

# Surface Water Delineation Report

Environmental Design & Research  
Big Blue River Wind Farm

J18X461200



## Document Information

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## Acronyms

CFR	Code of Federal Regulations
CWA	Clean Water Act
DBH	diameter at breast height
FAC	Facultative Plants
FACU	Facultative Upland Plants
FACW	Facultative Wetland Plants
GIS	Geographic Information Systems
GPS	Global Positioning System
HUC	Hydrologic Unit Code
IDEM	Indiana Department of Environmental Management
JD	Jurisdictional Determination
MBTA	Migratory Bird Treaty Act
NHD	National Hydrography Dataset
NLCD	National Land Cover Database
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
NWPL	National Wetland Plant List
OBL	Obligate Wetland Plants
OHWM	Ordinary High Water Mark
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
Project	Big Blue River Wind Farm
RTE	rare, threatened, or endangered
SBAS	Satellite Based Augmentation System
SWANCC	Solid Waste Agency of Northern Cook County
TNW	Traditionally Navigable Waters
TOB	Top-of-Bank
UPL	Obligate Upland Plants
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOTUS	Waters of the U.S.

# 1 Introduction

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Big Blue River Wind Farm, LLC is proposing to construct the Big Blue River Wind Farm (Project) near New Castle, Indiana, located approximately 44 miles east of Indianapolis, Indiana. The Project is proposed as a wind facility within an area of approximately 49,710 acres (77.7 square miles) on leased private lands (Project Corridor). The Project Corridor is located in Fall Creek, Greensboro, Harrison, Henry, Jefferson, and Prairie Townships, within Henry County, Indiana. Figure 1.1 shows an overview of the proposed Project Corridor.

In support of Project planning, Cardno conducted a field delineation survey to identify surface waters within the Project Corridor. Surface waters are regulated under the Clean Water Act (CWA), under jurisdiction of either the state or federal government. Cardno identified potentially jurisdictional Waters of the U.S. (WOTUS), including Traditionally Navigable Waters (TNW), their tributaries, and non-isolated wetlands, which are regulated under the jurisdiction of the State of Indiana and the U.S. Army Corps of Engineers (USACE) in accordance with Section 401/404 of the CWA. Cardno also identified waterbodies and isolated wetlands that do not have a significant nexus to a TNW, which are considered waters of the state and are regulated by the Indiana Department of Environmental Management's (IDEM) Isolated Wetlands Permitting Program.

Cardno's field efforts focused on the Project Corridor, which totaled approximately 1,145 acres. The Project Corridor includes proposed locations of Project components, such as wind turbines, private access roads, and buried collection lines. The Project Corridor includes 100-feet on either side of Project components and 250 feet around wind turbines.

Prior to field surveys, Cardno conducted a desktop review of the Project Corridor to identify and classify potential environmental resources and create field maps for use during the field survey. This report outlines the methodologies and results for both the desktop review and the field survey (Sections 2 and 3). Section 4 presents the conclusions of the delineation and site survey, and Section 5 provides a list of references cited in this report. This report is also accompanied by several appendices as listed in the table of contents.

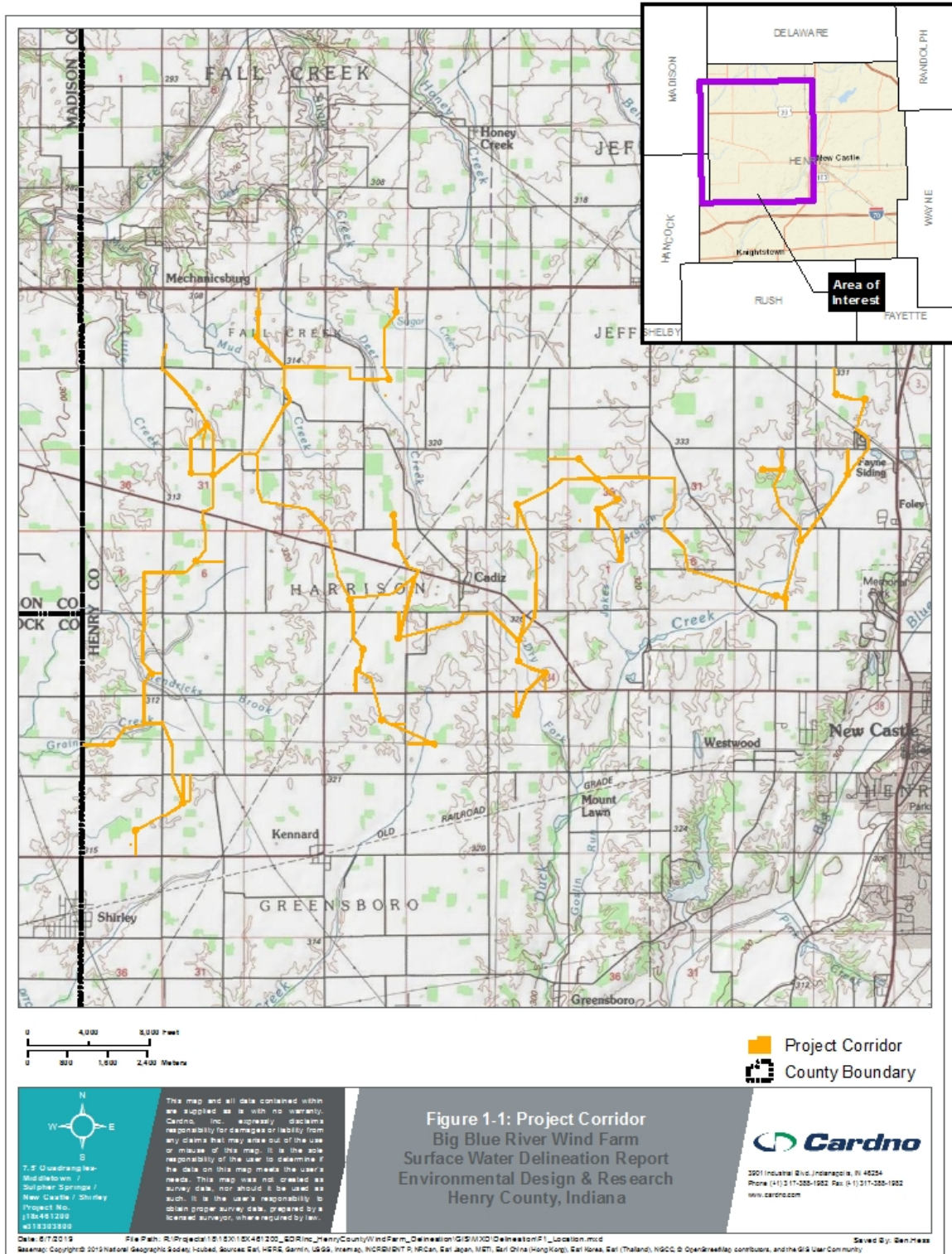


Figure 1.1 Overview of Big Blue River Wind Farm in Henry County, Indiana

## 2 Desktop Assessment

Prior to field surveys, Cardno conducted a desktop review of the Project Corridor using publically available Geographic Information Systems (GIS) data to identify and classify potential surface water features and create field maps for use during survey. Sources of this reference material included, but were not limited to: the National Land Cover Database (NLCD); the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey for Henry County; historic aerial photographs; U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps; U.S. Geological Survey (USGS) topographic maps; and the USGS National Hydrography Dataset (NHD).

