 40.6924609 Long: -83.7636060 Datum: WGS84
Soil Map Unit Name: MF, Milford silt clay loam 0-2% slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (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 ____	No ✓	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:
0 of 3 criteria have been met. Area is not a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot size: 5')			
1. ZEA MAYS	100	Y	N/A
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation criterion has NOT met.

Sampling Point: UPL-SKB 1

SOIL

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-14	10YR 2/1	100					SiCL	
14-20	GLEY 2.5N/1	100					SiCl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric soil criterion has NOT BEEN met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

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

N/A

Remarks:

Wetland hydrology criterion has NOT BEEN met.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: 302899 : Hardin Wind Energy Project City/County: Hardin County Sampling Date: 5/18/18
Applicant/Owner: TRC/Invenergy, LLC. State: OH Sampling Point: WET-HW-MM
Investigator(s): MMM, SKB, LNM Section, Township, Range: N/A
Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave
Slope (%): 0% Lat: 40.63591 Long: -83.77849 Datum: WGS84
Soil Map Unit Name: (PkA) Pewamo Silty Clay Loam, 0-1% slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? N Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? N (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 ✓	No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: All 3 wetland criteria have been met.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Phalaris arundinacea	70	✓	FACW
2. Carex lurida	20	✓	OBL
3. Juncus effusus	10		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
✓ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation criterion has been met.

SOIL

Sampling Point: WET-HW-MM

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4"	10YR 3/1	95	5YR 4/6	15	C	M	silty clay loam	
4-12"	10YR 4/2	90	10YR 4/6	10	C	M	" "	
12-18"	10YR 3/1	70	5YR 4/6	30	C	M	" "	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: None

Depth (inches): N/A

Hydric Soil Present? Yes ✓ No ___

Remarks:

Hydric soil criterion has been met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required: check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): N/A

Water Table Present? Yes ✓ No ___ Depth (inches): 8"

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): N/A

Wetland Hydrology Present? Yes ✓ No ___

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

N/A

Remarks:

Wetland hydrology criterion has been met.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: 302899: Hardin Wind Energy Project City/County: Hardin County Sampling Date: 5/18/18
Applicant/Owner: TRC/Invenergy, LLC. State: OH Sampling Point: UPL-HW-MM
Investigator(s): MMM, SKB, LNM Section, Township, Range: N/A
Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none
Slope (%): 0 Lat: 40.63599 Long: -83.77845 Datum: WGS84
Soil Map Unit Name: (PkA) Pewamo Silty Clay Loam, 0-1% slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? N (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 ____	No ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: 0 of 3 wetland criteria have been met. Area is not a wetland. Active farmland, row crops

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Zea mays	60	✓	UPL
2.			
3.			
4.			
5.			
6.			
7. 40% bare dirt			
8.			
9.			
10.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation N
___ 2 - Dominance Test is >50% N
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)
Hydrophytic vegetation criterion has not been met.

SOIL

Sampling Point: UPL-HW-MM

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5"	10YR4/2	100					sandy clay	
5-18"	10YR3/1	100					silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: None

Depth (inches): N/A

Hydric Soil Present? Yes ____ No ✓

Remarks:

Hydric soil criterion has not been met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): N/A

Water Table Present? Yes ____ No ✓ Depth (inches): N/A

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): N/A

Wetland Hydrology Present? Yes ____ No ✓

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

N/A

Remarks:

Wetland hydrology criterion has not been met.

Appendix D

Ohio EPA ORAM Data Forms

Category 1

ORAM v. 5.0 Field Form Quantitative Rating

Wetland W-SKB-1

Site: Hardin Wind II	Rater(s): SKB, JP	Date: 5/2/19

Metric 1. Wetland Area (size).

1 | 1 (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)
- (1) 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)
- [x] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

Circle: (PEM) PSS PFO

Circle: ~~Isolated~~ [Adjacent] Abutting

# of flags: 6

Continue offsite? No

Metric 2. Upland buffers and surrounding land use.

1 | 2 (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)
- 0 [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [x] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

(1) 2b. Intensity of surrounding land use. Select one or double check and average.

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

Metric 3. Hydrology.

5 | 7 (max 30 pts. | subtotal)

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

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

3b. Connectivity. Score all that apply.

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

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

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

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

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

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

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

Check all disturbances observed

- [ ] ditch
- [x] tile
- [ ] dike
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other_____

Metric 4. Habitat Alteration and Development.

3 | 10 (max 20 pts. | subtotal)

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

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

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

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

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

- [ ] None or none apparent (9)
- [ ] Recovered (6)
- 1 [ ] Recovering (3)
- [x] 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
- [x] farming
- [ ] nutrient enrichment

10 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Wetland W-SKB-1

Site: Hardin Wind II	Rater(s): SKB	Date: 5/2/19

10 subtotal this page

0 max 10 pts. | 10 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 Praires (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)

3 max 20 pts. | 13 subtotal

Metric 6. Plant communities, interspersion, microtopography.