Multiple sources were reviewed prior to field investigations to identify potential resources as part of a preliminary desktop review. The findings of the desktop review were also verified during the field surveys.

### 2.1 National Land Cover Database Review

Based on a review of available aerial imagery, the Project Corridor appeared to be largely dominated by cultivated crop areas. Review of the 2011 NLCD\* (Homer et al. 2015) confirmed this assessment, which showed that cultivated crops accounted for approximately 95 percent of the total acreage in the Project Corridor. The second most prominent land use within the Project Corridor was classified as Developed/Open Space areas for approximately four percent of the total acreage, followed by Deciduous Forest for approximately one percent. All other land use types identified made up less than one percent of the total acreage in the Project Corridor. A summary is provided in Table 2-1 below.

**Table 2-1 Land Use within the Project Corridor**

Type	Project Corridor (acres)	Project Corridor (%)
Cultivated Crops	1,084.84	94.83%
Developed, Open Space	42.70	3.73%
Deciduous Forest	12.01	1.05%
Developed, Low Intensity	2.45	0.21%
Hay/Pasture	0.89	0.08%
Shrub/Scrub	0.67	0.06%
Herbaceous	0.44	0.04%
<b>TOTAL</b>	<b>1,144.00</b>	<b>100.00%</b>

Source: Compiled from NLCD 2011, amended 2014

\*Review of the National Landcover Database is based on a raster analysis in GIS. Due to the precision of the data, there is a slight discrepancy between the calculated area (1,144.00 acres) for this analysis and the area of the project corridor (1,144.50 acres).

The field team observed that the land use in the Project Corridor closely matched the remote land use data described above.

### 2.2 Geology

The Project is located within the Central Till Plain Physiographic Region of Indiana, and, in particular, the New Castle Till Plains and Drainage Ways Region. The New Castle Till Plains and Drainage Ways Region is characterized by the abundance of rivers and other drainage ways that cross the flat to gently rolling glacial till plain (Gray 2001, Hillis and Neely 1987). Thick clay deposits over Silurian, Ordovician,



and Devonian-age dolomite, limestone, and shale comprise most of Henry County (Grove 2006, USGS). Ridgetops in this region are well drained, while depressions are very poorly drained. Elevations in this county range from about 880 to 1,190 feet above sea level with low relief (Hillis and Neely 1987).

## 2.3 Soils

Cardno reviewed soil types for the Project Corridor using the Web Soil Survey, an application of the NRCS (USDA-NRCS 2017). Presented in Table 2-2 below, there were 15 soil types identified, with four soil types identified as hydric (Hydric Rating of greater than 50) in the Project Corridor. The poor draining qualities of hydric soils combined with local flat or bowl-shaped topography can make locations predisposed to wetlands.

**Table 2-2 Soil Types within the Project Corridor**

Soil Symbol	Map Unit Description	Hydric Rating	Acreage	Project Corridor (%)
CrA	Crosby silt loam, 0 to 2 percent slopes	7	374.0	32.7%
Cy	Cyclone silty clay loam, 0 to 2 percent slopes	83	322.6	28.2%
CeB2	Celina silt loam, 2 to 6 percent slopes, eroded	4	164.7	14.4%
Mx	Millgrove loam	100	101.2	8.8%
MmB2	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	5	91.8	8.0%
We	Westland silt loam	100	24.8	2.2%
EdA	Eldean silt loam, 0 to 2 percent slopes	5	23.6	2.1%
LhC3	Losantville clay loam, 6 to 12 percent slopes, severely eroded	3	18.0	1.6%
Sk	Sleeth silt loam, 0 to 2 percent slopes	3	8.7	0.8%
LeB2	Losantville silt loam, 2 to 6 percent slopes, eroded	3	4.1	0.4%
Wb	Washtenaw silt loam	100	4.4	0.4%
EdB2	Eldean silt loam, 2 to 6 percent slopes, eroded	3	2.5	0.2%
La	Landes loam, rarely flooded	0	2.1	0.2%
MIB2	Miami silt loam, gravelly substratum, 2 to 6 percent slopes, eroded	3	2.0	0.2%
LhD3	Losantville clay loam, 12 to 18 percent slopes, severely eroded	0	0.3	0.0%
<b>TOTAL</b>			<b>1,144.9</b>	<b>100%</b>

## 2.4 Navigable Waters

The Project Corridor is located within the Upper White and the Driftwood Drainage Basins (Hydrologic Unit Code (HUC)-8) which flows into the Ohio River via the Wabash River. No navigable waterways occur in the Project Corridor. However, tributaries to the Upper White River and Driftwood River are located within the Project Corridor. Tributaries in the Project Corridor include: Deer Creek, Dry Fork, Duck Creek, Farmer Ditch, Grain Creek, Hendricks Brook, Jakes Branch, Lick Creek, Little Creek, Montgomery Creek, Mud Creek, Owner Run, Six Mile Creek, Sugar Creek, Ten Creek, Veatch Ditch, and Wilkinson Ditch.

## 2.5 Remote Wetland and Waterbody Identification

Prior to site investigations, the Project Corridor was screened using the USFWS NWI, USGS NHD, and 2011-2013 Indiana Statewide LiDAR remote data for potential wetlands and waterbodies in the vicinity of

the Project. The NWI data shows remotely identified wetlands, based on aerial imagery interpretation and soil surveys, the NHD uses digital stream information to identify potential waterways, and the LiDAR data shows detailed elevation maps that reveal drainage patterns and basins beneath tree cover.

Multiple waterbodies and wetlands were identified within the Project Corridor. The majority of the waterbodies remotely identified appeared to be field tiled stream in agricultural fields or regulated drains. Most of the wetlands identified by the NWI occurred in crop areas or wood lots.

## **2.6 Desktop Review Summary**

The desktop review indicated potential for wetlands to be located in crop areas and forested areas within the Project Corridor. The vast majority of the Project Corridor, however, is cultivated crop area that limits the development of wetlands. The remotely identified features and land use information was expected given the region's heavy, historic manipulation of land use to accommodate and maintain farming operations.

## 3 Field Delineation Surveys

The following is a discussion of the methodologies and results of field surveys conducted in 2018 and 2019 within the Project Corridor. Climatic conditions were considered normal for the time of year during the survey period. Appendix A contains representative photographic documentation of the delineated wetland and waterbody features. Appendix B contains maps depicting the delineated wetlands and waterbodies. Appendix C contains the completed routine wetland data from the field efforts.

### 3.1 Field Delineation Methodologies

Surveys were conducted in October, November, and December of 2018 and February and April of 2019 within the approximately 1,145 acres of the Project Corridor to determine the extent of surface waters in accordance with applicable federal and state regulations and guidelines. A Trimble® Global Positioning System (GPS) with sub-meter accuracy was used to collect data points for mapping. As wetland and waterbody point features were collected, they were assigned a FEATURE\_ID with the following format:

FF-XXX

Where: FF = Feature Type,

- S – Streams
- WL – Wetlands
- DP – Data Point
- PS – Photo Station

XXX = Three-digit number as the unique identifier.

The information collected in the field was corrected real-time in the field using Satellite Based Augmentation System (SBAS) and verified by the field team for accuracy. If a feature continued outside of the Project Corridor, it was noted by the field teams.

#### 3.1.1 Wetland Delineation Methodologies

Wetland delineations were conducted according to the 1987 USACE *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the applicable regional supplements; *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)* (USACE 2012).

Together, these documents are referred to as the “Manual.” The methodology outlined in the Manual requires the area being evaluated to meet the three wetland criteria in order for a wetland to be present; 1) dominance of hydrophytic vegetation, 2) hydric soils, and 3) sufficient hydrology.

Sampling points were taken at each NWI, suspected wetlands, within the wetland and in an adjacent upland area. At each sampling point, Cardno:

- recorded location using GPS equipment;
- completed routine wetland determination forms in the wetland and upland area, including:
  - evaluating sampling points for dominance of hydrophytic vegetation;
  - evaluating soils for evidence of hydric conditions;
  - evaluating presence of indicators of wetland hydrology; and
  - documenting the feature’s current conditions with photos.

The boundaries of each wetland were recorded by GPS at intervals to accurately capture changes in profile.

**3.1.1.1 Hydrophytic Vegetation Criterion**

The hydrophytic vegetation criterion is met when more than 50 percent of the dominant plant community is hydrophytic, as determined by species dominance and the assigned species-specific indicator status of the identified species. The National Wetland Plant List (NWPL) is a list of wetland plants and their assigned indicator statuses. An indicator status reflects the likelihood that a particular plant occurs in a wetland or non-wetland. Table 3-1 shows the indicator status categories for plants.

**Table 3-1 Plant Indicator Categories**

Indicator Category	Indicator Symbol	Definition
Obligate Wetland Plants	OBL	Plants that occur almost always (estimated probability > 99 percent) in wetlands under natural conditions, but which may also occur rarely (estimated probability <1 percent) in non-wetland.
Facultative Wetland Plants	FACW	Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands, but also occur (estimated probability 1 percent to 33 percent) in non-wetland.
Facultative Plants	FAC	Plants with a similar likelihood (estimated probability 33 percent to 67 percent) of occurring in both wetlands and non-wetland.
Facultative Upland Plants	FACU	Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in non-wetland.
Obligate Upland Plants	UPL	Plants that occur rarely (estimated probability <1 percent) in wetlands, but occur almost always (estimated probability >99 percent) in non-wetland under natural conditions.

The Midwest regional supplement evaluates vegetation in four different stratum, including tree, sapling/shrub, herbaceous, or woody vine. The tree stratum includes all woody plants with a diameter at breast height (DBH) of more than 3 inches. The sapling/shrub stratum includes all woody vegetation with a DBH less than 3 inches and greater than 1 meter tall. The herbaceous stratum includes all herbaceous/non-woody plants and woody plants less than 1 meter tall. The woody vine stratum includes all the woody vines greater than 1 meter in height. Typically the vegetation in each stratum is evaluated within a uniform plot size at each sampling point. The plots are often nested, so that all trees and vines within a 30-foot radius are evaluated, then all sapling/shrubs within a 15-foot radius, and then all herbaceous plants within a 5-foot radius of the sampling point. The plot size and dimensions can be altered as needed. For example, if a wetland is identified as rectangular, the plots can be rectangular as well and of varying sizes for each of the stratum.

Dominant vegetation was assessed for hydrophytic preference. After identifying the plant species present within the sampling point of a potential wetland, the dominance and indicator status for each identified unique species was determined. Based on the results, the vegetation community being evaluated was determined to be indicative of either a wetland or non-wetland.

If the site is dominated by hydrophytic vegetation (OBL or FACW) only, then the site meets the criteria for the rapid test for hydrophytic vegetation. However, if the dominant vegetation is a mix of species and indicators, then a more detailed analysis of the dominance can be completed on the wetland determination data form. The dominance test is simply the number of dominant species that are rated as OBL, FACW, or FAC divided by the total number of dominant species. If the dominance test result is greater than 50 percent, then the hydrophytic vegetation criteria is met.

Additional methods can be used on the wetland determination form for areas where a suspected wetland has hydric soils and hydrology but fails the dominance test. Cardno utilized one such evaluation method that involves calculating a prevalence index which weights the coverage of a particular class of species (using its wetland indicator status) against the total coverage within the sampling area. If a sampling area passes this test (which requires the value to be less than or equal to 3), it can be considered a wetland. Cardno also noted the presence of morphological adaptations, which can include root buttressing, shallow roots, or multi-stemmed trunks. The presence of such adaptations is considered evidence that the plants (even FACU species) have adapted to survive in prolonged inundation or root saturation.

In rare instances, another method for identifying hydrophytic vegetation is to report “Problematic Hydrophytic Vegetation.” This method is used sparingly, and reflects the delineator’s opinion that conditions outside of those considered normal may be present, such as vegetation being bent or damaged to such a degree that identification to species level is impracticable. Damage to vegetation may be the result of recent severe weather, unseasonably cold conditions, or habitat destruction. Under this method, the vegetation present would be treated as consistent with a wetland, but the vegetation could not be reliably identified. This method was not used during the delineations for this Project.