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

- [0] Aquatic bed
- [1] Emergent
- [0] Shrub
- [0] Forest
- [0] Mudflats
- [0] Open water
- [0] Other_____

6b. horizontal (plan view) Interspersion. Select only one.

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [ ] Moderately low (2)
- [ ] Low (1)
- [X] 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)
- [X] Absent (1)

6d. Microtopography. Score all present using 0 to 3 scale.

- [0] Vegetated hummucks/tussucks
- [0] Coarse woody debris >15cm (6in)
- [0] Standing dead >25cm (10in) dbh
- [1] Amphibian breeding pools

Vegetation Community Cover Scale

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

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generallyw/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

13 **GRAND TOTAL(max 100 pts)**

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories at the following address: http://www.epa.state.oh.us/dsw/401/401.html

ORAM v. 5.0 Field Form Quantitative Rating

Wetland HW-MM

Site: 302899 Hardin Solar II	Rater(s): MMM, SKB, LNM	Date:

Metric 1. Wetland Area (size).

max 6 pts. | subtotal: 1 | 1

Select one size class and assign score.

(1)
- [ ] >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)
- [x] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

Metric 2. Upland buffers and surrounding land use.

max 14 pts. | subtotal: 1 | 1

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

(0)
- [ ] 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)
- [x] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

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

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

Metric 3. Hydrology.

max 30 pts. | subtotal: 7 | 8

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

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

3b. Connectivity. Score all that apply.

(0)
- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

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

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

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

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

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

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

Check all disturbances observed

[ ] ditch	[ ] point source (nonstormwater)
[x] tile	[x] filling/grading
[ ] dike	[ ] road bed/RR track
[ ] weir	[ ] dredging
[ ] stormwater input	[ ] other_____

Metric 4. Habitat Alteration and Development.

max 20 pts. | subtotal: 4 | 12

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

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

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

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

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

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

Check all disturbances observed

[x] mowing	[ ] shrub/sapling removal
[ ] grazing	[ ] herbaceous/aquatic bed removal
[ ] clearcutting	[x] sedimentation
[ ] selective cutting	[ ] dredging
[ ] woody debris removal	[ ] farming
[ ] toxic pollutants	[x] nutrient enrichment

12

subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Wetland HW-MM

Site: 302899	Rater(s): MMM, SKB, LNM	Date: 5/18/18

12 subtotal this page

0 max 10 pts. | 12 subtotal

Metric 5. Special Wetlands.

Check all that apply and score as indicated.

0 <

- [ ] 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 Praires (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)

0 max 20 pts. | 12 subtotal

Metric 6. Plant communities, interspersion, microtopography.

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

1

- [ ] Aquatic bed
- [1] Emergent
- [ ] Shrub
- [ ] Forest
- [ ] Mudflats
- [ ] Open water
- [ ] Other_____

6b. horizontal (plan view) Interspersion.
Select only one.

1

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

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

-3

- [ ] Extensive >75% cover (-5)
- [X] 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.

1

- [ ] Vegetated hummucks/tussucks
- [ ] Coarse woody debris >15cm (6in)
- [ ] Standing dead >25cm (10in) dbh
- [1] Amphibian breeding pools

Vegetation Community Cover Scale

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

Narrative Description of Vegetation Quality

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

Mudflat and Open Water Class Quality

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

Microtopography Cover Scale

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

12 **GRAND TOTAL(max 100 pts)**

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories at the following address: http://www.epa.state.oh.us/dsw/401/401.html

Appendix E

Ohio EPA Stream Data Forms

Ohio EPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 23

Stream & Location: Stream HW-M9 **RM:** ___ **Date:** 5/14/18

Scorers Full Name & Affiliation: M. Molnar TRC

River Code: ___-___-___ **STORET #:** _____ **Lat./Long.:** (NAD 83 - decimal °) 40.6747 / 83.8268 ☐ Office verified location

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

Check ONE (Or 2 & average)

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR/SLABS [10]	___	___	☐☐ HARDPAN [4]	___	___
☐☐ BOULDER [9]	___	___	☐☐ DETRITUS [3]	___	___
☐☐ COBBLE [8]	___	___	☐☐ MUCK [2]	___	___
☐☐ GRAVEL [7]	20	20	■■ SILT [2]	80	80
☐☐ SAND [6]	___	___	☐☐ ARTIFICIAL [0]	___	___
☐☐ BEDROCK [5]	___	___	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ■ 3 or less [0]

ORIGIN		QUALITY	
☐ LIMESTONE [1]	SILT	☐ HEAVY [-2]	Substrate
■ TILLS [1]		■ MODERATE [-1]	3
☐ WETLANDS [0]		☐ NORMAL [0]	
☐ HARDPAN [0]		☐ FREE [1]	
☐ SANDSTONE [0]	EMBEDDEDNESS	☐ EXTENSIVE [-2]	Maximum 20
☐ RIP/RAP [0]		■ MODERATE [-1]	
☐ LACUSTURINE [0]		☐ NORMAL [0]	
☐ SHALE [-1]		☐ NONE [1]	
☐ COAL FINES [-2]			