### **3.1.1.2 Hydric Soils Criterion**

The hydric soils criterion is met when the soils demonstrate characteristics representative of soils in reducing (hydric) conditions. Field teams dig small test pits to evaluate the upper 12 to 16 inches of soil (or to a depth until refusal, bedrock, or large debris preventing further digging). Cardno evaluates if the soils fall within the hydric ranges on the Munsell Color Chart, examine soil profiles for other evidence of reducing conditions, and/or observe other indicators of anaerobic activity per the Manual. Under certain conditions, hydric soils can be assumed to be present without testing, including when a sampling point is dominated by hydrophytic vegetation (i.e., vegetation rated OBL or FACW) and obvious wetland hydrology is present, such as direct observation of surface water or saturated soils.

### **3.1.1.3 Hydrology Criterion**

The hydrology criterion is met when sufficient hydrologic indicators are present. The indicators must be representative of sufficient saturation or inundation occurring over the growing season sufficient to support a hydrophytic plant-dominated vegetative community. The Manual categorizes the wetland hydrology indicators into four groups which document different types of hydrologic observations:

- Group A indicators are based on direct observation of surface or ground water;
- Group B indicators identify the site as having evidence of potential flooding or ponding despite a lack of inundation at the time of a site visit;
- Group C indicators document evidence of soil saturation, either recent or current; and
- Group D indicators consist of landscape, soil, and vegetation features identifying contemporary wet conditions.

Each of the groups is further identified as either a primary or a secondary indicator for each group. Identification as primary or secondary is based on estimated reliability of an indicator to accurately identify wetland conditions, and can vary by region. In all regions, a single primary indicator is needed to identify the presence of wetland hydrology, or at least two secondary indicators.

Regional indicators and their status as primary or secondary are identified in Table 3-2. If an indicator does not have an ‘X’ for a region, then it is not applicable to that area.

**Table 3-2 Hydrology Indicators and Regional Manual Status**

Type of Indicator	Primary	Secondary
<b>Group A - Observation of Surface Water or Saturate Soils</b>		
▪ A1 - Surface Water	X	
▪ A2 - High Water Table	X	
▪ A3 - Saturation	X	
<b>Group B - Evidence of Recent Inundation</b>		
▪ B1 - Water Marks	X	
▪ B2 - Sediment Deposits	X	
▪ B3 - Drift Deposits	X	
▪ B4 - Algal Mat or Crust	X	
▪ B5 - Iron Deposits	X	
▪ B6 - Surface Soil Cracks		X
▪ B7 - Inundation Visible on Aerial Imagery	X	
▪ B8 - Sparsely Vegetated Concave Surface	X	
▪ B9 - Water-stained Leaves	X	
▪ B10 - Drainage Patterns		X
▪ B13 - Aquatic Fauna	X	
▪ B15 - Marl Deposits	X	
▪ B16 - Moss Trim Lines		X
<b>Group C - Evidence of Current or Recent Soil Saturation</b>		
▪ C1 - Hydrogen Sulfide Odor	X	
▪ C2 - Dry-season Water Table		X
▪ C3 - Oxidized Rhizospheres Along Living Roots	X	
▪ C4 - Presence of Reduced Iron	X	
▪ C6 - Recent Iron Reduction in Tilled Soils	X	
▪ C7 - Think Much Surface	X	
▪ C8 - Crayfish Burrows		X
▪ C9 - Saturation Visible on Aerial Imagery		X
<b>Group D - Evidence from Other Site Conditions or Data</b>		
▪ D1 - Stunted or Stressed Plants		X
▪ D2 - Geomorphic Position	X	X
▪ D3 - Shallow Aquitard		X
▪ D5 - FAC-neutral Test	X	X

### 3.1.2 Waterbody Delineation Methodologies

Other surface waters present in the Project Corridor, including streams, ditches, and ponds were also delineated by Cardno field teams. Waterbodies were delineated by taking GPS points along the Ordinary High Water Mark (OHWM) along the course of the channel. The OHWM is defined as the lateral extents over which agencies have regulation, and is defined in the CWA and the Code of Federal Regulations (CFR) as “*The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas*” (33 CFR 328.3(e)). The USACE has issued additional regulatory guidance, as a Regulatory Guidance Letter, which identifies physical characteristics which can be used to identify the OHWM in the field, including: shelving, changes in soil character, bed and bank, wracking, or natural line impressed on the bank (USACE 2005).

Measurements including bank full width (OHWM to OHWM) and Top-of-Bank (TOB) to TOB were also recorded. Photos were taken along the waterbodies to capture the typical conditions. Observational notes about the characteristics of the waterbody (such as flow regime and substrate) were recorded by the field team for use in evaluating the stream quality. Table 3-3 identifies the definitions used in assigning flow categories.

**Table 3-3 Waterbody Flow Categories**

Flow Category	Definition
Perennial	Flow is continuous and likely permanent across the seasons (although it may vary). Such flow can be surface based or occur as interstitial flow, which would include the flow driving underground for a portion of the channel.
Intermittent	Flow is present during extended periods of time during some seasons, but gradually returns to a state of isolated pools in the channel or a dry channel. There may be indications of subsurface flow.
Ephemeral	Flow is often not present during the majority of the year, and only occurs after a precipitation event. Channels of ephemeral streams will be dry with no evidence of isolated pools of water.

### 3.1.3 Jurisdictional Determination

Cardno made a recommendation on the potential jurisdictional status of each identified surface water feature based on USACE/U.S. Environmental Protection Agency (USEPA) guidance material. Guidance used for these determinations includes documentation from the USEPA “Current Implementation of Waters of the United States”<sup>1</sup> which discusses the definition of “water of the United States” included in 40 CFR 230.2 and Supreme Court cases which further defined the term.

The Supreme Court cases include those known as the Solid Waste Agency of Northern Cook County (SWANCC) case<sup>2</sup> and the Rapanos and Carabell cases<sup>3</sup>. In the 2001 SWANCC decision, it was determined that the USACE could not extend CWA Section 404 jurisdiction over physically isolated, intrastate, non-navigable water wetlands using the Migratory Bird Treaty Act (MBTA). In the case, SWANCC had sought to fill isolated and non-navigable wetlands, but the USACE had extended CWA jurisdiction due to their use as habitat by migratory birds. Since the wetlands were non-navigable waters and isolated from any true navigable WOTUS, it was determined that the use of the MBTA to assert

<sup>1</sup> <https://www.epa.gov/wotus-rule/about-waters-united-states#Legal>

<sup>2</sup> 531 U.S. 159 (2001)

<sup>3</sup> 547 U.S. 715 (2006) (consolidated the cases)

<sup>4</sup> Revised USEPA 2008

jurisdiction was improper. The Rapanos/Carabell Guidance<sup>4</sup> refers to two court cases which were consolidated, *Rapanos v. United States* and *Carabell v United States*. The combined guidance document developed after the rulings from USEPA and USACE identified several key points regarding jurisdiction and when it would be exercised:

- Agencies would always assert jurisdiction over TNWs, wetlands adjacent to TNWs, non-navigable tributaries of TNWs with relatively permanent flow (flow year round or have continuous flow at least seasonally), and wetlands abutting such tributaries;
- Agencies will evaluate the following waters for a significant nexus to a TNW before deciding jurisdiction: non-navigable tributaries that are not relatively permanent, wetlands adjacent to non-navigable tributaries that are not relatively permanent, or wetlands adjacent to but do not directly abut a relatively permanent non-navigable tributary; and
- Agencies will not assert jurisdiction over swales, erosional features, or those ditches excavated wholly in and draining only uplands that do not carry a relatively permanent flow of water.

Critical to the Rapanos/Carabell Guidance is the definition of a *significant nexus*, which is determined by assessing the flow characteristics of a tributary and functions performed by any adjacent wetlands to determine if the function of the wetland or waterbody significantly affects the chemical, physical, or biological integrity of a down-stream TNW.

The version of 40 CFR 230.3, in place just prior to the 2015 Clean Water Rule, currently in effect as the result of litigation, defines WOTUS as:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
  - a. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
  - b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
  - c. Which are used or could be used for industrial purposes by industries in interstate commerce;
4. All impoundments of waters otherwise defined as WOTUS under this definition;
5. Tributaries of waters identified in paragraphs (s)(1) through (4) of this section;
6. The territorial sea;
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not WOTUS.

Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

Tables 3-7 and 3-8 include Cardno's recommendation on the potential jurisdictional status of each feature.



## 3.2 Field Delineation Results

The following is a discussion of the results of the field surveys conducted in October, November, and December of 2018 and February and April of 2019 within the approximately 1,145 acres of the Project Corridor to determine the extent of surface waters in accordance with applicable federal and state regulations and guidelines.

### 3.2.1 General Habitat within the Project Corridor

The data obtained during the desktop review was found to be generally consistent with the results of the field survey. As identified in Table 2-1, the predominant land use in the Project Corridor is agricultural crop area, followed by developed, open areas.

The agricultural areas were comprised of harvested fields and remnants of mostly soybean and corn crops. The field team observed limited areas of cover crops or standing crops, with the majority of the fields consisting of corn and soybean stubble. The cultivated areas within the Project Corridor are expected to occupy the same general area from year to year, with the potential for the type of crop to change seasonally. Many of the crop areas and roadsides had man-made or modified ditches which helped maintain field drainage for agricultural operations. In between many of the fields, as well as along many roadsides, there were also grassy swales (consisting of *Festuca* and fescue grasses) that helped to direct stormwater runoff away from the crop area, but lacked the defined bed and bank necessary to be classified as a waterbody. Some of the fields appeared to be tilled to help with additional field drainage and this water travels to the nearby streams and ditches. In intermittent and ephemeral ditches, the channels were often vegetated with reed canary grass (*Phalaris arundinacea*) and narrow-leaf cattail (*Typha angustifolia*) indicating the presence of water during portions of the year. Some ditches, which rarely received any runoff except during severe storm events, lacked vegetation in the channel or had a mix of grasses (*Festuca* and fescue).

There were very few woodlots that were observed within the Project Corridor, many of which occurred between crop areas or along roadsides. Aggressive weedy species, such as poison ivy (*Toxicodendron radicans*) often occurred along the woodlot edges, with the interiors of woodlots comprised predominately of relatively young maples (*Acer sp.*) and oaks (*Quercus sp.*)

No evidence of rare, threatened, or endangered (RTE) species was observed by Cardno during field surveys. The delineated waterbodies could potentially provide habitat, but they had significantly reduced quality due to the surrounding land use and were unlikely to be suitable for most species (i.e., high sediment loading during storms, fertilizer in runoff).

### 3.2.2 Description of the Delineated Wetlands in the Project Corridor

A total of 16 wetlands were delineated during field surveys, for a total of 14.8 acres within the Project Corridor. Twelve (12) of the 16 wetlands were considered palustrine forested (PFO) wetlands, one was considered palustrine scrub shrub (PSS) wetland, one was identified as a palustrine emergent wetland (PEM) due to the lack of woody vegetation, and two were PFO wetlands with an emergent component.

Two of the wetlands (WL-001, WL-020) are considered jurisdictional due to a potential hydrologic connection to a WOTUS. The rest are considered isolated wetlands, but are under state jurisdiction through IDEM's Isolated Wetlands Permitting Program. Therefore, potential impacts to these isolated wetlands would require State Isolated Wetland Permits from IDEM. Table 3-7 provides a list of the delineated wetlands and associated characteristics. Wetland acreages reported in the summaries below are representative only of the portion of the wetland located within the Project Corridor.

- **WL-001** (0.43 acre) was a scrub shrub wetland located in a ditch, which flowed west into Dry Fork. This wetland is potentially a jurisdictional water. Dominant vegetation in the vicinity of dp102 included Eastern Cottonwood (*Populus deltoides*, FAC), Sandbar Willow (*Salix interior*, FACW), Narrow-Leaf Cat-Tail (*Typha angustifolia*, OBL), and Flat-Top Goldentop (*Euthamia graminifolia*, FACW). In

addition, non-dominant vegetation observed included Saw-Tooth Sunflower (*Helianthus grosseserratus*, FACW), and Allegheny Blackberry (*Rubus allegheniensis*, FACU). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-6 inches had a matrix soil color of 10YR 6/1 with a texture of Clay loam. The soil from 6-14 inches had a matrix soil color of 10YR 6/1 with concentrations in the matrix at 30%, and a texture of Clay loam. The soil at the data point was mapped as Cyclone silty clay loam (Cy), and met the Depleted Matrix (F3) hydric soil criteria. Primary indicators of hydrology included High Water Table (A2) and Saturation (A3), and secondary indicators of hydrology included Geomorphic Position (D2) and the FAC-Neutral Test (D5).