Comments: 2+2+1-1-1

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

2 UNDERCUT BANKS [1]	0 POOLS > 70cm [2]	0 OXBOWS, BACKWATERS [1]	
1 OVERHANGING VEGETATION [1]	0 ROOTWADS [1]	1 AQUATIC MACROPHYTES [1]	
1 SHALLOWS (IN SLOW WATER) [1]	0 BOULDERS [1]	0 LOGS OR WOODY DEBRIS [1]	
0 ROOTMATS [1]			

AMOUNT Check ONE (Or 2 & average)
☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
☐ SPARSE 5-<25% [3]
■ NEARLY ABSENT <5% [1]

Comments: 1+1+1+1

Cover Maximum 20: 4 → 7

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	■ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
■ NONE [1]	■ POOR [1]	■ RECENT OR NO RECOVERY [1]	

Comments: 1+1+1+2

Channel Maximum 20: 5 → 12

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

River right looking downstream

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

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

Comments: 3+0+0+0

Riparian Maximum 10: 3 → 15

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!)
☐ > 1m [6]
☐ 0.7-<1m [4]
☐ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
■ < 0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 & average)
■ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ■ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
■ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments: 0+2+1+1

Pool / Current Maximum 12: 4 → 19

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check ONE (Or 2 & average). ■ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments:

Riffle / Run Maximum 8: 0 → 19

6] GRADIENT
(1.64 ft/mi) ■ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (1.97 mi²)

%POOL: ___ %GLIDE: 100
%RUN: ___ %RIFFLE: ___

Gradient Maximum 10: 4

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ L. LINE
- ☐ OTHER

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

STAGE

1st -sample pass- 2nd

- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

CLARITY

1st --sample pass-- 2nd

- ☐ < 20 cm ☐
- ☐ 20-<40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

CANOPY

- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%-CLOSED

1st pass _____ cm

2nd _____ cm

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

Comment RE: Reach consistency/ Is reach typical of steam?, *Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

Dock observed

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

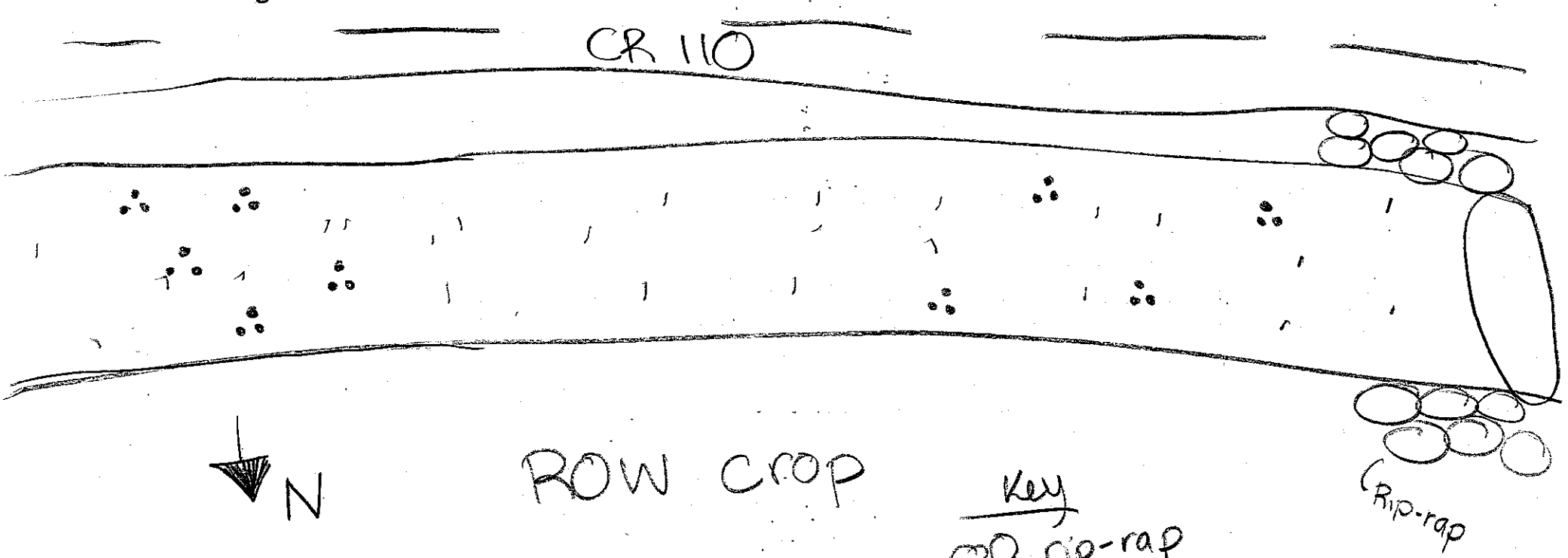
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



Case No(s). 09-0479-EL-BGN, 11-3446-EL-BGA, 16-0469-EL-BGA, 16-2404-EL-BGA

Summary: Notification of Phase 3 – Compliance with Condition 57(a), 2018 and 2019 Wetlands Delineation Reports electronically filed by Christine M.T. Pirik on behalf of Hardin Wind Energy LLC