- **WL-002** (3.19 acres) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp408 included American Hornbeam (*Carpinus caroliniana*, FAC), Swamp White Oak (*Quercus bicolor*, FACW), Green Ash (*Fraxinus pennsylvanica*, FACW), Toothache tree (*Zanthoxylum americanum*, FACU), Gray's Sedge (*Carex grayi*, FACW), and Virginia Wild Rye (*Elymus virginicus*, FACW). In addition, non-dominant vegetation observed included American Elm (*Ulmus americana*, FACW) in multiple strata, Silver Maple (*Acer saccharinum*, FACW), and Black Elder (*Sambucus nigra*, FAC). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-20 inches had a matrix soil color of 10YR 3/1 with concentrations in the matrix at 5%, and a texture of Silty Clay Loam. The soil at the data point was mapped as Crosby silt loam, 0 to 2 percent slopes (CrA), and met the Redox Dark Surface (F6), and Redox Depressions (F8) hydric soil criteria. Primary indicators of hydrology included Surface Water (A1), Drift Deposits (B3), and secondary indicators of hydrology observed included Geomorphic Position (D2), and the FAC-Neutral Test (D5).
- **WL-003** (0.83 acre) consisted of an emergent wetland portion (0.41 acre) located in an unfarmed depression in an agricultural field and a forested wetland portion (0.42 acre) located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp507 included Swamp White Oak (FACW), American Elm (FACW), Eastern Cottonwood (FAC), Climbing Rose (*Rosa setigera*, FACU), Eastern Poison Ivy (*Toxicodendron radicans*, FAC), and Fowl Manna Grass (*Glyceria striata*, OBL). In addition, non-dominant vegetation observed included Black Elder (FAC), Virginia Wild Rye (FACW), Cress-Leaf Groundsel (*Packera glabella*, FACW), False Mermaidweed (*Floerkea proserpinacoides*, FACW), and Spotted Touch-Me-Not (*Impatiens capensis*, FACW). The plants at this data point qualified as hydrophytic vegetation. The soil from 0 to 20 inches had a matrix soil color of 10YR 5/2 with concentrations in the matrix at 2 percent, and a texture of Silty Clay Loam. The soil at the data point was mapped as Celina silt loam, 1 to 6 percent slopes, eroded (CeB2), and met the Depleted Matrix (F3) hydric soil criteria. The primary indicators of hydrology observed were Surface Water (A1), Saturation (A3), and the secondary indicator of hydrology was the FAC-Neutral Test (D5).
- **WL-005** (0.03 acre) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp16 included Slippery Elm (FAC), Green Ash (FACW), Eastern Cottonwood (FAC), Canadian Clearweed (*Pilea pumila*, FACW), and White Mulberry (*Morus alba*, FAC). In addition, non-dominant vegetation observed included American Pokeweed (*Phytolacca americana*, FACU). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-6 inches had a matrix soil color of 10YR 3/1 with a texture of Clay Loam. The soil from 6-20 inches had a matrix soil color of 10YR 3/1 with concentrations in the matrix at 5%, and a texture of Clay Loam. The soil at the data point was mapped as Crosby silt loam, 0 to 2 percent slopes (CrA), and met the Redox Dark Surface (F6) hydric soil criteria. Secondary indicators of hydrology observed included Geomorphic Position (D2), and the FAC-Neutral Test (D5).

- **WL-007** (4.01 acres) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp27 included Silver Maple (FACW), American Elm (FACW), Northern Spicebush (*Lindera benzoin*, FACW), Sweet Wood-Reed (*Cinna arundinacea*, FACW), Gray's Sedge (FACW), and Clustered Black-Snakeroot (FAC). In addition, non-dominant vegetation observed included Slippery Elm (FAC), White Avens (FAC), Farewell-Summer (*Symphotrichum lateriflorum*, FACW), Canadian Clearweed (FACW), and Chinaroot (*Smilax hispida*, FACU). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-20 inches had a matrix soil color of 10YR 4/1 with concentrations in the matrix at 5%, and a texture of Clay Loam. The soil at the data point was mapped as Cyclone silty clay loam (Cy), and met the Depleted Matrix (F3) hydric soil criteria. Secondary indicators of hydrology included Geomorphic Position (D2) and the FAC-Neutral Test (D5).
- **WL-008** (0.66 acre) was an emergent wetland located in a depression in an agricultural field. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp203 included Fall Panic Grass (FACW), and Prickly Fanpetals (*Sida spinosa*, FACU). In addition, non-dominant vegetation observed included Japanese Bristle Grass (*Setaria faberi*, FACU), Velvetleaf (*Abutilon theophrasti*, FACU), Rough Cockleburr (*Xanthium strumarium*, FAC), Great Ragweed (*Ambrosia trifida*, FAC), and Water Smartweed (*Persicaria amphibia*, OBL). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-20 inches had a matrix soil color of 10YR 4/2 with concentrations in the matrix at 2%, and a texture of Silty Clay Loam. The soil at the data point was mapped as Millgrove loam (Mx), and met the Depleted Matrix (F3) hydric soil criteria. The primary indicator of hydrology observed was Surface Water (A1), and the secondary indicator of hydrology, the FAC-Neutral Test (D5).
- **WL-012** (2.78 acres) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp205 included Green Ash (FACW) in multiple strata, American Hornbeam (FAC), Virginia Wild Rye (FACW), and Blunt Broom Sedge (*Carex tribuloides*, OBL). In addition, non-dominant vegetation observed included Common Hackberry (FAC), White Avens (FAC), and Hooded Blue Violet (*Viola sororia*, FAC). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-20 inches had a matrix soil color of 10YR 4/2 with concentrations in the matrix at 5%, and a texture of Silty Clay Loam. The soil at the data point was mapped as Crosby silt loam, 0 to 2 percent slopes (CrA), and met the Depleted Matrix (F3) hydric soil criteria. Primary indicators of hydrology included Surface Water (A1), and secondary indicators of hydrology observed included Geomorphic Position (D2), and the FAC-Neutral Test (D5).
- **WL-016** (0.14 acre) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp412 included Swamp White Oak (FACW), American Elm (FACW), Downy Hawthorn (*Crataegus mollis*, FAC), Green Ash (FACW), Sweet Wood-Reed (FACW), and Blunt Broom Sedge (OBL). In addition, non-dominant vegetation observed included Gray's Sedge (FACW). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-20 inches had a matrix soil color of 10YR 4/2 with concentrations in the matrix at 5%, and a texture of Silty Clay Loam. The soil at the data point was mapped as Celina silt loam, 1 to 6 percent slopes, eroded (CeB2), and met the Depleted Matrix (F3), and Redox Depressions (F8) hydric soil criteria. Primary indicators of hydrology included Surface Water (A1), and secondary indicators of hydrology observed included Geomorphic Position (D2), and the FAC-Neutral Test (D5).
- **WL-017** (0.09 acre) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp414 included Silver Maple (FACW), Rough-Leaf

Dogwood (FAC), and Sweet Wood-Reed (FACW). In addition, non-dominant vegetation observed included Green Ash (FACW), and Swamp Rose (*Rosa palustris*, OBL). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-20 inches had a matrix soil color of 10YR 3/1 with concentrations in the matrix at 10%, and a texture of Silty Clay Loam. The soil at the data point was mapped as Celina silt loam, 1 to 6 percent slopes, eroded (CeB2), and met the Redox Dark Surface (F6), and Redox Depressions (F8) hydric soil criteria. Primary indicators of hydrology included Surface Water (A1), and secondary indicators of hydrology observed included Geomorphic Position (D2), and the FAC-Neutral Test (D5).

- **WL-018** (0.11 acre) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp416 included Green Ash (FACW). In addition, non-dominant vegetation observed included Northern White Oak (*Quercus alba*, FACU). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-2 inches had a matrix soil color of 10YR 4/2 with a texture of Silty Clay Loam. The soil from 2-20 inches had a matrix soil color of 10YR 6/1 with concentrations in the matrix at 20%, and a texture of Silty Clay Loam. The soil at the data point was mapped as Crosby silt loam, 0 to 2 percent slopes (CrA), and met the Depleted Matrix (F3) hydric soil criteria. The primary indicator of hydrology observed was Sparsely Vegetated Concave Surface (B8), and the secondary indicator of hydrology, the FAC-Neutral Test (D5).
- **WL-019** (0.30 acre) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp418 included Swamp White Oak (FACW), Downy Hawthorn (FAC), Eastern Poison Ivy (FAC), and Virginia Wild Rye (FACW). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-20 inches had a matrix soil color of 10YR 4/2 with concentrations in the matrix at 2%, and a texture of Silty Clay Loam. The soil at the data point was mapped as Crosby silt loam, 0 to 2 percent slopes (CrA), and met the Depleted Matrix (F3) hydric soil criteria. The primary indicators of hydrology observed were Surface Water (A1), Sparsely Vegetated Concave Surface (B8), and the secondary indicator of hydrology was the FAC-Neutral Test (D5).
- **WL-020** (0.30 acre) was a forested wetland located in a depression in a woodlot, which flowed north into Sugar Creek. This wetland is potentially a jurisdictional water. Dominant vegetation in the vicinity of dp421 included Common Hackberry (*Celtis occidentalis*, FAC) in multiple strata, Green Ash (FACW), Slippery Elm (FAC), Gray's Sedge (FACW), and Virginia Wild Rye (FACW). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-20 inches had a matrix soil color of 10YR 4/2 with concentrations in the matrix at 2%, and a texture of Silty Clay Loam. The soil at the data point was mapped as Cyclone silty clay loam (Cy), and met the Depleted Matrix (F3) hydric soil criteria. Primary indicators of hydrology included Surface Water (A1), and secondary indicators of hydrology observed included Geomorphic Position (D2), and the FAC-Neutral Test (D5).
- **WL-021** (0.78 acre) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp423 included Common Hackberry (FAC), Black Elder (FAC), and Rough-Leaf Dogwood (FAC). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-20 inches had a matrix soil color of 10YR 4/2 with concentrations in the matrix at 20%, and a texture of Silty Clay Loam. The soil at the data point was mapped as Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded (MmB2), and met the Depleted Matrix (F3) hydric soil criteria. The primary indicator of hydrology observed was Surface Water (A1), and the secondary indicator of hydrology, Geomorphic Position (D2).
- **WL-022** (0.26 acre) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional

feature. Dominant vegetation in the vicinity of dp425 included American Elm (FACW), Slippery Elm (FAC), Sweet Wood-Reed (FACW), and Small-Spike False Nettle (*Boehmeria cylindrica*, OBL). In addition, non-dominant vegetation observed included Limestone-Meadow Sedge (*Carex granularis*, FACW). The plants at this data point qualified as hydrophytic vegetation. The soil from 0-20 inches had a matrix soil color of 10YR 4/2 with concentrations in the matrix at 3%, and a texture of Clay Loam. The soil at the data point was mapped as Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded (MmB2), and met the Depleted Matrix (F3) hydric soil criteria. Primary indicators of hydrology included Surface Water (A1), Drift Deposits (B3), Water-Stained Leaves (B9), and secondary indicators of hydrology observed included Drainage Patterns (B10), and the FAC-Neutral Test (D5).

- **WL-030** (0.06 acre) consisted of an emergent wetland portion (0.04 acre) located in a depression in an agricultural field and a forested wetland portion (0.06 acre) located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp502 included Rough-Leaf Dogwood (*Cornus drummondii*, FAC), Green Ash (FACW), and Cress-Leaf Groundsel (FACW). The plants at this data point qualified as hydrophytic vegetation. The soil from 0 to 20 inches had a matrix soil color of 10YR 5/2 with concentrations in the matrix at 5 percent, and a texture of Clay Loam. The soil at the data point was mapped as Crosby silt loam, 0 to 2 percent slopes (CrA), and met the Depleted Matrix (F3), and Redox Depressions (F8) hydric soil criteria. Primary indicators of hydrology included Surface Water (A1), and secondary indicators of hydrology observed included Geomorphic Position (D2), and the FAC-Neutral Test (D5).
- **WL-031** (0.80 acre) was a forested wetland located in a depression in a woodlot. No surface water connection with any WOTUS was observed; this wetland should be considered a non-jurisdictional feature. Dominant vegetation in the vicinity of dp504 included Silver Maple (FACW), Common Hackberry (FAC), Rough-Leaf Dogwood (FAC), Black Elder (FAC), and Eastern Poison Ivy (FAC). In addition, non-dominant vegetation observed included Common Hackberry (FAC), and Green Ash (FACW). The plants at this data point qualified as hydrophytic vegetation. The soil from 0 to 20 inches had a matrix soil color of 10YR 5/2 with concentrations in the matrix at 10 percent, and a texture of Silty Clay Loam. The soil at the data point was mapped as Celina silt loam, 1 to 6 percent slopes, eroded (CeB2), and met the Depleted Matrix (F3), and Redox Depressions (F8) hydric soil criteria. Primary indicators of hydrology included Surface Water (A1), Drift Deposits (B3), and secondary indicators of hydrology observed included Geomorphic Position (D2), and the FAC-Neutral Test (D5).

Wetland ID	Latitude of Center Point	Longitude of Center Point	Acres	Wetland Type	Jurisdictional Recommendation	Drainage Basin
WL-001	39.936105	-85.468835	0.43	PSS	Yes	Duck Creek-Dry Fork
WL-002	39.923593	-85.493167	3.19	PFO	No	Montgomery Creek-Headwaters
WL-003	39.967983	-85.415036	0.41	PEM	No	Duck Creek-Jakes Branch
WL-003	39.968243	-85.414208	0.42	PFO	No	Duck Creek-Jakes Branch
WL-005	39.997578	-85.504488	0.03	PFO	No	Fall Creek-Sugar Creek/Deer Creek
WL-007	39.953140	-85.553044	4.01	PFO	No	Sugar Creek-Pee Dee Ditch
WL-008	39.945723	-85.561238	0.66	PEM	No	Sugar Creek-Pee Dee Ditch
WL-012	39.967166	-85.546520	2.78	PFO	No	Fall Creek-Mud Creek/Little Creek
WL-016	39.952173	-85.470370	0.14	PFO	No	Duck Creek-Jakes Branch
WL-017	39.952126	-85.469581	0.09	PFO	No	Duck Creek-Jakes Branch
WL-018	39.961218	-85.547328	0.11	PFO	No	Sugar Creek-Pee Dee Ditch
WL-019	39.978374	-85.548415	0.30	PFO	No	Fall Creek-Mud Creek/Little Creek
WL-020	39.937413	-85.562529	0.30	PFO	Yes	Sugar Creek-Pee Dee Ditch
WL-021	39.978751	-85.393999	0.78	PFO	No	Duck Creek-Jakes Branch
WL-022	39.984574	-85.393923	0.26	PFO	No	Duck Creek-Jakes Branch
WL-030	39.978576	-85.547300	0.04	PEM	No	Fall Creek-Mud Creek/Little Creek
WL-030	39.978468	-85.547335	0.06	PFO	No	Fall Creek-Mud Creek/Little Creek
WL-031	39.977567	-85.546342	0.80	PFO	No	Fall Creek-Mud Creek/Little Creek
<b>Total</b>			<b>14.81</b>			

Notes:

Wetland types classified according to Cowardin et al. (1979):

PEM: Palustrine (freshwater) Emergent Wetland – characterized by erect, rooted herbaceous and grasslike plants suited to growing in wet conditions

PFO: Palustrine Forested Wetland - dominated by woody vegetation at least 20 feet tall with a tolerance to a seasonally high water table

### **3.2.3 Description of the Delineated Waterbodies in the Project Corridor**

A total of 21 waterbodies were delineated during field surveys. Twenty of the delineated waterbodies were identified as streams, and one was identified as a pond. The waterbody delineation results are summarized in Table 3-8. Representative photographs of typical waterbodies can also be found in Appendix A.

Streams were more often considered natural channels that had indications of significant recovery since any historic modification had occurred. Streams are more likely to have vegetated riparian buffers along the banks, a variety of substrates in the channel, and pools of water which might support aquatic species.

The majority of the streams are correlated to tributaries to the Upper White River and Driftwood River. Four streams were associated with Duck Creek – Dry Fork (S-001, S-005, S-022, S-027); eight streams were associated with Duck Creek – Jakes Branch (S-002, S-003, S-004, S-007, S-008, S-018, S-030, S-031); two streams were associated with Fall Creek’s Sugar Creek and Deer Creek (S-009, S-010); two streams were associated with Montgomery Creek (S-006, S-020); one stream was associated with Six Mile Creek (S-013); and two streams were associated with Sugar Creek and Pee Dee Ditch (S-012, S-014, S-021).

Stream ID	County	Linear Feet	Flow Regime	Drainage Basin	Jurisdictional Recommendation
S-001	Henry	881	Ephemeral	Duck Creek-Dry Fork	Yes
S-002	Henry	345	Intermittent	Duck Creek-Jakes Branch	Yes
S-003	Henry	779	Intermittent	Duck Creek-Jakes Branch	Yes
S-004	Henry	652	Perennial	Duck Creek-Jakes Branch	Yes
S-005	Henry	345	Perennial	Duck Creek-Dry Fork	Yes
S-006	Henry	1,152	Perennial	Montgomery Creek-Headwaters	Yes
S-007	Henry	561	Perennial	Duck Creek-Jakes Branch	Yes
S-008	Henry	447	Perennial	Duck Creek-Jakes Branch	Yes
S-009	Henry	302	Perennial	Fall Creek-Sugar Creek/Deer Creek	Yes
S-010	Henry	262	Perennial	Fall Creek-Sugar Creek/Deer Creek	Yes
S-012	Henry	698	Perennial	Sugar Creek-Pee Dee Ditch	Yes
S-013	Henry	114	Intermittent	Six Mile Creek - Headwaters	Yes
S-014	Henry	1,694	Perennial	Sugar Creek-Pee Dee Ditch	Yes
S-018	Henry	1,572	Intermittent	Duck Creek-Jakes Branch	Yes
S-020	Henry	958	Perennial	Montgomery Creek-Headwaters	Yes
S-021	Henry	319	Perennial	Sugar Creek-Pee Dee Ditch	Yes
S-022	Henry	369	Perennial	Duck Creek-Dry Fork	Yes
S-027	Henry	365	Perennial	Duck Creek-Dry Fork	Yes
S-030	Henry	2,489	Perennial	Duck Creek-Jakes Branch	Yes
S-031	Henry	760	Perennial	Duck Creek-Jakes Branch	Yes
<b>Total</b>		<b>15,066</b>			

Pond ID	County	Acres	Type	Drainage Basin	Jurisdictional Recommendation
P-001	Henry	0.05	PUB	Sugar Creek-Pee Dee Ditch	No
<b>Total</b>		<b>0.05</b>			



## 4 Conclusions

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The Project Corridor was dominated by agricultural land use (cultivated crops). The history of land conversion for farming and other landscape manipulation to support farming operations has reduced the land available for surface waters to develop. The small forested portions of the Project Corridor occurred as small sparse woodlots located between crop fields or as windrows along historic property boundaries. The quality of streams was consistently low across all delineated waterbodies. The higher quality streams exhibited greater channel development, less evidence of disturbance or modification, and moderate quality habitat in the riparian buffer. The 16 wetlands identified in the Project Corridor occurred in depressional areas in forested areas or agricultural fields.

Cardno delineated 21 waterbodies, 20 of which were identified as streams and one was identified as a pond. The 20 streams are expected to be jurisdictional due to their hydrologic connectivity to a potential WOTUS.

During the field surveys, Cardno did not observe any federal RTE species in the Project Corridor or vicinity. One State Endangered species was observed. A Short-eared Owl (*Asio flammeus*) was flushed from the project corridor. The relative sparseness of the woodlots and fragmentation of wooded habitats by roads, residential land use, and farm fields reduces the likelihood of significant wildlife occurring in the Project Corridor.

The findings of this investigation represent a study of the Project Corridor for non-tidal wetlands and waterbodies. The findings depend on the season, the conditions at that time of year, site-specific influences (e.g. anthropogenic disturbance), and individual professional judgment. This report represents a professional estimate of the Project Corridor wetlands and waterbodies based upon available information and techniques. Final verification of their boundaries for regulatory purposes can only be completed through a Jurisdictional Determination (JD) review by the USACE or its duly appointed representative.

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